United States Department of Agriculture

Soil Conservation Service

In cooperation with North Carolina Department of Natural Resources and Community Development, North Carolina Agricultural Research Service, North Carolina Agricultural Extension Service, and Bladen County Board of Commissioners

Soil Survey of Bladen County, North Carolina

How To Use This Soil Survey

General Soil Map

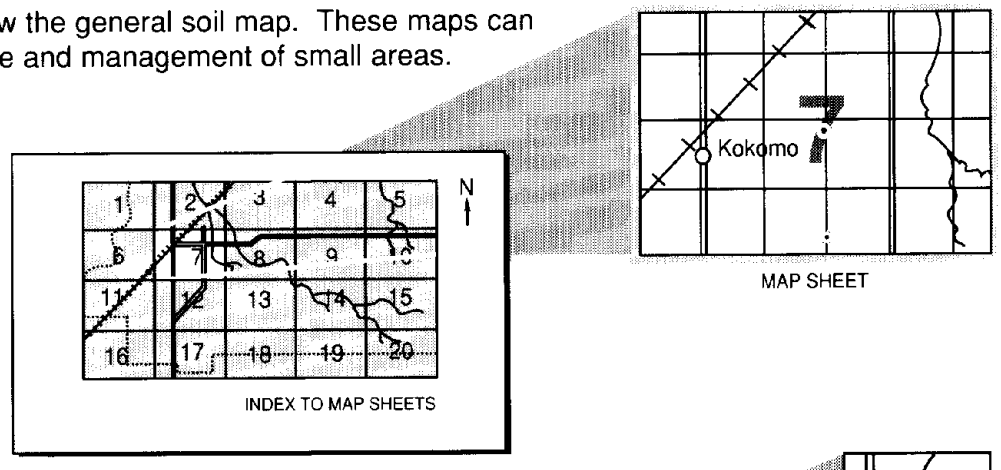
The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

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

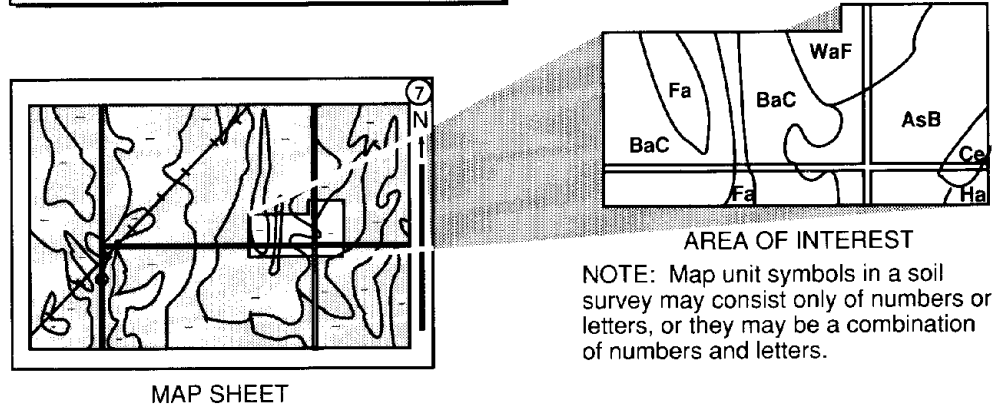
Detailed Soil Maps

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

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



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



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

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

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

The first soil survey of Bladen County was published in 1915. This survey updates the first soil survey and provides additional information.

Major fieldwork for this soil survey was completed in 1983. Soil names and descriptions were approved in 1983. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1983. This soil survey was made cooperatively by the Soil Conservation Service and the North Carolina Department of Natural Resources and Community Development, the North Carolina Agricultural Research Service, the North Carolina Agricultural Extension Service, and the Bladen County Board of Commissioners. It is part of the technical assistance furnished to the Bladen County Soil and Water Conservation District.

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

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

Cover: Corn stubble has been disked into Rains fine sandy loam in Bladen County. Drainage is necessary for optimum production of crops on this soil.

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Issued July 1990

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Foreword

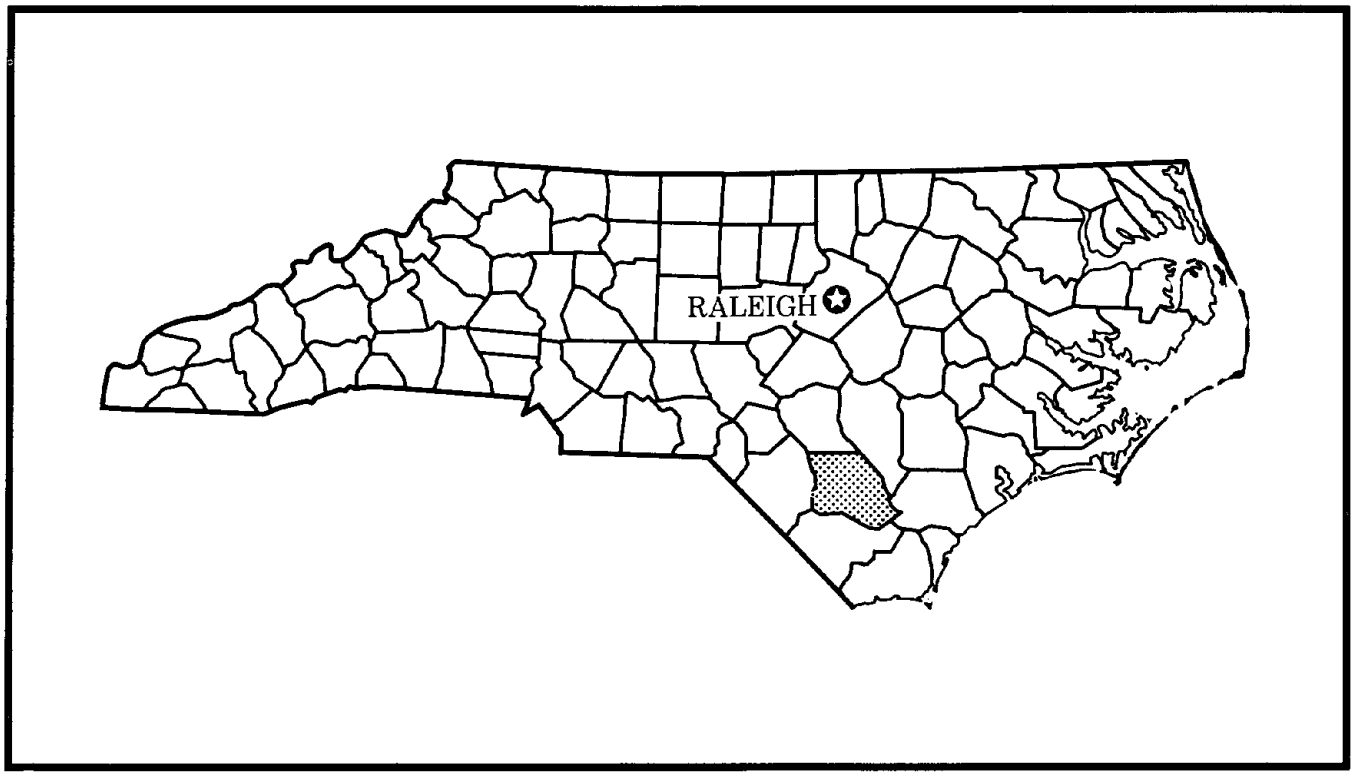
This soil survey contains information that can be used in land-planning programs in Bladen County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact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

Bobbye Jack Jones
State Conservationist
Soil Conservation Service



Location of Bladen County in North Carolina.

Soil Survey of Bladen County, North Carolina

By Roger J. Leab, Soil Conservation Service

Soils surveyed by Roger J. Leab, Willie E. Spruill, William E. Woody, and Mark S. Hudson, Soil Conservation Service; and Russell A. Rebertus and Willard R. Dunlop, Jr., North Carolina Department of Natural Resources and Community Development

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

BLADEN COUNTY is an agricultural county in southeastern North Carolina. It has a total area of 568,205 acres, or 888 square miles. It is bounded on the north by Cumberland County, on the northeast along the South and Black Rivers by Sampson County, on the east by Pender County, on the south by Columbus County, and on the west along the Big Swamp by Robeson County.

According to the 1980 census, the population of Bladen County was 30,069. The county seat is Elizabethtown, which is by the Cape Fear River near the center of the county. Other towns in the county are Tar Heel and Dublin in the western part, White Lake in the central part, Bladenboro and Clarkton in the southern part, and East Arcadia in the eastern part.

General Nature of the Survey Area

This section gives general information concerning the settlement of Bladen County and the physiography, relief, drainage, and climate of the area.

Settlement

Bladen County was first settled about 1734 by Highland Scots who came to the Cape Fear Valley seeking religious freedom *(12)*. Settlement was along the Cape Fear River and its tributaries but soon spread to the fertile farmlands to the south and west and to the northern areas where longleaf pine was abundant.

The early economy depended on natural resources, such as soil and water. The main source of income was lumber products and naval stores from the abundant stands of longleaf pine *(16)*. As agriculture increased, cotton became the leading source of income. In the late 1800's, tobacco replaced cotton as the leading income producer. Today, Bladen County's economy still depends on soil and water. Agriculture leads the economy. The main crops are tobacco, corn, soybeans, peanuts, and blueberries. Forestry is second in the economy, and 70 percent of the county is woodland.

Physiography, Relief, and Drainage

Bladen County lies in two broad physiographic regions, the Southern Coastal Plain and, to a lesser extent, the Atlantic Coast Flatwoods.

The southwestern half of the county lies mostly on the Sunderland geomorphic surface, where the elevation is 100 to 155 feet. The soils are predominantly nearly level to gently sloping; however, along the Cape Fear River and its tributaries, the soils are often steep. The extreme southeastern part of the county is on the Wicomico geomorphic surface, where

the elevation is 42 to 100 feet. The soils are predominantly nearly level.

The northeastern half of the county was formed as part of the Sunderland and Wicomico geomorphic surfaces but has since been completely altered by stream development, wind action, and the formation of Carolina bays. The elevation of this part of the county ranges from 10 feet in the southern part to 110 feet in the northern part. The soils are nearly level to gently sloping.

The Cape Fear River is the largest stream in the county and flows from northwest to southeast through the approximate center of the county. Harrison Creek, Ellis Creek, and Turnbull Creek flow south into the Cape Fear River in the northern part of the county. Hammond Creek and Carvers Creek flow into it from the southern part of the county. The South and Black Rivers form the eastern boundary of Bladen County with Sampson County. The Big Swamp forms the western boundary with Robeson County, and Crawley Swamp and Bryant Swamp flow into it. In the southern part of the county, Brown Marsh Swamp flows south into Columbus County. In the northeastern part of the county, Colly Creek and Lyon Swamp flow southeast into Pender County.

Bladen County is marked by shallow, oval depressions known as Carolina bays. They are scattered throughout the county but are most abundant northeast of the Cape Fear River. The Carolina bays range from less than 1 acre to more than 1,000 acres. During wet seasons, water can pond for short periods. Several Carolina bays are ponded year-round to form natural lakes. White Lake, Bay Tree Lake, Singletary Lake, Jones Lake, Salters Lake, and Horseshoe Lake are examples.

Climate

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

Bladen County is hot and humid in summer, but the coast is frequently cooled by sea breezes. Winter is cool with occasionally 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 Elizabethtown Lock in the period 1957 to 1979. 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 45 degrees F, and the average daily minimum temperature is 33 degrees. The lowest temperature on record, which occurred at Elizabethtown Lock on January 17, 1977, is 6 degrees. In summer the average temperature is 77 degrees, and the average daily maximum temperature is 88 degrees. The highest recorded temperature, which occurred at Elizabethtown Lock on July 20, 1977, is 100 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 45 inches. Of this, 27 inches, or 60 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 23 inches. The heaviest 1-day rainfall during the period of record was 5.96 inches at Elizabethtown Lock on September 12, 1960. Thunderstorms occur on about 45 days each year, and most occur in summer.

The average seasonal snowfall is less than 2 inches. The greatest snow depth at any one time during the period of record was 4 inches.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 85 percent. The sun shines 65 percent of the time possible in summer and 60 percent in winter. The prevailing wind is from the south-southwest. Average windspeed is highest, 11 miles per hour, in early spring.

Every few years a hurricane crosses the area.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; and the kinds of crops and native plants growing on the soils. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material from which the soil formed. The

unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

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

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

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

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

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

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

Map Unit Composition

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

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and

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

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

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, 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 a building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Dominantly Excessively Drained to Very Poorly Drained Soils; on Broad Smooth Uplands

1. Norfolk-Goldsboro-Rains

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

These soils are on broad ridges, broad flats, and in irregularly shaped or oval depressions in the southwestern half of the county and on old, high stream terraces in the northern part of the county.

This map unit makes up 19 percent of the county. It is about 21 percent Norfolk soils, 18 percent Goldsboro soils, 12 percent Rains soils, and 49 percent soils of minor extent. The minor soils are Autryville, Aycock, Blanton, Butters, Coxville, Exum, Foreston, Grantham, Gritney, Johnston, Lynchburg, Nahunta, Ocilla, Pantego, Stallings, Toisnot, Torhunta, Wagram, and Woodington soils.

Norfolk soils are well drained. They are on broad flats and smooth side slopes. The surface layer is grayish brown loamy fine sand, and the subsurface layer is light yellowish brown loamy fine sand. The subsoil is yellowish brown sandy clay loam.

Goldsboro soils are moderately well drained. They are on smooth to slightly convex slopes on broad flats and on ridges. The surface layer is dark grayish brown sandy loam. The subsoil is yellowish brown sandy loam in the upper part, yellowish brown sandy clay loam in the middle part, and gray sandy clay loam in the lower part.

Rains soils are poorly drained. They are in shallow depressions and along drainageways. The surface layer is very dark gray fine sandy loam, and the subsurface layer is gray fine sandy loam. The subsoil is sandy clay loam. It is gray in the upper part and light gray in the lower part.

The soils in this map unit are used mainly as cropland. In some areas they are used as woodland or pasture. A seasonal high water table in Goldsboro and Rains soils is a limitation affecting crop production. This limitation generally can be overcome by a drainage system. Wind erosion is a hazard on Norfolk soils. Water erosion can be an additional hazard on the more sloping Norfolk soils. Wetness is the main limitation affecting urban and recreational uses.

2. Rains-Lynchburg-Goldsboro

Nearly level and gently sloping, poorly drained, somewhat poorly drained, and moderately well drained soils that have a loamy surface layer and a loamy subsoil

These soils are on broad flats, in irregularly shaped or oval depressions, and on broad ridges in the southwestern and southeastern parts of the county.

This map unit makes up 9 percent of the county. It is about 30 percent Rains soils, 16 percent Lynchburg soils, 14 percent Goldsboro soils, and 40 percent soils of minor extent. The minor soils are Coxville, Exum, Foreston, Grantham, Nahunta, Norfolk, Ocilla, Pantego, Stallings, Toisnot, Torhunta, and Woodington soils.

Rains soils are poorly drained. They are in shallow depressions and along drainageways. The surface layer

is very dark gray fine sandy loam, and the subsurface layer is gray fine sandy loam. The subsoil is sandy clay loam. It is gray in the upper part and light gray in the lower part.

Lynchburg soils are somewhat poorly drained. They are on broad, smooth flats. The surface layer is very dark gray fine sandy loam. The subsoil is sandy clay loam. It is yellowish brown in the upper part, gray in the middle part, and mottled gray and brown in the lower part.

Goldsboro soils are moderately well drained. They are on smooth to slightly convex slopes on broad flats and on ridges. The surface layer is dark grayish brown sandy loam. The subsoil is yellowish brown sandy loam in the upper part, yellowish brown sandy clay loam in the middle part, and gray sandy clay loam in the lower part.

The soils in this map unit are used about equally as woodland and cropland. In a few areas they are used as pastureland. A seasonal high water table is the major limitation affecting most agricultural, urban, and recreational uses. A drainage system can be installed to lower the water table; however, drainage outlets are often difficult to establish in areas of these soils, particularly in the Rains soils.

3. Exum-Nahunta-Grantham

Nearly level and gently sloping, moderately well drained, somewhat poorly drained, and poorly drained soils that have a loamy surface layer and a loamy subsoil

These soils are on broad upland flats and in irregularly shaped depressions in the southern part of the county and on old, high stream terraces in the northern part.

This map unit makes up 7 percent of the county. It is about 25 percent Exum soils, 18 percent Nahunta soils, 15 percent Grantham soils, and 42 percent soils of minor extent. The minor soils are Aycock, Coxville, Goldsboro, Lynchburg, Pantego, Rains, Stallings, Torhunta, and Woodington soils.

Exum soils are moderately well drained. They are on broad flats. The surface layer is dark gray very fine sandy loam. The subsoil is brownish yellow loam in the upper part, yellowish brown clay loam in the middle part, and gray clay loam in the lower part.

Nahunta soils are somewhat poorly drained. They are on broad flats. The surface layer is dark gray very fine sandy loam. The subsoil is olive yellow loam and clay loam in the upper part, gray clay loam in the middle part, and light gray clay loam in the lower part.

Grantham soils are poorly drained. They are on broad flats and in irregularly shaped depressions. The surface layer is very dark gray very fine sandy loam. The subsoil is light brownish gray loam and clay loam in the upper part, gray clay loam in the middle part, and light brownish gray loam in the lower part.

The soils in this map unit are used about equally as woodland and cropland. In a few areas they are used as pastureland. A seasonal high water table is the main limitation affecting most agricultural, urban, and recreational uses. A drainage system can be used to lower the water table.

4. Wagram-Norfolk-Blanton

Nearly level and gently sloping, well drained and moderately well drained soils that have a sandy surface layer and a loamy subsoil

These soils are on broad ridges and side slopes on the south side of the Cape Fear River in the central part of the county.

This map unit makes up 3 percent of the county. It is about 30 percent Wagram soils, 18 percent Norfolk soils, 7 percent Blanton soils, and 45 percent soils of minor extent. The minor soils are Autryville, Wakulla, Duplin, Gritney, Goldsboro, and Rains soils.

Wagram soils are well drained. They are on broad, smooth flats and on hillsides. The surface layer is grayish brown fine sand, and the subsurface layer is pale yellow fine sand. The subsoil is yellowish brown sandy clay loam.

Norfolk soils are well drained. They are on broad flats, convex ridges, and smooth side slopes. The surface layer is grayish brown loamy fine sand, and the subsurface layer is light yellowish brown loamy fine sand. The subsoil is yellowish brown sandy clay loam.

Blanton soils are moderately well drained. They are on broad uplands and rounded side slopes. The surface layer is brown sand. The subsurface layer is very pale brown sand in the upper part, light yellowish brown and pale brown sand in the middle part, and white sand in the lower part. The subsoil is yellowish brown sandy clay loam and sandy loam.

About half of the soils in this map unit are used as cropland. The rest is woodland or pastureland. Wind erosion is a hazard in large open areas, and blowing sand often damages young plants. Droughtiness and leaching of plant nutrients in the Blanton soils and in some areas of the Wagram soils are limitations affecting agricultural uses to some degree. Also, the thick, sandy surface layer of the Blanton and Wagram soils are limitations affecting some urban and recreational uses. Lawns and shrubs can be difficult to

establish and maintain because of the droughtiness and leaching of nutrients.

5. Autryville-Wakulla-Lakeland

Nearly level and gently sloping, well drained to excessively drained soils that have a sandy surface layer and a loamy subsoil or that are sandy throughout

These soils are on broad upland ridges and stream terraces along the western edge and north-central part of the county.

This map unit makes up 3 percent of the county. It is about 24 percent Autryville soils, 14 percent Wakulla soils, 11 percent Lakeland soils, and 51 percent soils of minor extent. The minor soils are Butters, Blanton, Foreston, Goldsboro, Norfolk, and Wagram soils.

Autryville soils are well drained. They are on broad flats. The surface layer is dark grayish brown loamy sand, and the subsurface layer is light yellowish brown loamy sand. The subsoil is yellowish brown sandy loam in the upper part, yellowish brown sand in the middle part, and brownish yellow sandy loam in the lower part.

Wakulla soils are somewhat excessively drained. They are on broad ridges and stream terraces. The surface layer is grayish brown sand, and the subsurface layer is light yellowish brown sand. The subsoil is yellowish brown loamy sand. The underlying material is yellow and very pale brown sand.

Lakeland soils are excessively drained. They are on broad uplands and narrow ridges along stream terraces. The surface layer is very dark grayish brown sand. The underlying material is yellowish brown and brownish yellow sand in the upper part, yellow sand in the middle part, and very pale brown sand in the lower part.

About half of the soils in this map unit are used as woodland. The rest is pastureland or cropland. Droughtiness and leaching of nutrients are the main limitations affecting most cultivated crops. Peanuts and tobacco grow fairly well on the Autryville soils. Rapid permeability, which results in poor filtration of sewage effluent, and a seasonal high water table in Autryville soils are limitations affecting homesites that require septic tank absorption fields. Lawns and shrubs can be difficult to maintain because of the droughtiness and the rapid leaching of plant nutrients.

6. Foreston-Woodington-Torhunta

Nearly level, moderately well drained, poorly drained, and very poorly drained soils that have a sandy or loamy surface layer and a loamy subsoil

These soils are on broad ridges and in irregularly shaped and oval depressions in the southwestern, southeastern, and northeastern parts of the county.

This map unit makes up 6 percent of the county. It is about 20 percent Foreston soils, 19 percent Woodington soils, 18 percent Torhunta soils, and 43 percent soils of minor extent. The minor soils are Butters, Coxville, Goldsboro, Lynchburg, Ocilla, Rains, and Stallings soils.

Foreston soils are moderately well drained. They are on broad uplands and on rims of Carolina bays. The surface layer is dark grayish brown loamy sand. The subsoil is yellowish brown and light yellowish brown sandy loam in the upper part and light gray loamy sand in the lower part.

Woodington soils are poorly drained. They are on broad, smooth flats and in depressions on uplands. The surface layer is very dark gray loamy sand, and the subsurface layer is light brownish gray loamy sand. The subsoil is gray sandy loam in the upper part, light brownish gray sandy loam in the middle part, and light gray loamy sand in the lower part.

Torhunta soils are very poorly drained. They are on broad flats and in depressions and drainageways. The surface layer is black mucky sandy loam. The subsurface layer is black sandy loam. The subsoil is dark grayish brown sandy loam and loamy sand. The underlying material is light brownish gray loamy sand and light gray sand.

About two-thirds of the soils in this map unit are used as woodland. The rest is mainly cropland or pastureland. Wetness, caused by a high seasonal water table, is the main limitation affecting crop production. When these soils are adequately drained, droughtiness can be a problem during dry periods. Wetness and seepage are the main limitations affecting urban uses, and wetness limits most recreational uses.

Dominantly Well Drained and Moderately Well Drained Soils; on Dissected Uplands

7. Gritney-Norfolk-Goldsboro

Nearly level to strongly sloping, well drained and moderately well drained soils that have a loamy or sandy surface layer and a clayey or loamy subsoil

These soils are on short choppy slopes, knolls, and low ridgecrests on the south side of the Cape Fear River in the central part of the county.

This map unit makes up 2 percent of the county. It is about 45 percent Gritney soils, 10 percent Norfolk soils, 8 percent Goldsboro soils, and 37 percent soils of minor extent. The minor soils are Exum, Wagram, Foreston, Autryville, Duplin, and Aycock soils.

Gritney soils are well drained and moderately well drained. They are on knolls, ridges, and side slopes. The surface layer is dark grayish brown fine sandy loam. The subsurface layer is light yellowish brown fine sandy loam. The subsoil is yellowish brown sandy clay and clay in the upper part and mottled gray, yellowish brown, reddish yellow, and dark red clay in the lower part. The underlying material is brownish yellow clay.

Norfolk soils are well drained. They are on convex ridges and side slopes. The surface layer is grayish brown loamy fine sand, and the subsurface layer is light yellowish brown loamy fine sand. The subsoil is yellowish brown sandy clay loam.

Goldsboro soils are moderately well drained. They are on convex side slopes. The surface layer is dark grayish brown sandy loam. The subsoil is yellowish brown sandy loam in the upper part, yellowish brown sandy clay loam in the middle part, and gray sandy clay loam in the lower part.

About half of the soils in this map unit are used as cropland. The rest is woodland or pastureland. Water erosion is a hazard in some of the more sloping areas. Slow permeability, high shrink-swell potential, and wetness are limitations affecting some urban and recreational uses.

Dominantly Well Drained to Very Poorly Drained Soils; on Stream Terraces and Flood Plains That Are Subject to Flooding

8. Congaree-Roanoke-Altavista

Nearly level and gently sloping, well drained, poorly drained, and moderately well drained soils that have a loamy surface layer underlain by loamy material or a loamy or clayey subsoil; rarely to frequently flooded

These soils bisect the county northwest to southeast along the Cape Fear River and are also in a few small isolated areas northeast of the river.

This map unit makes up 7 percent of the county. It is about 20 percent Congaree soils, 12 percent Roanoke soils, 9 percent Altavista soils, and 59 percent soils of minor extent. The minor soils are Chewacla, Chastain, Wickham, Augusta, Portsmouth, Dogue, Wahee, Cape Fear, Leon, Lynn Haven, Centenary, and Lakeland soils.

Congaree soils are well drained and moderately well drained. They are on flood plains. The surface layer is dark brown silt loam. The underlying material is brown silt loam in the upper part and brown and strong brown silty clay loam in the lower part.

Roanoke soils are poorly drained. They are on low flats and in depressions and along drainageways on terraces. The surface layer is very dark grayish brown loam. The subsoil is dark grayish brown loam in the upper part, dark gray and light brownish gray clay in the middle part, and light brownish gray sandy clay loam in the lower part. The underlying material is light brownish gray sandy loam and sand.

Altavista soils are moderately well drained. They are on terraces. The surface layer is dark yellowish brown fine sandy loam, and the subsurface layer is yellowish brown fine sandy loam. The subsoil is yellowish brown sandy clay loam in the upper part and yellowish brown sandy clay loam and sandy loam in the lower part. The lower part of the subsoil has gray mottles. The underlying material is light brownish gray and strong brown loamy sand in the upper part and gray loamy sand in the lower part.

The soils in this map unit are used mainly as woodland. In some areas they are used as pastureland or cropland. Wetness and the hazard of flooding are the main limitations affecting agricultural uses. Most cultivated areas of Roanoke and Altavista soils are drained and are used for corn and soybeans. Congaree soils are subject to frequent flooding and generally are not used for cultivated crops. Wetness and the hazard of flooding are also limitations affecting most urban and recreational uses.

9. Wasda-Torhunta-Croatan

Nearly level, very poorly drained soils that have a muck surface layer and a loamy subsoil or underlying material or have a loamy surface layer underlain by a loamy and sandy subsoil; rarely to frequently flooded

These soils are on broad flats, in depressions, and on low terraces in the eastern part of the county around the Kelly community.

This map unit makes up 2 percent of the county. It is about 34 percent Wasda soils, 14 percent Torhunta soils, 13 percent Croatan soils, and 39 percent soils of minor extent. The minor soils are Portsmouth, Pamlico, Dorovan, Lynn Haven, Leon, and Woodington soils.

Wasda soils are very poorly drained. They are on smooth to slightly concave slopes on low terraces. The surface layer is black and very dark brown muck, and the subsurface layer is very dark grayish brown sandy loam. The subsoil is dark grayish brown sandy clay loam. The underlying material is dark grayish brown loamy sand and light brownish gray sand.

Torhunta soils are very poorly drained. They are in depressions and drainageways on broad flats. The surface layer is black mucky sandy loam, and the

subsurface layer is black sandy loam. The subsoil is dark grayish brown sandy loam and loamy sand. The underlying material is light brownish gray loamy sand and light gray sand.

Croatan soils are very poorly drained. They are in depressions on flood plains and low terraces. The surface layer is black muck in the upper part and very dark grayish brown muck in the lower part. The subsurface layer is brown loam. The underlying material is brown clay loam.

The soils in this map unit are used mainly as cropland. In some areas they are used as woodland or pastureland. Wetness, the hazard of flooding, low strength, and high acidity are the main limitations affecting agricultural uses. In most areas these soils have been extensively drained and are cropped to corn and soybeans. Wetness, the hazard of flooding, and low strength are also limitations affecting urban and recreational uses.

10. Roanoke-Wahee

Nearly level, poorly drained and somewhat poorly drained soils that have a loamy surface layer and a clayey subsoil; rarely flooded

These soils are on broad flats and in broad, shallow depressions several miles northeast of and roughly paralleling the Cape Fear River.

This map unit makes up 2 percent of the county. It is about 53 percent Roanoke soils, 20 percent Wahee soils, and 27 percent soils of minor extent. The minor soils are Cape Fear, Dogue, Exum, Goldsboro, Grantham, Lynchburg, Nahunta, Rains, and Torhunta soils.

Roanoke soils are poorly drained. They are on flats and in depressions and drainageways on stream terraces. The surface layer is very dark grayish brown loam. The subsoil is dark grayish brown loam in the upper part, dark gray and light brownish gray clay in the middle part, and light brownish gray sandy clay loam in the lower part. The underlying material is light brownish gray sandy loam and sand.

Wahee soils are somewhat poorly drained. They are on flats and in depressions and drainageways on stream terraces. The surface layer is dark grayish brown loam. The subsoil is grayish brown clay in the upper part and light brownish gray clay in the lower part. The underlying material is light brownish gray sandy clay loam and light gray sandy loam.

The soils in this map unit are used mainly as woodland. In some areas they are used as cropland or pastureland. Wetness is the main limitation affecting crop production. If drained, these soils can be used for corn and soybeans. Wetness, the hazard of flooding, and slow permeability are the main limitations affecting urban and recreational uses.

11. Johns-Paxville-Johnston

Nearly level, moderately well drained and very poorly drained soils that have a loamy surface layer and a loamy subsoil or loamy and sandy underlying material; rarely to frequently flooded

These soils are on low ridges, in depressions, on irregularly shaped flats, and on flood plains along the eastern edge and in the north-central part of the county.

This map unit makes up 3 percent of the county. It is about 15 percent Johns soils, 12 percent Paxville soils, 9 percent Johnston soils, and 64 percent soils of minor extent. The minor soils are Cape Fear, Centenary, Croatan, Dogue, Dorovan, Kalmia, Kenansville, Leon, Lynn Haven, Torhunta, Wahee, and Wakulla soils.

Johns soils are moderately well drained. They are on stream terraces. The surface layer is dark grayish brown fine sandy loam, and the subsurface layer is pale brown fine sandy loam. The subsoil is yellowish brown sandy clay loam in the upper part, light brownish gray sandy clay loam in the middle part, and light brownish gray fine sandy loam in the lower part. The underlying material is light brownish gray loamy sand in the upper part and white sand in the lower part.

Paxville soils are very poorly drained. They are on stream terraces. The surface layer is very dark brown sandy loam. The subsoil is very dark gray sandy loam in the upper part, dark grayish brown sandy clay loam in the middle part, and dark grayish brown sandy loam in the lower part. The underlying material is light gray sand.

Johnston soils are very poorly drained. They are on flood plains. The surface layer is black mucky loam. The underlying material is dark gray fine sandy loam in the upper part and fine sand in the lower part.

The soils in this map unit are used mainly as woodland. In some areas they are used as cropland or pastureland. Wetness and the hazard of flooding are limitations affecting crop production. If drained, Johns and Paxville soils can be used as cropland. Johnston soils are subject to frequent flooding and generally are not used as cropland. Wetness and the hazard of flooding are limitations affecting urban and recreational uses.

12. Croatan-Dorovan

Nearly level, very poorly drained soils that have muck

surface and subsurface layers underlain by loamy material or that are muck throughout; frequently flooded

These soils are along major drainageways north of the Cape Fear River and in the western part of the county.

This map unit makes up 3 percent of the county. It is about 48 percent Croatan soils, 40 percent Dorovan soils, and 12 percent soils of minor extent. The minor soils are Johnston, Pamlico, Lynn Haven, and Torhunta soils.

Croatan soils are very poorly drained. They are on flood plains. The surface layer is black muck. The underlying material is very dark grayish brown mucky sandy loam and grayish brown sandy loam in the upper part, grayish brown sandy clay loam in the middle part, and light brownish gray sand in the lower part.

Dorovan soils are very poorly drained. They are on flood plains. The surface layer is very dark gray muck in the upper part and black muck in the lower part. The underlying material is dark gray fine sandy loam and dark grayish brown fine sand.

Nearly all areas of these soils are used as woodland. A small acreage is used as cropland. Wetness, low strength, and the hazard of frequent flooding are limitations affecting nearly all agricultural, urban, and recreational uses.

13. Wilbanks-Grifton-Meggett

Nearly level, very poorly drained and poorly drained soils that have a loamy surface layer and a clayey or loamy subsoil; occasionally to frequently flooded

These soils are in the southern part of the county along the Brown Marsh and Elkton Swamps.

This map unit makes up 1 percent of the county. It is about 35 percent Wilbanks soils, 30 percent Grifton soils, 30 percent Meggett soils, and 5 percent soils of minor extent. The minor soils are Coxville, Grantham, Johnston, Lynchburg, and Rains soils.

Wilbanks soils are very poorly drained. They are on flood plains. The surface layer is very dark gray loam in the upper part and black clay loam in the lower part. The subsoil is dark gray clay in the upper part, grayish brown clay loam in the middle part, and dark grayish brown fine sandy loam in the lower part. The underlying material is dark grayish brown loamy sand.

Grifton soils are poorly drained. They are on flood plains, low terraces, and adjacent flats. The surface layer is very dark grayish brown fine sandy loam, and the subsurface layer is light brownish gray fine sandy loam. The subsoil is light brownish gray fine sandy loam and sandy clay loam. The underlying material is light brownish gray fine sandy loam.

Meggett soils are poorly drained. They are on flood plains, low terraces, and adjacent flats. The surface layer is very dark grayish brown fine sandy loam, and the subsurface layer is grayish brown loamy fine sand. The subsoil is gray clay and sandy clay. The underlying material is gray fine sandy loam and light brownish gray fine sand.

The soils in this map unit are used mainly as woodland. In some areas they are used as pastureland or cropland. The hazard of flooding and wetness are the main limitations affecting agricultural uses. Grifton and Meggett soils on terraces can be drained and cultivated to corn and soybeans. Wetness, the hazard of flooding, and slow permeability are limitations affecting urban and recreational uses.

Dominantly Excessively Drained to Very Poorly Drained Soils; in Carolina Bays, on Adjacent Uplands, and on Terraces

14. Centenary-Lakeland-Wakulla

Nearly level to gently sloping, moderately well drained, excessively drained, and somewhat excessively drained soils that are sandy throughout

These soils are on broad ridges and gently rolling uplands north of the Cape Fear River and are scattered from the north-central to the southeastern parts of the county.

This map unit makes up 7 percent of the county. It is about 35 percent Centenary soils, 30 percent Lakeland soils, 10 percent Wakulla soils, and 25 percent soils of minor extent. The minor soils are Kenansville, Kureb, Leon, and Lynn Haven soils.

Centenary soils are moderately well drained. They are on broad, smooth flats on uplands and terraces. The surface layer is dark grayish brown sand. The subsurface layer is yellowish brown sand in the upper part, brownish yellow and pale brown sand in the middle part, and white sand in the lower part. The subsoil is dark grayish brown and very dark gray loamy sand.

Lakeland soils are excessively drained. They are on ridges, terraces, and Carolina bay rims. The surface layer is very dark grayish brown sand. The underlying material is yellowish brown and brownish yellow sand in the upper part, yellow sand in the middle part, and very pale brown sand in the lower part.

Wakulla soils are somewhat excessively drained. They are on broad ridges and on terraces. The surface layer is grayish brown sand, and the subsurface layer is light yellowish brown sand. The subsoil is yellowish brown loamy sand. The underlying material is yellow and very pale brown sand.

The soils in this map unit are used mainly as woodland. In some areas they are used as pastureland or cropland. Droughtiness, leaching of nutrients, and susceptibility to wind erosion are limitations affecting agricultural uses. Rapid permeability, which results in poor filtration of sewage effluent, limits the suitability of this soil for homesites that require septic tank absorption fields. Lawns and shrubs are difficult to establish and maintain because of droughtiness and leaching of nutrients.

15. Lynn Haven-Pamlico-Leon

Nearly level, poorly drained and very poorly drained soils that are sandy throughout or have muck surface and subsurface layers underlain by sandy material

These soils are on broad flats and in Carolina bays north of the Cape Fear River. A few isolated areas of these soils are in the southern part of the county.

This map unit makes up about 26 percent of the county. It is about 21 percent Lynn Haven soils, 21 percent Pamlico soils, 19 percent Leon soils, and 39 percent soils of minor extent. The minor soils are Centenary, Lakeland, Autryville, Butters, Croatan, Dorovan, Foreston, Johnston, Kenansville, Kureb, Ocilla, Stallings, Torhunta, Wakulla, and Woodington soils.

Lynn Haven soils are poorly drained. They are on low flats and in depressions on uplands and in Carolina bays. The surface layer is black sand, and the subsurface layer is dark grayish brown sand. The subsoil is organically stained sand. It is black and very dark grayish brown in the upper part and reddish black in the lower part.

Pamlico soils are very poorly drained. They are in Carolina bays and in depressions on terraces. The surface layer is black muck in the upper part and very dark gray muck in the lower part. The underlying material is very dark grayish brown sand and loamy sand.

Leon soils are poorly drained. They are on flats and in Carolina bays. The surface layer is very dark gray sand. The subsurface layer is grayish brown sand in the upper part and white sand in the lower part. The organically stained subsoil is very dark brown loamy sand in the upper part and black sand in the lower part.

The soils in this map unit are used mainly as woodland. In some areas they are used as cropland or pastureland. Wetness, droughtiness, low strength, and high acidity are limitations affecting agricultural uses; however, the Leon soils are suitable for some varieties of blueberries. Wetness and low strength in the Pamlico soils are limitations affecting most urban and recreational uses, and wetness and excess sand are limitations of the Leon and Lynn Haven soils.

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. All soils in the survey area formed in sediments deposited by the ocean, streams, lakes, or wind.

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, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Norfolk loamy fine sand, 0 to 2 percent slopes, is one of several phases in the Norfolk series.

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

A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Grifton-Meggett complex is an example.

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

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

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.

AaA—Altavista fine sandy loam, 0 to 3 percent slopes. This moderately well drained soil is on terraces along the Cape Fear River. Individual areas of this soil are long and narrow or irregular in shape and range from 5 to 80 acres.

Typically, the surface layer is dark yellowish brown fine sandy loam about 5 inches thick. The subsurface layer to a depth of about 7 inches is yellowish brown fine sandy loam. The subsoil extends to a depth of about 39 inches. The upper part is yellowish brown sandy clay loam that has mottles in shades of brown and red. The lower part is yellowish brown sandy clay loam and sandy loam that has mottles in shades of brown, red, and gray. The underlying material is mottled light brownish gray and strong brown loamy sand in the upper part. The lower part to a depth of 70 inches is gray loamy sand that has mottles in shades of brown and red.

Permeability is moderate, and the available water capacity is moderate. This soil is very strongly acid to medium acid except where lime has been added. The seasonal high water table is at a depth of 1.5 to 2.5 feet. This soil is subject to rare flooding.

Included with this soil in mapping are small areas of Wickham, Dogue, Augusta, Wahee, and Roanoke soils. Wickham soils are on narrow ridges and are well drained. Augusta, Wahee, and Roanoke soils are in shallow depressions and along drainageways and are wetter than the Altavista soil. In addition, Wahee and Roanoke soils are more clayey. Dogue soils are more clayey and are scattered throughout the map unit. Also included are small areas of soils that have a thick, sandy surface layer and small areas of soils that have a thinner subsoil than is typical for the Altavista soil. The included soils make up less than 35 percent of this map unit.

This Altavista soil is used mainly as woodland. About a third of the acreage is in cultivated crops or pasture.

The main cultivated crops are corn, soybeans, small grains, and tobacco. Artificial drainage is needed in some areas of this soil for optimum growth of tobacco and other crops that require good drainage. Rare flooding can occur for brief periods in areas that are not protected.

This soil is good pastureland. Proper stocking, pasture rotation, timely deferment of grazing, and restricted use during wet periods help keep the pasture and soil in good condition.

The dominant trees are loblolly pine, sweetgum, white oak, water oak, willow oak, and southern red oak. The main understory includes American holly, blackgum, and sourwood. Some equipment use limitations can occur if trees are harvested or planted during wet periods.

This soil is limited for most urban and recreational uses because of wetness and rare flooding.

This Altavista soil is in capability subclass IIw. The woodland ordination symbol is 9W.

At—Augusta sandy loam. This somewhat poorly drained soil is on terraces along the Cape Fear River. Slopes range from 0 to 2 percent. Individual areas of this soil are long and narrow or irregular in shape and range from 5 to 50 acres.

Typically, the surface layer is dark grayish brown sandy loam about 8 inches thick. The subsoil to a depth of about 41 inches is sandy clay loam and fine sandy loam. It is yellowish brown in the upper part and light gray in the lower part. The underlying material to a depth of 70 inches is light gray sand.

Permeability is moderate in the subsoil and rapid in the underlying material. The available water capacity is moderate. This soil is very strongly acid to medium acid except where lime has been added. The seasonal high water table is at a depth of 1 to 2 feet. This soil is subject to rare flooding.

Included with this soil in mapping are small areas of Altavista, Dogue, Wahee, and Roanoke soils. Also included are some loamy soils that are wetter than the Augusta soil and some soils that are sandier. Altavista and Dogue soils are in slightly higher positions on the landscape than the Augusta soil and are better drained. Roanoke and other soils that are wetter than the Augusta soil are in slightly lower positions on the landscape. Wahee soils and the sandier soils are scattered throughout the map unit. In addition, Dogue, Roanoke, and Wahee soils are more clayey than Augusta soil. The included soils make up less than 35 percent of this map unit.

This Augusta soil is used mainly as woodland. It is also used as cropland or pastureland.

The main cultivated crops are corn, soybeans, and small grains. Artificial drainage is needed for optimum production. Rare flooding can occur for brief periods in areas that are not protected.

This soil can produce good hay and pasture, although wetness is a limitation. Proper stocking, pasture rotation, timely deferment of grazing, and restricted use during wet periods help keep the pasture and soil in good condition.

The dominant trees are loblolly pine, water oak, white oak, willow oak, red maple, and sweetgum. The main understory includes blackgum, American holly, and greenbrier. Some equipment use limitations can occur if trees are harvested or planted during wet periods.

This soil is limited for most urban and recreational uses because of wetness and rare flooding.

This Augusta soil is in capability subclass IIIw. The woodland ordination symbol is 9W.

AuA—Autryville loamy sand, 0 to 3 percent slopes. This well drained soil is on broad, smooth flats on uplands. It is most extensive along the western edge of the county and on uplands just south of the Cape Fear River. Individual areas of this soil are irregular in shape and range from 5 to 200 acres.

Typically, the surface layer is dark grayish brown loamy sand about 10 inches thick. The subsurface layer to a depth of about 24 inches is light yellowish brown loamy sand. The subsoil to a depth of about 38 inches is yellowish brown sandy loam. Another soil sequence begins at a depth of 38 inches. It is yellowish brown

sand to a depth of about 50 inches underlain by brownish yellow sandy loam to a depth of 62 inches.

Permeability is moderately rapid in the upper part of the subsoil and moderate in the lower part. The available water capacity is low. This soil is very strongly acid or strongly acid except where lime has been added. The seasonal high water table is at a depth of 4 to 6 feet. Wind erosion is a hazard.

Included with this soil in mapping are a few areas of similar soils that have a sand or loamy sand surface layer less than 20 inches thick. Also included are small areas of Blanton, Lakeland, Wakulla, Norfolk, Butters, and Wagram soils. Blanton, Lakeland, and Wakulla soils are more sandy than Autryville soil, and Norfolk and Butters soils are less sandy. Wagram soils have a more clayey subsoil. The included soils are on the edge of delineations or they are scattered throughout the map unit. Typically, only two or three of the included soils are in any one delineation. The included soils make up less than 20 percent of this map unit.

About half of the acreage of this Autryville soil is in cultivated crops. The rest is mainly woodland or pastureland.

The main crops are corn, soybeans, tobacco, peanuts, and small grains. Leaching of plant nutrients, soil blowing, and low available water capacity are the main limitations. Blowing sand can damage young plants. Winter cover crops, conservation tillage, and crop residue management help to maintain organic matter content and to conserve moisture. Conservation practices, such as no-tillage planting and windbreaks, and crop rotations that include close-growing crops also help to conserve soil and water. Fertilizer, particularly nitrogen, should be added in split applications.

The use of this soil for hay and pasture is effective in conserving soil and water. Droughtiness is the main limitation. Coastal bermudagrass and bahiagrass are the most suitable pasture plants.

The dominant trees are longleaf pine, loblolly pine, blackjack oak, and hickory. The main understory includes sassafras, flowering dogwood, and turkey oak. The thick, sandy surface layer causes equipment use problems and contributes to seedling mortality.

This soil is used for urban purposes, but there are some limitations. Lawns and shrubs can be difficult to establish and maintain because of leaching of plant nutrients and droughtiness. Ditchbanks and trench walls cave easily, and seepage often occurs. The thick, sandy surface layer is a limitation affecting some recreational uses.

This Autryville soil is in capability subclass IIs. The woodland ordination symbol is 7S.

AyB—Aycock very fine sandy loam, 1 to 4 percent slopes. This well drained soil is on broad, smooth flats on uplands. It is most extensive in the southern part of the county or on old stream terraces in the northern part. Individual areas of this soil are irregular in shape and range from 5 to 30 acres.

Typically, the surface layer is grayish brown very fine sandy loam about 4 inches thick. The subsurface layer to a depth of about 10 inches is light yellowish brown very fine sandy loam. The subsoil to a depth of 75 inches is clay loam. It is brownish yellow in the upper part, strong brown in the middle part, and brownish yellow and yellowish brown in the lower part.

Permeability is moderately slow to moderate, and the available water capacity is high. This soil is very strongly acid or strongly acid except where lime has been added. The seasonal high water table is at a depth of 4 to 6 feet.

Included with this soil in mapping are small areas of Gritney, Duplin, Exum, Norfolk, and Goldsboro soils. Gritney soils are on side slopes. Exum, Duplin, and Goldsboro soils are in slightly lower positions on the landscape than Aycock soil and are wetter. Norfolk soils are scattered throughout the map unit. Gritney and Duplin soils are more clayey than Aycock soil, and Goldsboro and Norfolk soils are less silty. The included soils make up less than 20 percent of this map unit.

This Aycock soil is used mainly for cultivated crops. In some areas it is used as woodland or pastureland.

The main cultivated crops are corn, soybeans, small grains, and tobacco. Winter cover crops, conservation tillage, and crop residue management help to control erosion and maintain tilth. Field borders and crop rotations that include close-growing crops also help to conserve soil and water. This soil produces good pasture and hay.

The dominant trees are loblolly pine, longleaf pine, southern red oak, white oak, and hickory. The main understory includes flowering dogwood, American holly, sourwood, and sassafras.

This soil is limited for some urban uses because of wetness and low strength. It has no major limitations affecting recreational uses.

This Aycock soil is in capability subclass IIe. The woodland ordination symbol is 9A.

BnB—Blanton sand, 2 to 7 percent slopes. This moderately well drained soil is in broad areas and to a lesser extent on rounded side slopes on uplands. It is most extensive in the southwestern part of the county along the Robeson County line and above the Cape Fear River bluff. Individual areas of this soil are

irregular in shape and range from 5 to 100 acres.

Typically, the surface layer is brown sand about 8 inches thick. The subsurface layer to a depth of about 60 inches is sand. It is very pale brown in the upper part, light yellowish brown and pale brown in the middle part, and white in the lower part. The subsoil extends to a depth of about 83 inches. It is yellowish brown sandy clay loam in the upper part. The lower part is yellowish brown sandy loam that has light gray mottles. The underlying material to a depth of 105 inches is light brownish gray sandy loam that has pockets of sandy clay loam.

Permeability is rapid in the surface and subsurface layers and moderate in the subsoil. The available water capacity is low. This soil is very strongly acid to medium acid in the surface and subsurface layers and very strongly acid or strongly acid in the subsoil and underlying material. The seasonal high water table is at a depth of 5 to 6 feet. Wind erosion is a hazard.

Included with this soil in mapping are small areas of Norfolk, Wagram, Autryville, Ocilla, Lakeland, and Wakulla soils. Ocilla soils are in lower positions on the landscape than Blanton soil, and the other included soils are scattered throughout the map unit. Norfolk, Wagram, Autryville, and Ocilla soils are less sandy than Blanton soil, and Lakeland and Wakulla soils are more sandy. In addition, Ocilla soils are wetter. Typically, no more than two or three of the included soils are in any one delineation. The included soils make up less than 20 percent of this map unit.

This Blanton soil is used mainly as woodland. It is also used as pastureland or cropland.

Corn, soybeans, peanuts, tobacco, and small grains are grown on this soil. The low available water capacity is a limitation affecting crop production. Conservation tillage, crop residue management, windbreaks, and close-growing grasses and legumes in the cropping system help to control soil blowing, reduce leaching, and conserve moisture. Coastal bermudagrass and bahiagrass are grown for hay and pasture.

The dominant trees are loblolly pine and longleaf pine. The main understory is blackjack oak and turkey oak. The thick, sandy surface layer limits equipment use and contributes to seedling mortality.

This soil is limited for some urban and recreational uses because of wetness and the thick, sandy surface layer. Lawns and shrubs can be difficult to establish and maintain because of leaching of plant nutrients and droughtiness. Seepage and caving of ditchbanks and trench walls are other management problems.

This Blanton soil is in capability subclass IIIs. The woodland ordination symbol is 8S.

BuA—Butters fine sand, 0 to 2 percent slopes. This well drained soil is on uplands. It is most extensive in the southwestern part of the county. Individual areas of this soil are irregular in shape and range from 5 to 80 acres.

Typically, the surface layer is dark grayish brown fine sand about 11 inches thick. The subsurface layer to a depth of about 18 inches is light yellowish brown fine sand. The subsoil to a depth of about 29 inches is yellowish brown fine sandy loam, and to a depth of 35 inches it is brownish yellow loamy fine sand. Another soil sequence begins at a depth of 35 inches. To a depth of about 48 inches it is yellow fine sand that has pockets of clean white sand and mottles in shades of yellow. The next layer is light gray fine sandy loam that has reddish yellow and brownish yellow mottles. Below that layer to a depth of 70 inches is brownish yellow fine sandy loam that has light gray mottles.

Permeability is moderately rapid, and the available water capacity is low. This soil is strongly acid or very strongly acid except where lime has been added. The seasonal high water table is at a depth of 4 to 5 feet. Wind erosion is a hazard.

Included with this soil in mapping are a few areas of Wagram, Wakulla, Autryville, Norfolk, and Foreston soils. Also included are areas of soils that do not have a bisequum. In some of these soils, the subsoil does not extend to a depth of 60 inches. Wagram, Wakulla, and Autryville soils are in higher positions on the landscape than Butters soil, and they are more sandy. Foreston soils are on the edge of delineations or in slight depressions and are wetter. Norfolk soils are intermixed and are less sandy. Typically, only two or three of the included soils are in any one delineation. The included soils make up less than 20 percent of this map unit.

This Butters soil is used mainly for cultivated crops. In some areas it is used as woodland or pastureland.

Corn, soybeans, tobacco, peanuts, and small grains are the main crops grown. Leaching of plant nutrients and low available water capacity are the main limitations affecting crop production. Conservation tillage, windbreaks, crop residue management, and winter cover crops reduce leaching of plant nutrients, conserve moisture, and help to control wind erosion.

The dominant trees are loblolly pine, longleaf pine, white oak, and southern red oak. The understory includes flowering dogwood, American holly, and sourwood. This soil has few limitations affecting woodland management.

This soil is limited for some urban uses because of wetness and seepage. The high sand content contributes to the seepage problem. Also, this soil is too

sandy for some recreational uses.

This Butters soil is in capability subclass IIs. The woodland ordination symbol is 9A.

By—Byars loam. This very poorly drained soil is on broad flats and in depressions on uplands. It is most extensive in the southern part of the county. Slopes are less than 2 percent. Individual areas of this soil are broad and irregular in shape and range from 5 to 80 acres.

Typically, the surface layer is black loam about 10 inches thick. The subsoil extends to a depth of about 70 inches. It is very dark gray clay loam in the upper part and dark grayish brown and dark gray clay in the middle part. The lower part is dark gray sandy clay that has pockets of loamy sand.

Permeability is slow. This soil is extremely acid to strongly acid except where lime has been added. The seasonal high water table is at or near the surface from winter to early in spring. Ponding is common during periods of heavy or extended rainfall.

Included with this soil in mapping are small areas of Coxville, Rains, and Pantego soils. Coxville and Rains soils are in slightly higher positions on the landscape than Byars soil and are better drained. Pantego soils are scattered throughout the map unit. Rains and Pantego soils are less clayey. The included soils make up less than 15 percent of this map unit.

This Byars soil is used mainly as woodland. In some areas it is drained and used for cultivated crops.

Because of the high water table, artificial drainage is necessary for crop production. Corn and soybeans are the main crops grown. Because of the high clay content and slow permeability, open ditches are the most common method of drainage.

Drainage is also necessary for maximum production of grasses and legumes for hay and pasture. Proper stocking, pasture rotation, timely deferment of grazing, and restricted use during wet periods help keep the pasture and soil in good condition. When the soil is too wet, grazing can cause surface compaction and poor tilth.

The dominant trees are loblolly pine, water oak, cypress, sweetgum, and red maple. If this soil is drained, hardwoods, such as southern red oak and white oak, will grow. The main understory includes greenbrier, American holly, sweetbay, blackgum, sassafras, and switchcane. Wetness restricts the use of equipment and contributes to seedling mortality.

This soil is limited for urban and recreational uses because of ponding and slow permeability.

This Byars soil is in capability subclass VIw (undrained) or IIIw (drained). The woodland ordination symbol is 10W.

Ca—Cape Fear loam. This very poorly drained soil is on terraces of the Cape Fear, South, and Black Rivers. Slopes are less than 2 percent. Individual areas of this soil generally are long and narrow and range from 5 to 30 acres or more.

Typically, the surface layer is very dark gray loam about 12 inches thick. The subsoil extends to a depth of about 46 inches. It is dark gray clay in the upper part, gray and light brownish gray clay in the middle part, and light brownish gray sandy clay loam in the lower part. The underlying material to a depth of 60 inches is light brownish gray sand.

Permeability is slow in the subsoil and rapid in the underlying material. This soil is very strongly acid to medium acid except where lime has been added. The seasonal high water table is at or near the surface from winter to early in spring. This soil is rarely flooded. Some areas adjacent to the South and Black Rivers flood more often.

Included with this soil in mapping are small areas of Roanoke, Wahee, Portsmouth, Paxville, Wasda, and Johnston soils. Roanoke and Wahee soils are in slightly higher positions on the landscape than Cape Fear soil and are better drained. Johnston soils are on the edge of delineations along drainageways, and Portsmouth, Paxville, and Wasda soils are scattered throughout the map unit. These soils are less clayey than Cape Fear soil. The included soils make up less than 15 percent of this map unit.

This Cape Fear soil is used mainly as woodland. A few small areas have been cleared for crops or pasture.

Corn, soybeans, and small grains are commonly grown on this soil. Open ditches are the most commonly used drainage method.

Grasses and legumes are grown for hay and pasture, but drainage is necessary for maximum production. Proper stocking, pasture rotation, timely deferment of grazing, and restricted use during wet periods help keep the pasture and soil in good condition. When the soil is too wet, grazing can cause surface compaction and poor tilth.

The dominant trees are loblolly pine, baldcypress, water tupelo, red maple, willow oak, blackgum, and water oak. The main understory includes ironwood, greenbrier, and American holly. Wetness and flooding restrict the use of equipment and contribute to seedling mortality.

This soil is limited for urban and recreational uses because of wetness, flooding, slow permeability, and low strength.

This Cape Fear soil is in capability subclass VIw (undrained) or IIIw (drained). The woodland ordination symbol is 11W.

Ce—Centenary sand. This moderately well drained soil is on broad, smooth flats on uplands and on stream terraces. It is most extensive in the northeastern part of the county. Slopes are less than 2 percent. Individual areas of this soil are irregular in shape and range from 5 to 60 acres or more.

Typically, the surface layer is dark grayish brown sand about 6 inches thick. The subsurface layer to a depth of about 58 inches is sand that is yellowish brown and brownish yellow in the upper part, pale brown in the middle part, and white in the lower part. The subsoil to a depth of 80 inches is loamy sand that is dark grayish brown in the upper part and very dark gray in the lower part.

Permeability is moderately rapid, and the available water capacity is low. This soil is very strongly acid to medium acid except where lime has been added. The seasonal high water table is at a depth of 3.5 to 5 feet from winter to early in spring. Wind erosion is a hazard.

Included with this soil in mapping are small areas of Lakeland, Kureb, Wakulla, Kenansville, and Leon soils. Lakeland, Kureb, Kenansville, and Wakulla soils are in higher positions on the landscape than Centenary soil, and Leon soils are in lower positions. Lakeland, Kureb, and Wakulla soils are better drained. Kenansville soils are more clayey, and Leon soils are wetter. Also included are small areas of soils similar to Centenary soil except they have thin loamy layers and areas of soils that have organic stained layers at a depth of less than 30 inches or more than 60 inches. The included soils make up less than 30 percent of this map unit.

This Centenary soil is used mainly as woodland. In some areas it is used as cropland or pastureland.

Corn, soybeans, small grains, and tobacco are sometimes grown on this soil. The low available water capacity is a limitation affecting crop production. Conservation tillage, crop residue management, windbreaks, and close-growing grasses and legumes in the cropping system help to conserve moisture, reduce leaching, and control soil blowing.

Using this soil for pasture or hay is a good way to conserve soil and water. Coastal bermudagrass and bahiagrass are suitable pasture plants.

The dominant trees are loblolly pine, longleaf pine, blackjack oak, turkey oak, and post oak. The main understory includes waxmyrtle and switchgrass. The thick, sandy layers restrict the use of equipment and contribute to seedling mortality.

This soil is limited for urban and recreational uses because of seepage, wetness, and the thick, sandy layers.

This Centenary soil is in capability subclass IIIs. The woodland ordination symbol is 6S.

Ch—Chewacla and Chastain soils, frequently flooded. These soils are on flood plains along the Cape Fear River. Chewacla soil is somewhat poorly drained, and Chastain soil is poorly drained. Slopes range from 0 to 2 percent. These soils were not separated in mapping because they react similarly to most uses and management. The areas of these soils do not occur in a predictable pattern. Some areas are only Chewacla soil and some are only Chastain soil, but most areas have both soils in varying percentages. Chewacla soil is in higher positions on the landscape than Chastain soil, which is on long, narrow flats and in troughs on the flood plains away from the river. The areas of these soils range from 5 to 200 acres or more.

Typically, this Chewacla soil has a yellowish brown loam surface layer about 5 inches thick. The subsoil extends to a depth of at least 80 inches. It is light yellowish brown loam in the upper part, grayish brown clay loam in the middle part, and light brownish gray clay loam in the lower part.

Permeability is moderate, and the available water capacity is high. This soil is very strongly acid to slightly acid. The seasonal high water table generally is at a depth of 0.5 to 1.5 feet from fall to early in spring. This soil is subject to frequent flooding for brief periods.

Typically, this Chastain soil has a grayish brown silty clay loam surface layer about 5 inches thick. The subsoil extends to a depth of at least 80 inches. It is grayish brown silty clay loam in the upper part, grayish brown silty clay in the middle part, and gray and greenish gray silty clay in the lower part.

Permeability is slow, and the available water capacity is moderate. This soil is very strongly acid to medium acid. The seasonal high water table is within 1 foot of the surface from fall to early in spring. This soil is subject to frequent flooding for very long periods.

Included with these soils in mapping are small areas of Congaree soils, which are in higher positions on the landscape, and soils that are wetter than Chewacla and Chastain soils and have a thick, dark surface layer. Also included throughout the map unit are small areas

of soils that are sandier or that have a clayey subsoil. The included soils make up about 20 percent of this map unit.

Chewacla and Chastain soils are used mainly as woodland. A small acreage has been cleared for pasture.

If these soils are drained and protected from flooding, corn and soybeans grow well. However, flood control along the Cape Fear River has not been feasible.

Grasses and legumes grow on these soils, but artificial drainage is required for optimum production. Pasture rotation and timely deferment of grazing during wet periods reduce compaction and help to maintain tilth.

The dominant trees are American sycamore, eastern cottonwood, baldcypress, water tupelo, green ash, American elm, swamp chestnut oak, sweetgum, water oak, and willow oak. Some stands have loblolly pine scattered throughout. The understory includes blackgum, river birch, American hornbeam, and winged elm. Wetness and the hazard of flooding are the main limitations affecting woodland management.

These soils are limited for urban and recreational uses because of wetness, flooding, and low strength.

Chewacla soil is in capability subclass IVw, and Chastain soil is in capability subclass VIw. The woodland ordination symbol is 10W for Chewacla soil and 8W for Chastain soil.

Cn—Congaree silt loam, frequently flooded. This well drained to moderately well drained soil is on the Cape Fear River flood plain. Slopes are less than 2 percent. Individual areas of this soil form long, narrow benches above the river and range from 5 to 200 acres or more.

Typically, the surface layer is dark brown silt loam about 5 inches thick. The underlying material is brown silt loam in the upper part. The lower part to a depth of 90 inches is brown and strong brown silty clay loam.

Permeability is moderate, and the available water capacity is high. This soil is neutral to very strongly acid. The seasonal high water table generally is at a depth of 2.5 to 4 feet from winter to early in spring. This soil is frequently flooded for brief periods.

Included with this soil in mapping are small areas of Chewacla and Chastain soils. These soils are in slightly lower positions on the landscape and in troughs, and they are wetter than Congaree soil. In addition, Chastain soils are more clayey. Also included are small areas of sandier soils on narrow ridges. The included soils make up less than 15 percent of this map unit.

This Congaree soil is used mainly as woodland. A small acreage has been cleared for pasture.

Corn and soybeans grow well on this soil if it is protected from flooding. However, flood control along the Cape Fear River has not been feasible.

Grasses and legumes for pasture grow well on this soil. Pasture rotation and timely deferment of grazing during wet periods reduce compaction and help to maintain tilth.

The dominant trees are American sycamore, eastern cottonwood, sweetgum, yellow poplar, water oak, and southern red oak. Most stands have loblolly pine scattered throughout. The understory includes hackberry and winged elm. The hazard of flooding is the main limitation affecting woodland management.

This soil is limited for urban and recreational uses because of flooding, wetness, and low strength.

This Congaree soil is in capability subclass IIIw. The woodland ordination symbol is 10A.

Co—Coxville loam. This poorly drained soil is on broad, smooth flats and in shallow depressions on uplands. It is most extensive in the southern part of the county. Slopes are less than 2 percent. Individual areas of this soil generally are irregular in shape or oval and range from 5 to 60 acres or more.

Typically, the surface layer is very dark grayish brown loam about 6 inches thick. The subsurface layer to a depth of about 11 inches is dark gray fine sandy loam. The subsoil extends to a depth of at least 70 inches. It is gray sandy clay loam in the upper part, gray clay in the middle part, and light gray sandy clay in the lower part.

Permeability is moderately slow. This soil is very strongly acid or strongly acid except where lime has been added. The seasonal high water table is at or near the surface from winter to early in spring. Some areas of this soil that are in depressions are ponded for brief periods after heavy rains.

Included with this soil in mapping are small areas of Dunbar, Lynchburg, Rains, and Byars soils. Dunbar and Lynchburg soils are in slightly higher positions on the landscape than Coxville soil and are better drained. Byars soils are in slightly lower positions and are wetter. Rains soils are scattered throughout the map unit and are sandier. Also included are small areas of clayey soils that have loamy or sandy layers at a depth of less than 60 inches. The included soils make up about 20 percent of this map unit.

This Coxville soil is used mainly as woodland. In a few areas it is used for row crops or pasture.

Corn and soybeans can be grown in areas of this soil that have been drained. Parallel and open ditches are

the most common methods of drainage. Even if this soil is drained, tillage can be delayed in the spring because of wetness. Conservation tillage, cover crops, and grasses and legumes in the cropping system help to maintain tilth.

Grasses and legumes grow well on this soil, but artificial drainage is required for optimum production. Pasture rotation and timely deferment of grazing during wet periods reduce compaction and help to maintain tilth.

The dominant trees are loblolly pine, sweetgum, water oak, and red maple. The understory includes American holly, switchcane, gallberry, and greenbrier. Equipment use limitations can be expected if trees are planted or harvested during wet periods.

This soil is limited for most urban and recreational uses because of wetness, moderately slow permeability, and low strength.

This Coxville soil is in capability subclass IVw (undrained) or IIIw (drained). The woodland ordination symbol is 9W.

Cr—Croatan muck, rarely flooded. This very poorly drained soil is in oval depressions (Carolina bays), irregular depressions, and on stream terraces, mainly northeast of the Cape Fear River. Slopes are less than 2 percent. Individual areas of this soil range from 5 to 1,000 acres or more.

Typically, this soil has an organic horizon 32 inches thick. The upper part is black muck, and the lower part is very dark grayish brown muck. The underlying material is brown loam in the upper part. The lower part to a depth of 62 inches is brown clay loam. Areas of this soil on terraces along the Cape Fear River have a few more weatherable minerals in the underlying mineral material than is typical.

Permeability is slow to moderately rapid in the organic layers and moderately slow to moderately rapid in the mineral layers. This soil is extremely acid in the organic layers except where lime has been added. The underlying material is extremely acid to slightly acid. Except where this soil has been drained, the seasonal high water table is at or near the surface during 6 to 10 months of the year. Some areas of this soil are ponded.

Included with this soil in mapping are small areas of Torhunta, Lynn Haven, Portsmouth, Paxville, and Leon soils, all of which are mineral soils and occur around the edge of delineations or in slightly higher areas within the map unit. Leon soils are better drained than Croatan soil. Also included are small areas of Pamlico and Wasda soils that have thinner organic layers. The included soils make up less than 20 percent of this map unit.

About two-thirds of the acreage of this Croatan soil is woodland. The rest has been cleared for corn and soybeans.

Wetness, ponding, high acidity, and possible flooding are the main limitations affecting cultivated crops. If this soil is drained, corn and soybeans can be grown; however, suitable drainage outlets are not always available. Annual soil testing is needed to maintain the delicate chemical balance required for growing cultivated crops. Once properly applied, lime and fertilizer must be worked deeply into the root zone because little or no leaching occurs in this soil.

Wetness, ponding, and high acidity also limit the use of this soil for pasture and hay. Even if this soil is properly drained, grazing probably would be difficult during very wet periods.

The dominant trees are pond pine, water tupelo, baldcypress, loblolly pine, sweetgum, and Atlantic white cedar. The understory includes titi, huckleberry, redbay, sweetbay, greenbrier, switchcane, and gallberry. Wetness, the hazard of flooding, low strength, and slow growth are the main limitations affecting woodland management. In its natural state this soil provides good habitat for wetland wildlife.

This soil is limited for urban and recreational uses because of ponding, low strength, and possible flooding.

This Croatan soil is in capability subclass VIIw (undrained) or IVw (drained). The woodland ordination symbol is 4W.

CT—Croatan muck, frequently flooded. This very poorly drained soil is on low stream terraces and flood plains northeast of the Cape Fear River and in the western part of the county. Slopes are less than 2 percent. Most areas of this soil have thick, almost impenetrable fringe undergrowth and are often covered with water, which limits field observations. Therefore, this soil was examined mostly along canals, trails, and roads. Although this soil was mapped with fewer detailed observations than were other soils in the survey area, the mapping is adequate to meet the needs for the major anticipated uses. Individual areas of this soil range from 5 to 1,000 acres or more.

Typically, this soil is black muck to a depth of 27 inches. The underlying material is very dark grayish brown mucky sandy loam and grayish brown sandy loam in the upper part. The middle part is grayish brown sandy clay loam, and the lower part to a depth of 80

inches is light brownish gray sand. Areas of this soil on terraces along the Cape Fear River have a few more weatherable minerals in the underlying mineral material than is typical.

Permeability is slow to moderately rapid in the organic layers and moderately slow to moderately rapid in the mineral layers. This soil is extremely acid in the muck layer except where lime has been added. The underlying material is extremely acid to slightly acid. Except where this soil has been drained the seasonal high water table is near or above the surface for 6 to 10 months of the year.

Included with this soil in mapping are small areas of Cape Fear, Johnston, Torhunta, Lynn Haven, Paxville, and Leon soils, all of which are mineral soils and occur around the edge of delineations or in slightly higher positions on the landscape than Croatan soil. Also included are small areas of Dorovan soils that have thicker organic layers and Wasda soils that have thinner organic layers. The included soils make up less than 20 percent of this map unit.

Nearly all of this Croatan soil is used as woodland. Some areas have been cleared for corn, soybeans, or pasture.

Wetness, high acidity, and the hazard of frequent flooding are the main limitations affecting cultivated crops and pasture. If this soil is drained, corn and soybeans can be grown; however, suitable drainage outlets generally are not available. Annual soil testing is needed to maintain the delicate chemical balance required for growing cultivated crops. Once properly applied, the lime and fertilizer must be worked deeply into the root zone because little or no leaching occurs in this soil.

Wetness, high acidity, and flooding also limit the use of this soil for pasture and hay. Even if this soil is properly drained, grazing probably would be difficult during very wet periods.

The dominant trees are pond pine, water tupelo, baldcypress, loblolly pine, sweetgum, and Atlantic white cedar. The understory includes titi, huckleberry, redbay, sweetbay, greenbrier, switchcane, and gallberry. Wetness, the hazard of flooding, high acidity, and low strength are the main limitations affecting woodland management. In its natural state, this soil provides good habitat for wetland wildlife.

This soil is limited for urban and recreational uses, because of wetness, low strength, and frequent flooding.

This Croatan soil is in capability subclass VIIw. The woodland ordination symbol is 4W.

DgA—Dogue sandy loam, 0 to 3 percent slopes. This moderately well drained soil is on terraces along the Cape Fear, South, and Black Rivers. Individual areas of this soil are irregular in shape and range from 5 to 60 acres.

Typically, the surface layer is dark grayish brown sandy loam about 3 inches thick. The subsurface layer to a depth of about 10 inches is light yellowish brown sandy loam. The subsoil is brownish yellow clay loam in the upper part. The middle part is brownish yellow and strong brown clay that has gray mottles, and the lower part to a depth of 62 inches is light gray sandy clay loam that has pockets of sandy clay.

Permeability is moderately slow, and the available water capacity is moderate. Shrink-swell potential is moderate. This soil is extremely acid to strongly acid except where lime has been added. The seasonal high water table is 1.5 to 3 feet below the surface from winter to early in spring. This soil is subject to rare flooding.

Included with this soil in mapping are small areas of Wickham, Altavista, Wahee, Roanoke, Johns, Exum, and Goldsboro soils. Wickham soils are on narrow ridges and are better drained than Dogue soil. Altavista soils are intermixed with the Dogue soil but they are less clayey. Wahee and Roanoke soils are in shallow depressions and drainageways and are wetter. Johns soils are intermixed with the Dogue soil along the South and Black River terraces. Exum and Goldsboro soils are intermixed with the Dogue soil on the older, more highly weathered Cape Fear River terraces that are several miles northeast of the river. These soils are less clayey than Dogue soil. The included soils make up less than 20 percent of this map unit.

This Dogue soil is used mainly as woodland. In some areas it is used for row crops or pasture.

The main crops are tobacco, corn, soybeans, and small grains. Artificial drainage is needed for optimum growth of tobacco and other crops that require good drainage. Rare flooding may occur for brief periods.

This soil is good pastureland. Proper stocking, pasture rotation, and restricted use during wet periods help keep the pasture and soil in good condition.

The dominant trees are loblolly pine, sweetgum, red oak, water oak, red maple, and white oak. The main understory includes American holly, sourwood, waxmyrtle, and flowering dogwood. This soil has few limitations affecting woodland management; however, wetness can restrict the use of equipment.

This soil is limited for most urban and recreational development because of wetness, moderate shrink-

swell potential, moderately slow permeability, and rare flooding.

This Dogue soil is in capability subclass IIw. The woodland ordination symbol is 9W.

DO—Dorovan muck, frequently flooded. This very poorly drained soil is on flood plains along major drainageways in the northern and western parts of the county. Slopes are less than 2 percent. The boundaries of the soil were drawn from field observations using aerial photographs as aids for interpretation. Although this soil was mapped with fewer detailed observations than were most other soils in the survey area, the mapping is adequate to meet the needs for the major anticipated uses. Individual areas of this soil range from 5 to 200 acres or more.

Typically, the soil is muck to a depth of 53 inches. It is very dark gray in the upper part and black in the lower part. The underlying material is dark gray fine sandy loam underlain by dark grayish brown fine sand to a depth of 62 inches.

Permeability is moderate in the organic layers and rapid in the underlying mineral layers. This soil is extremely acid in the organic layers and extremely acid to slightly acid in the underlying material. The seasonal high water table is near or above the surface throughout the year. This soil is frequently flooded for very long periods.

Included with this soil in mapping are small areas of Johnston, Torhunta, and Lynn Haven soils, all of which are mineral soils that occur around the edge of delineations or in slightly higher positions on the landscape than the Dorovan soil. Also included are small areas of Croatan and Pamlico soils, which have organic layers less than 51 inches thick. These soils are dispersed throughout the map unit. The included soils make up less than 20 percent of this map unit.

Nearly all of this Dorovan soil is used as woodland.

This soil is seldom used for cultivated crops, hay, or pasture because of the wetness, high acidity, and flooding. If this soil is drained, corn and soybeans can be grown; however, it is not easily drained and flooding is difficult to control because this soil is on the lowest part of the landscape. Even if this soil is properly drained, crop and hay production and grazing probably would be affected during very wet periods because of the low load-bearing strength of the organic layers.

The dominant trees are pond pine, blackgum, baldcypress, loblolly pine, sweetgum, swamp tupelo, redbay, loblollybay, and sweetbay. The understory includes titi, fetterbush, greenbrier, and gallberry. Wetness, high acidity, the hazard of flooding, and low strength are the main limitations affecting woodland management. In its natural undrained state, this soil provides good habitat for wetland wildlife.

This soil is limited for urban and recreational uses because of wetness, flooding, and low strength.

This Dorovan soil is in capability subclass VIIw. The woodland ordination symbol is 7W.

Dr—Dunbar fine sandy loam. This somewhat poorly drained soil is on broad, smooth flats on uplands and around the head of drainageways in the southwestern part of the county. Slopes range from 0 to 2 percent. Individual areas of this soil are irregular in shape and range from 5 to 75 acres.

Typically, the surface layer is dark grayish brown fine sandy loam about 4 inches thick. The subsurface layer to a depth of about 11 inches is pale brown fine sandy loam. The subsoil extends to a depth of at least 65 inches. The upper part is light yellowish brown sandy clay loam and pale brown clay loam that has light gray mottles. The middle part is light brownish gray clay. The lower part is gray and dark gray clay.

Permeability is moderately slow, and the available water capacity is moderate. Shrink-swell potential is moderate. This soil is very strongly acid or strongly acid except where lime has been added. The seasonal high water table is at a depth of 1 to 2.5 feet from winter to early in spring.

Included with this soil in mapping are small areas of Duplin, Gritney, Coxville, Lynchburg, and Nahunta soils. Duplin and Gritney soils are in slightly higher positions on the landscape than Dunbar soil and are moderately well drained. Coxville soils are poorly drained. Lynchburg and Nahunta soils are scattered throughout the map unit. Lynchburg soils are less clayey than Dunbar soil, and Nahunta soils are more silty. The included soils make up less than 20 percent of this map unit.

This Dunbar soil is used mainly as woodland. A small acreage is in cultivated crops.

The main crops are corn and soybeans. Artificial drainage generally is needed for optimum production. Conservation tillage, crop residue management, cover crops, and grasses and legumes in the cropping system help to maintain tilth and production.

Grasses and legumes for hay and pasture can be grown on this soil. Proper stocking, pasture rotation, and restricted use during wet periods help keep the pasture and soil in good condition.

The dominant trees are red maple, sweetgum, loblolly pine, willow oak, and water oak. The main understory includes cane, American holly, sourwood,

waxmyrtle, and greenbrier. Wetness from fall to early in spring can restrict the use of equipment.

This soil is limited for most urban uses because of wetness and slow permeability.

This Dunbar soil is in capability subclass IIw. The woodland ordination symbol is 9W.

DuA—Duplin sandy loam, 0 to 3 percent slopes. This moderately well drained soil is on broad flats on uplands. It is most extensive in the southern part of the county. Individual areas of this soil are irregular in shape and range from 5 to 40 acres.

Typically, the surface layer is dark grayish brown sandy loam about 7 inches thick. The subsoil extends to a depth of at least 62 inches. It is brownish yellow and dark yellowish brown clay loam in the upper part, brownish yellow clay in the middle part, and light gray clay in the lower part.

Permeability is moderately slow, and the available water capacity is moderate to high. Shrink-swell potential is moderate. This soil is very strongly acid or strongly acid except where lime has been added. The seasonal high water table is within 2 to 3 feet of the surface from winter to early in spring.

Included with this soil in mapping are small areas of Dunbar, Exum, Goldsboro, Lynchburg, and Norfolk soils. Dunbar and Lynchburg soils are in slightly lower positions on the landscape than Duplin soil and are wetter. Norfolk soils are in slightly higher positions and are better drained. Exum and Goldsboro soils are scattered throughout the map unit. All of the included soils except the Dunbar soils are less clayey than Duplin soil. The included soils make up less than 20 percent of this map unit.

About half the acreage of this Duplin soil is used for cultivated crops or pasture. The rest is mainly woodland.

Corn, soybeans, small grains, and tobacco are the main cultivated crops. Artificial drainage is needed in some areas for optimum growth of tobacco and other crops that require good drainage. Crop residue management helps to maintain tilth.

This soil is good pastureland. Proper stocking, pasture rotation, and restricted use during wet periods help keep the pasture and soil in good condition.

The dominant trees are sweetgum, loblolly pine, white oak, southern red oak, willow oak, and water oak. The main understory includes switchcane, American holly, sourwood, and greenbrier. Wetness from November to April can restrict the use of equipment.

This soil is limited for most urban uses because of wetness, moderately slow permeability, and moderate shrink-swell potential. If this soil is not properly drained, septic tank absorption fields do not function properly because of wetness and the moderately slow permeability. Wetness and moderately slow permeability are also the main limitations affecting recreational uses.

This Duplin soil is in capability subclass IIw. The woodland ordination symbol is 9W.

DyF—Dystrochrepts, steep. These excessively drained to well drained soils are on steep bluffs above the Cape Fear River and its entrenched tributaries. These soils developed in sandy, loamy, and clayey stratified Coastal Plain sediments of three geologic ages. These sediments vary in texture, both vertically and laterally over short distances. Although these soils were mapped with fewer detailed observations than were most other soils in the survey area, the mapping is adequate to meet the needs for the major anticipated uses. Slope ranges from 8 to 70 percent, but is generally about 30 percent. Because of mass slumping, some nearly vertical shear faces are part of this map unit. The steeper slopes are along the bluff, and the least sloping areas are at the head of drainageways that dissect the bluff. Individual areas of these soils are long and narrow and range from 10 to 1,000 acres or more.

These soils are mostly brown and yellow sandy or loamy material, but some are clayey. Some of these soils appear to have significant horizonation, but for the most part, textural horizon differences are geologic layering rather than soil development.

Permeability is very rapid to slow, and the available water capacity is low to moderate. These soils generally are extremely acid to strongly acid. Where they formed in or adjacent to marl, they are mildly alkaline. Surface runoff is rapid. Erosion is a severe hazard. Slopes are unstable, and mass slumping occurs.

Included in mapping are small areas of the better developed Blanton, Wagram, and Norfolk soils, which occur where the Dystrochrepts soils contact the upland. These included soils make up less than 5 percent of this map unit. Also included are exposed layers of iron indurated sandstone 1 inch to 4 feet thick. These layers often crop out near the top of delineations as a resistant layer, but they can occur at any one or more positions along the vertical decent of the slope. The sandstone layers make up less than 5 percent of this map unit.

Except in very small areas that are cleared for pipelines or power lines, these soils are used as woodland.

Common trees are American beech, yellow poplar, American sycamore, hickory, loblolly pine, sweetgum,

and southern red oak. Common understory plants include American holly, American hornbeam, eastern hophornbeam, pawpaw, and serviceberry. Although trees grow well on these soils, harvesting timber would be difficult and could result in severe erosion.

Because of the highly erodible, steep, and unstable slopes, agricultural, urban, and recreational uses generally are not practical. Most areas of these soils will probably remain as undisturbed scenic woodland or be used for watershed protection.

Neither a capability subclass nor a woodland ordination symbol has been assigned to this map unit.

ExA—Exum very fine sandy loam, 0 to 3 percent slopes. This moderately well drained soil is on broad flats on uplands. It is most intensive in the southern part of the county around Bladenboro and Clarkton, but some areas are on old stream terraces in the northern part. Individual areas of this soil are irregular in shape and range from 5 to 100 acres.

Typically, the surface layer is dark gray very fine sandy loam about 9 inches thick. The subsoil extends to a depth of at least 62 inches. It is brownish yellow loam in the upper part, yellowish brown clay loam in the middle part, and gray clay loam in the lower part.

Permeability is moderately slow, and the available water capacity is high. This soil is very strongly acid or strongly acid except where lime has been added. The seasonal high water table is at a depth of 2 to 3 feet from winter to early in spring.

Included with this soil in mapping are small areas of Norfolk, Aycock, Goldsboro, Duplin, Nahunta, Dunbar, Lynchburg, and Gritney soils. Also included are small areas of soils that have layers of loamy sand or sandy loam at a depth of less than 60 inches. Norfolk and Aycock soils are in slightly higher positions on the landscape than Exum soil and are better drained. Nahunta, Dunbar, and Lynchburg soils are in slightly lower positions and are wetter. Goldsboro, Gritney, and the sandier soils are scattered throughout the map unit. Goldsboro soils are less silty than Exum soil, and Gritney soils are more clayey and better drained. Duplin soils are also more clayey. The included soils make up less than 20 percent of this map unit.

This Exum soil is used mainly for cultivated crops. In some areas it is used as woodland or pasture.

The main cultivated crops are corn, soybeans, tobacco, small grains, and peanuts. Artificial drainage is needed in some areas for optimum growth of tobacco and other crops that require good drainage.

This soil can produce good hay and pasture. Proper stocking, pasture rotation, and restricted use during wet periods help keep the pasture and soil in good condition.

The dominant trees are loblolly pine, longleaf pine, yellow poplar, white oak, southern red oak, sweetgum, and red maple. The understory includes American holly and sourwood. Wetness can limit the use of equipment.

This soil is limited for some urban and recreational uses because of wetness and low strength. In many areas, drainage is necessary to ensure proper functioning of septic tank absorption fields.

This Exum soil is in capability subclass IIw. The woodland ordination symbol is 9W.

Fo—Foreston loamy sand. This moderately well drained soil generally is on smooth uplands and rims of Carolina bays throughout the southwestern part of the county. To a lesser extent, it is on stream terraces in the northern part of the county. Slopes are less than 2 percent. Individual areas of this soil generally are irregular in shape and range from 5 to 75 acres. Some larger areas south of Duplin and west of Council are flat to slightly convex.

Typically, the surface layer is dark grayish brown loamy sand about 9 inches thick. The subsoil extends to a depth of at least 62 inches. It is yellowish brown and light yellowish brown sandy loam in the upper part and light gray loamy sand in the lower part.

Permeability is moderately rapid in the upper part of the subsoil and rapid in the lower part. The available water capacity is low to moderate. This soil is very strongly acid to slightly acid in the surface layer and very strongly acid or strongly acid in the subsoil. The seasonal high water table is at a depth of 2 to 3.5 feet during winter and spring.

Included with this soil in mapping are small areas of soils that do not have a continuous loamy subsoil and areas of soils in which the subsoil does not extend to a depth of 60 inches. Some of these soils have organically stained horizons at a depth of more than 40 inches. Also included are small areas of Butters, Stallings, Kenansville, Autryville, and Goldsboro soils. Butters, Kenansville, and Autryville soils are in higher positions on the landscape than Foreston soil and are better drained. Stallings soils are in lower positions and are wetter. Goldsboro soils are intermixed with Foreston soil. The included soils make up less than 20 percent of this map unit.

About half the acreage of this Foreston soil remains forested. The rest is in cultivated crops, hay, or pasture.

The main crops are peanuts, tobacco, soybeans, and corn. Leaching of nutrients is the major limitation affecting crop production. During dry seasons, shallow-

rooted plants show stress from lack of moisture.

This soil can produce good hay and pasture. Proper stocking, pasture rotation, and restricted use during wet periods help keep the soil and pasture in good condition.

The dominant trees are loblolly pine, longleaf pine, turkey oak, blackjack oak, post oak, and sweetgum. Wetness can restrict the use of equipment.

This soil is limited for most urban uses because of wetness and seepage. It is a poor filter for septic tank absorption fields. Also, lawns and shrubs may be difficult to establish and maintain because of the droughtiness.

This Foreston soil is in capability subclass IIw. The woodland ordination symbol is 9W.

GbA—Goldsboro sandy loam, 0 to 3 percent slopes. This moderately well drained soil is on smooth to slightly convex slopes on uplands throughout the southwestern half of the county, along the northern boundary with Cumberland County, and along the South River. It is most extensive around Carvers and Abbottsburg. Individual areas of this soil are irregular in shape and range from 5 to 100 acres.

Typically, the surface layer is dark grayish brown sandy loam about 10 inches thick. The subsoil extends to a depth of at least 62 inches. It is yellowish brown sandy loam in the upper part. The middle part is yellowish brown sandy clay loam that has gray mottles, and the lower part is gray sandy clay loam that has pockets of sandy loam. In the southern part of the county, this soil has a higher percentage of fine sand throughout the profile.

This soil has moderate permeability, and the available water capacity is moderate. This soil is strongly acid or very strongly acid except where lime has been added. Depth to a seasonal high water table is 2 to 3 feet.

Included with this soil in mapping are small areas of soils in which the subsoil does not extend to a depth of 60 inches and small areas of soils that have thin, brittle, organically stained layers in the subsurface layer that break into marble-size pebbles if the soil is cultivated. Also included are small areas of Norfolk, Duplin, Gritney, Exum, Foreston, Lynchburg, Ocilla, and Rains soils. Norfolk soils are in higher positions on the landscape then Goldsboro soil, are better drained, and often have a lighter colored surface layer. Lynchburg, Ocilla, and Rains soils are in lower positions on the landscape, are wetter, and have a darker colored surface layer. The other included soils are intermixed with Goldsboro soil. Duplin and Gritney soils are more clayey, Exum soils are more silty, and Foreston soils are sandier. The included soils make up about 20 percent of this map unit.

This Goldsboro soil is used mainly as cropland. In some areas it is used as woodland or pasture.

The major crops are corn, soybeans, peanuts, tobacco, and small grains. Limitations affecting crop production are not significant, but in some areas drainage may be necessary to improve yields.

This soil can produce good hay and pasture. Proper stocking, pasture rotation, and restricted use during wet periods help keep the soil and pasture in good condition.

The dominant trees are loblolly pine, longleaf pine, sweetgum, southern red oak, and white oak. Wetness can restrict the use of equipment.

This soil is limited for most urban and recreational uses because of wetness.

This Goldsboro soil is in capability subclass IIw. The woodland ordination symbol is 9W.

GdA—Goldsboro-Urban land complex, 0 to 3 percent slopes. This map unit consists of areas of Goldsboro soil and Urban land that are too small and too intermingled to be mapped separately at the selected scale. About 40 percent of the acreage is undisturbed Goldsboro soil and about 30 percent is Urban land. Most areas of this soil and Urban land are in and around Dublin, Clarkton, Elizabethtown, and Bladenboro.

Typically, Goldsboro soil has a dark grayish brown sandy loam surface layer about 10 inches thick. The subsoil extends to a depth of about 62 inches. It is yellowish brown sandy loam in the upper part. The middle part is yellowish brown sandy clay loam that has gray mottles, and the lower part is gray sandy clay loam.

Permeability is moderately slow, and the available water capacity is moderate. This soil is very strongly acid or strongly acid except where lime has been added. Depth to a seasonal high water table is 2 to 3 feet.

Urban land consists of areas where the original soil has been covered by concrete, asphalt, buildings, or other impervious surfaces. Slopes are modified to fit the site needs and commonly range from 0 to 4 percent.

Included in mapping are small areas of Norfolk, Foreston, Duplin, Ocilla, Lynchburg, and Rains soils. The Norfolk soils are in higher positions on the landscape than Goldsboro soil and are better drained. Ocilla, Lynchburg, and Rains soils are in lower positions and are wetter. Duplin and Foreston soils are scattered

throughout the map unit. Duplin soils are more clayey than Goldsboro soil, and Foreston soils are sandier. The included soils make up less than 30 percent of this map unit.

The Goldsboro soil in this map unit is limited for most urban uses because of wetness, but in undeveloped areas, it is being converted to urban uses because better drained soils are not in the vicinity. This soil is also limited for recreational uses by wetness; however, artificial drainage can improve its suitability. Revegetating disturbed areas promptly reduces runoff and helps to control erosion. Lawns and shrubs are relatively easy to establish and maintain.

Neither the capability subclass nor a woodland ordination symbol has been assigned to this map unit.

Gh—Grantham very fine sandy loam. This poorly drained soil is on broad, smooth flats on uplands. It is most extensive in the southern part of the county and on old river terraces in the northern part. Slopes range from 0 to 2 percent. Individual areas of this soil are irregular in shape and range from 5 to 200 acres.

Typically, the surface layer is very dark gray very fine sandy loam about 8 inches thick. The subsurface layer to a depth of about 11 inches is gray very fine sandy loam. The subsoil extends to a depth of at least 60 inches. It is light brownish gray loam and clay loam in the upper part, gray clay loam in the middle part, and light brownish gray loam in the lower part. Few to common brown, yellow, and red mottles are throughout the subsoil.

Permeability is moderately slow. This soil is very strongly acid or strongly acid except where lime has been added. The seasonal high water table is at or near the surface from winter to early in spring.

Included with this soil in mapping are small areas of Coxville, Rains, Dunbar, Lynchburg, and Nahunta soils. Also included are small areas of soils that have a darker surface layer more than 10 inches thick. These soils are in slightly higher positions on the landscape than Grantham soil. Coxville and Rains soils are scattered throughout the map unit. Coxville soils are more clayey than Grantham soil, and Rains soils are less silty. Dunbar, Lynchburg, and Nahunta soils are in slightly higher positions on the landscape than Grantham soil and are better drained. In addition, Dunbar soils are more clayey, and Lynchburg soils are less silty. The included soils make up less than 20 percent of this map unit.

About half of the acreage of this Grantham soil is woodland. The rest is cropland or pastureland.

If this soil is drained, cultivated crops, such as corn and soybeans, can be grown.

This soil can produce good pasture and hay, although wetness is a limitation. Proper stocking, pasture rotation, timely deferment of grazing, and restricted use during wet periods help keep the pasture and soil in good condition.

The dominant trees are loblolly pine, water oak, sweetgum, and red maple. If this soil is drained, hardwoods, such as southern red oak and white oak, can be grown. The main understory includes greenbrier, American holly, sweetbay, sourwood, sassafras, and giant cane. Wetness restricts the use of equipment.

This soil is limited for urban and recreational uses because of wetness, moderately slow permeability, and low strength.

This Grantham soil is in capability subclass VIw (undrained) or IIIw (drained). The woodland ordination symbol is 9W.

Gm—Grifton-Meggett complex, occasionally flooded. This map unit consists of intermingled areas of nearly level, poorly drained Grifton and Meggett soils. These soils are on flood plains, low terraces, and adjacent flats of the Brown Marsh Swamp and streams in the southern part of the county. A typical mapped area is about 40 percent Grifton soil, 30 percent Meggett soil, and 30 percent other soils. The areas of these soils are long and narrow or irregular in shape and range from 10 to 1,000 acres or more.

Typically, this Grifton soil has a very dark grayish brown fine sandy loam surface layer about 6 inches thick. The subsurface layer to a depth of about 13 inches is light brownish gray fine sandy loam. The subsoil to a depth of about 65 inches is light brownish gray. It is fine sandy loam in the upper part, sandy clay loam in the middle part, and fine sandy loam in the lower part. The underlying material to a depth of 80 inches is light brownish gray fine sandy loam that has pockets of loamy fine sand.

Permeability is moderate, and the available water capacity is moderate. The surface and subsurface layers are very strongly acid to slightly acid except where lime has been added. The subsoil and underlying material are medium acid to moderately alkaline. The seasonal high water table is within 1 foot of the surface from fall to early in spring.

Typically, this Meggett soil has a very dark grayish brown fine sandy loam surface layer about 5 inches thick. The subsurface layer to a depth of about 12 inches is grayish brown fine sandy loam. The subsoil to

a depth of about 43 inches is gray. It is clay in the upper part and sandy clay in the lower part. The underlying material is gray fine sandy loam in the upper part. The lower part to a depth of 80 inches is light brownish gray fine sand.

Permeability is slow, and the available water capacity is moderate. The surface layer is very strongly acid to slightly acid except where lime has been added to the soil. The upper part of the subsoil is strongly acid to moderately alkaline, and the lower part is slightly acid to moderately alkaline. The seasonal high water table is at or near the surface from winter to early in spring.

Included with these soils in mapping are small areas of Rains, Woodington, Grantham, Coxville, and Lynchburg soils that are more acid. These soils are scattered throughout the map unit but are more prevalent along the upland sides. Lynchburg soils are in slightly higher positions on the landscape than the Grifton and Meggett soils and are better drained. Also included along the edge of delineations and in small depressions are the wetter Wilbanks and Johnston soils. Johnston soils are also more acid than the Grifton and Meggett soils.

Grifton and Meggett soils are used mainly as woodland. In a few areas they are used as pastureland or cropland.

Corn and soybeans can be grown if these soils are artificially drained; however, suitable drainage outlets are sometimes difficult to establish.

Grasses and legumes for hay and pasture can grow on these soils, although wetness is a limitation and artificial drainage is necessary for optimum production. Proper stocking, pasture rotation, timely deferment of grazing, and restricted use during wet periods help keep the pasture and soil in good condition.

The dominant trees are red maple, water oak, white oak, swamp chestnut oak, willow oak, green ash, swamp tupelo gum, blackgum, sweetgum, and loblolly pine. The dominant understory is American holly, ironwood, switchcane, and greenbrier. Wetness and the hazard of flooding are the major limitations affecting woodland management.

These soils are limited for urban and recreational uses because of wetness and possible flooding.

The Grifton and Meggett soils are in capability subclass VIw. The woodland ordination symbol is 9W for Grifton soil and 11W for Meggett soil.

GrB—Gritney fine sandy loam, 2 to 7 percent slopes. This well drained to moderately well drained soil is on knolls, ridges, and side slopes along the south side of the Cape Fear River and its tributaries. Individual areas of this soil are irregular in shape and range from 5 to 100 acres or more.

Typically, the surface layer is dark grayish brown fine sandy loam about 6 inches thick. The subsurface layer to a depth of about 10 inches is light yellowish brown fine sandy loam. The subsoil extends to a depth of about 50 inches. It is yellowish brown sandy clay in the upper part, yellowish brown clay in the middle part, and mottled gray, yellowish brown, reddish yellow, and dark red clay in the lower part. The underlying material to a depth of 60 inches is brownish yellow clay. Red, yellow, and relict gray mottles are in the middle part of the subsoil and increase with depth.

Permeability is slow, and the available water capacity is moderate. Shrink-swell potential is high. This soil is very strongly acid or strongly acid except where lime has been added. It does not have a seasonal high water table within a depth of 6 feet.

Included with this soil in mapping are small areas of Dunbar, Coxville, Norfolk, Goldsboro, Aycock, and Exum soils. Dunbar and Coxville soils are in lower positions on the landscape than Gritney soil and are wetter. Norfolk, Goldsboro, Aycock, and Exum soils are scattered throughout the map unit and are less clayey. Also included are small areas of soils that have a thick, sandy surface layer. The included soils make up less than 30 percent of this map unit.

This Gentry soil is used mainly as woodland. A small acreage is in cultivated crops.

The main cultivated crops are corn, soybeans, and small grains. Winter cover crops, conservation tillage, and crop residue management help to control erosion and to maintain tilth. Field borders and crop rotations that include close-growing crops also help to conserve soil and water. Water collects in low spots for brief periods after heavy rainstorms.

Grasses and legumes grow well on this soil. Using this soil for hay or pasture is a good conservation alternative.

The dominant trees are loblolly pine, shortleaf pine, beech, sweetgum, yellow poplar, red oak, and white oak. The main understory includes American holly, sourwood, sparkleberry, red maple, and flowering dogwood. This soil has few limitations affecting woodland management.

This soil is limited for most urban uses and some recreational uses because of the high shrink-swell potential, slow permeability, and low strength. Erosion can be a problem in sloping areas if disturbed sites are not revegetated promptly.

This Gritney soil is in capability subclass IIIe. The woodland ordination symbol is 8A.

GrD—Gritney fine sandy loam, 7 to 15 percent slopes. This well drained to moderately well drained soil is on side slopes along tributaries of the Cape Fear River in the southern part of the county. Individual areas of this soil are long and narrow and range from 5 to 20 acres or more.

Typically, the surface layer is dark grayish brown fine sandy loam about 6 inches thick. The subsurface layer to a depth of about 10 inches is light yellowish brown fine sandy loam. The subsoil extends to a depth of about 50 inches. It is yellowish brown sandy clay in the upper part, yellowish brown clay in the middle part, and mottled gray, yellowish brown, reddish yellow, and dark red clay in the lower part. The underlying material to a depth of 60 inches is brownish yellow clay. Red, yellow, and relict gray mottles are in the middle part of the subsoil and increase with depth.

Permeability is slow, and the available water capacity is moderate. Shrink-swell potential is high. This soil is very strongly acid or strongly acid except where lime has been added. This soil does not have a seasonal high water table within a depth of 6 feet. Because of the slope, water erosion is a hazard.

Included with this soil in mapping are small areas of Wagram, Blanton, and Norfolk soils. Some soils that are wetter than is typical for Gritney soil are in seepage areas. Wagram, Blanton, and Norfolk soils are scattered throughout the map unit. Wagram and Blanton soils are sandier than Gritney soil, and Norfolk soils are less clayey. The included soils make up less than 20 percent of this map unit.

This Gritney soil is used mainly as woodland. A small acreage is in pasture. Because of the slope and susceptibility to erosion, this soil is seldom used as cropland.

Grasses and legumes grow well on this soil. Using it for pasture or hay is a good conservation practice.

The dominant trees are loblolly pine, shortleaf pine, beech, yellow poplar, red oak, and white oak. The main understory includes American holly, sparkleberry, red maple, and flowering dogwood. This soil has few limitations affecting woodland management.

This soil is limited for most urban and recreational uses because of the slope, high shrink-swell potential, low strength, and slow permeability. Erosion can be a problem if disturbed sites are not revegetated promptly.

This Gritney soil is in capability subclass VIe. The woodland ordination symbol is 8A.

Jh—Johns fine sandy loam. This moderately well drained soil is on stream terraces along the South and Black Rivers on the eastern edge of the county and along Turnbull and Colly Creeks. Slopes range from 0 to 2 percent. Areas of this soil are somewhat elongated or irregular in shape and range from 5 to 50 acres.

Typically, the surface layer is dark grayish brown fine sandy loam about 7 inches thick. The subsurface layer to a depth of about 11 inches is pale brown fine sandy loam. The subsoil extends to a depth of about 37 inches. It is yellowish brown sandy clay loam in the upper part, light brownish gray sandy clay loam in the middle part, and light brownish gray fine sandy loam in the lower part. The underlying material is light brownish gray loamy sand in the upper part. The lower part to a depth of 72 inches is white sand.

Permeability is moderate in the subsoil and rapid in the underlying material. The available water capacity is moderate. This soil is very strongly acid or strongly acid except where lime has been added. The seasonal high water table is at a depth of 1.5 to 3 feet. This soil is subject to rare flooding.

Included with this soil in mapping are small areas of Dogue, Wahee, and Kalmia soils. Dogue and Wahee soils are scattered throughout the map unit and are more clayey than Johns soil. Kalmia soils are in higher positions on the landscape and are better drained. Some delineations have small areas of soils that are more sandy than Johns soil and some soils that are wetter. The wetter soils are in slightly lower positions on the landscape than Johns soil. The included soils make up less than 15 percent of this map unit.

This Johns soil is used mainly as woodland. In some areas it is used for cultivated crops or pasture.

The main cultivated crops are corn, soybeans, tobacco, and small grains. Artificial drainage is needed in some areas for optimum growth of tobacco and other crops that require good drainage. Conservation tillage, cover crops, crop residue management, and grasses and legumes in the cropping system help to maintain tilth and production.

This soil can produce good hay and pasture. Limitations affecting pasture use are not major; however, overgrazing can cause surface compaction and poor tilth. Proper stocking and pasture rotation help keep the pasture and soil in good condition.

The dominant trees are loblolly pine, white oak, southern red oak, willow oak, water oak, and sweetgum. The main understory includes American holly, flowering dogwood, persimmon, and sassafras. Wetness sometimes can restrict the use of equipment.

This soil is limited for most urban and recreational uses because of wetness, seepage, and flooding. Drainage can improve the suitability of this soil for some uses.

This Johns soil is in capability subclass IIw. The woodland ordination symbol is 9W.

JO—Johnston mucky loam, frequently flooded. This nearly level, very poorly drained soil is along major drainageways on flood plains throughout the county. Although this soil was mapped with fewer detailed observations than were most other soils in the survey area, the mapping is adequate to meet the needs for the major anticipated uses. The boundaries were drawn from limited field observations using aerial photographs as aids for interpretation. Individual areas of this soil are long and narrow and range from 10 to 500 acres or more.

Typically, the surface layer is black mucky loam 38 inches thick. The underlying material is dark gray fine sandy loam in the upper part. The lower part to a depth of 62 inches is dark gray fine sand.

Permeability is moderately rapid in the upper part of the soil and rapid in the lower part. This soil is very strongly acid or strongly acid. The seasonal high water table is at or above the surface most of the year.

Included with this soil in mapping are areas of Pamlico, Dorovan, and Croatan soils. These soils have a muck surface layer more than 16 inches thick. Also included are small areas of Torhunta and Lynn Haven soils and areas of poorly drained or very poorly drained soils that are sandy throughout. Torhunta soils have a thinner surface layer than that of the Johnston soil, and Lynn Haven soils are sandier. The included soils make up less than 30 percent of this map unit.

This Johnston soil is used mainly as woodland. A few areas have been cleared for pasture or row crops.

Drainage and flood protection are necessary if this soil is used for cultivated crops, hay, or pasture. However, a suitable outlet for drainage generally is hard to find because this soil is on the lowest part of the landscape.

Water tupelo and baldcypress can be grown on this soil. If this soil is drained, yellow poplar and loblolly pine can also be grown. The understory includes greenbrier, switchcane, and red maple. Equipment use limitations can be expected if trees are harvested or planted during wet periods. Competing vegetation needs to be controlled to insure adequate survival of planted seedlings. Bedding the land and planting trees on raised beds improve seedling survival and growth.

This soil is limited for all urban and recreational uses because of wetness, flooding, and low strength.

This Johnston soil is in capability subclass VIIw. The woodland ordination group 9W.

KaA—Kalmia loamy fine sand, 0 to 3 percent slopes. This well drained soil is on stream terraces along the South and Black Rivers on the eastern edge of the county and along Turnbull and Colly Creeks. Individual areas of this soil are somewhat elongated or irregular in shape and range from 5 to 50 acres.

Typically, the surface layer is dark grayish brown loamy fine sand about 5 inches thick. The subsurface layer to a depth of about 11 inches is light yellowish brown loamy fine sand. The subsoil extends to a depth of about 34 inches. It is strong brown sandy clay loam in the upper part, yellowish brown sandy clay loam in the middle part, and brownish yellow sandy loam in the lower part. The underlying material is yellow sand in the upper part. The lower part to a depth of 80 inches is light gray sand.

Permeability is moderate in the subsoil and rapid in the underlying material. The available water capacity is moderate. This soil is very strongly acid to medium acid except where lime has been added. It does not have a seasonal high water table within a depth of 6 feet. This soil is subject to rare flooding.

Included with this soil in mapping are small areas of Johns and Kenansville soils. Johns soils are in slightly lower positions on the landscape than Kalmia soil and are wetter. Kenansville soils are scattered throughout the map unit and are sandier. Some delineations have small areas of soils that are gravelly sand or sand throughout and small areas of soils in which the subsoil is thinner than is typical for Kalmia soil. The included soils make up less than 15 percent of this map unit.

This Kalmia soil is used mainly as woodland. In some areas it is used for cultivated crops or pasture.

The main cultivated crops are corn, soybeans, tobacco, and small grains. Limitations affecting agricultural uses are not significant; however, conservation tillage, cover crops, crop residue management, and the use of grasses and legumes in the cropping system help to maintain tilth and productivity.

Grasses and legumes can be grown for pasture and hay. Limitations affecting pasture are not major; however, overgrazing can cause surface compaction and poor tilth. Proper stocking and pasture rotation help keep the pasture and soil in good condition.

The dominant trees are loblolly pine, white oak, southern red oak, water oak, and hickory. The main understory includes American holly, flowering dogwood, persimmon, and sassafras.

This soil is limited for all urban and some recreational uses because of flooding.

This Kalmia soil is in capability class I. The woodland ordination symbol is 9A.

KeA—Kenansville sand, 0 to 3 percent slopes. This well drained soil is on stream terraces of the South and Black Rivers, Turnbull and Colly Creeks, and on eolian flats, all in the northeastern part of the county. Individual areas of this soil are irregular in shape and range from 5 to 200 acres.

Typically, the surface layer is dark grayish brown sand about 10 inches thick. The subsurface layer to a depth of about 23 inches is light yellowish brown sand. The subsoil extends to a depth of about 45 inches. It is strong brown sandy loam in the upper part and strong brown loamy sand in the lower part. The underlying material to a depth of 72 inches is very pale brown sand.

Permeability is moderately rapid, and the available water capacity is very low to low. This soil is very strongly acid to medium acid except where lime has been added. It does not have a seasonal high water table within a depth of 6 feet. Wind erosion is a hazard.

Included with this soil in mapping are small areas of Kalmia, Wakulla, Lakeland, and Centenary soils and soils that are similar to Kenansville soil except they have an organically stained layer below the subsoil and are sometimes wetter. Wakulla and Lakeland soils are on ridges and are sandier than Kenansville soil. Kalmia soils are on the edge of delineations and are more clayey. Centenary and the organically stained soils are in lower positions on the landscape than Kenansville soil. Centenary soils are also more clayey. The included soils make up less than 20 percent of this map unit.

This Kenansville soil is used mainly as woodland. In some areas it is used for cultivated crops, pasture, or hay.

The main cultivated crops are corn, tobacco, and soybeans. Leaching of plant nutrients, soil blowing, and low available water capacity are the main limitations affecting agricultural uses. Conservation tillage, crop residue management, cover crops, and grasses and legumes in the cropping system help to control wind erosion and reduce leaching.

Bahiagrass, Coastal bermudagrass, and common bermudagrass can be grown on this soil; however, the very low to low available water capacity is a limitation.

The dominant trees are loblolly pine, longleaf pine, turkey oak, and hickory. The understory includes American holly, flowering dogwood, sourwood, and sassafras. The deep sand can restrict the use of equipment, and the low available water capacity can effect seedling survival.

This soil is limited for most urban and recreational uses because of the loose sandy surface and subsurface layers. Lawns and shrubs can be difficult to maintain because of droughtiness and leaching of plant nutrients. Seepage is a limitation affecting sanitary facilities. Cutbanks cave easily.

This Kenansville soil is in capability subclass IIIs. The woodland ordination symbol is 8S.

KuB—Kureb sand, 1 to 8 percent slopes. This excessively drained soil is on long, broad, undulating ridges and on the rim of Carolina bays in the northeastern part of the county. It is most extensive in the southeastern end of large bays. Individual areas of this soil are irregular or crescent in shape and range from 5 to 75 acres.

Typically, the surface layer is gray sand about 4 inches thick. The subsurface layer to a depth of about 28 inches is white sand. The underlying material to a depth of 85 inches is sand. The upper part is light yellowish brown with streaks and bands of dark brown and dark reddish brown, the middle part is brownish yellow, and the lower part is light yellowish brown.

Permeability is rapid, and the available water capacity is very low. This soil is very strongly acid to neutral. It does not have a seasonal high water table within a depth of 6 feet. Wind erosion is a hazard.

Included with this soil in mapping are small areas of Lakeland, Centenary, and Leon soils. Also included are small areas of soils that have a continuous organically stained horizon. Centenary and Leon soils are in lower positions on the landscape than Kureb soil and are wetter. Lakeland soils are intermixed with the Kureb soil but are less sandy. The included soils make up less than 20 percent of this map unit.

Nearly all areas of this Kureb soil are woodland.

This soil is seldom used for crop production because of droughtiness, leaching of plant nutrients, and wind erosion. If this soil is used for crops, conservation tillage and the use of close-growing cover crops help to control wind erosion and reduce leaching.

Some areas of this soil are used for hay or pasture, although the very low available water capacity is a limitation. Bahiagrass, Coastal bermudagrass, and common bermudagrass are the common forages.

The dominant trees are longleaf pine and turkey oak. The understory is very sparse, consisting largely of clumps of threeawn and some lichens (fig. 1). Droughtiness, low productivity, and the loose sandy surface that can severely limit equipment use are the major concerns for woodland management.

This soil is limited for urban uses because it is a poor

Figure 1.—Vegetation is sparse on Kureb sand, 1 to 8 percent slopes.

filter for septic systems and because droughtiness and leaching of plant nutrients make grasses and shrubs difficult to establish. The loose sandy surface layer limits the suitability of this soil for recreational activities.

This Kureb soil is in capability subclass VIIs. The woodland ordination symbol is 3S.

LaB—Lakeland sand, 1 to 7 percent slopes. This excessively drained soil is on broad eolian ridges, narrow ridges along stream terraces, and Carolina bay rims throughout the survey area. Individual areas of this soil are irregular in shape and range from 10 to 200 acres or more.

Typically, the surface layer is very dark grayish brown sand about 6 inches thick. The underlying material to a depth of 88 inches is sand. It is yellowish brown and brownish yellow in the upper part, yellow in the middle part, and very pale brown in the lower part.

Areas of this soil nearest the Cape Fear River have slightly higher amounts of weatherable minerals.

Permeability is very rapid, and the available water capacity is low. This soil is very strongly acid to medium acid except where lime has been added. It does not have a seasonal high water table within a depth of 6 feet. Wind erosion is a hazard.

Included with this soil in mapping are small areas of Kenansville, Blanton, Wakulla, Centenary, Leon, and Kureb soils. Centenary and Leon soils are in lower positions on the landscape than Lakeland soil and are wetter. Kureb soils are intermixed with Lakeland soil on Carolina bay rims, but they are sandier. Kenansville, Blanton, and Wakulla soils are intermixed with the Lakeland soil throughout the map unit but are less sandy. The included soils make up less than 20 percent of this map unit.

This Lakeland soil is used mainly as woodland. In some areas it is used for pasture, hay, or crops, and some areas are idle fields.

Corn, soybeans, and hay and pasture plants are sometimes grown on this soil. Droughtiness, leaching of plant nutrients, and the hazard of wind erosion are the main limitations affecting cropland and pasture. Conservation tillage and the use of close-growing cover crops help to control wind erosion and reduce leaching.

Bahiagrass, Coastal bermudagrass, and common bermudagrass can be grown on this soil; however, droughtiness is a limitation.

The dominant trees are longleaf and loblolly pines. The understory includes turkey oak, flowering dogwood, sourwood, and sassafras. Droughtiness is the main limitation affecting woodland management. The loose sandy surface layer can limit equipment use. Survival and growth of planted seedlings are improved by bedding the land and by planting in the low areas.

This soil is limited for urban uses because it is a poor filter for septic systems and because droughtiness and leaching of plant nutrients make grasses and shrubs difficult to establish. The loose sandy surface layer limits the suitability of this soil for recreational uses.

This Lakeland soil is in capability subclass IVs. The woodland ordination symbol is 8S.

LeA—Leon sand, 0 to 3 percent slopes. This poorly drained soil is on flats and in depressions in and around Carolina bays. It is most extensive in the northeastern part of the county. Individual areas of this soil are irregular in shape or oval and range from 5 to 300 acres.

Typically, the surface layer is very dark gray sand that has many clean sand grains that give a salt-and-pepper appearance. It is about 3 inches thick. The subsurface layer to a depth of about 21 inches is sand. It is grayish brown in the upper part and white in the lower part. The subsoil is very dark brown loamy sand in the upper part and black sand in the lower part to a depth of 80 inches.

Permeability is rapid in the surface layer and moderate to moderately rapid in the subsoil. The available water capacity is low. This soil is extremely acid to strongly acid. The seasonal high water table is at or near the surface from winter to early in spring.

Included with this soil in mapping are small areas of Lynn Haven, Torhunta, and Centenary soils and some soils that have finer textured layers between depths of 40 and 60 inches. Centenary soils are in slightly higher positions on the landscape than Leon soil and are better drained. Lynn Haven and Torhunta soils are in slightly lower positions and are wetter. Also included are isolated areas of excessively drained Lakeland and Kureb soils on ridges and a few scattered areas of soils that have brittle layers in the subsoil. Typically, only two or three of the included soils are in any one delineation. The included soils generally make up less than 20 percent of this map unit.

This Leon soil is used mainly as woodland (fig. 2). In some areas it is used for blueberries, pasture, or other crops.

The main cultivated crops are corn and soybeans. The high water table can limit planting operations in the spring; however, during the dry summer months, the low available water capacity limits the growth of most crops. Leaching of plant nutrients is also a problem on this soil. This soil is used for some varieties of blueberries. During a good season, yields of 4,800 pounds per acre can be obtained. If irrigation is used, this soil can produce 9,600 pounds per acre.

If this soil is used for hay or pasture, wetness can limit grazing in winter and early in spring and droughtiness during dry summer months can make it difficult to maintain an adequate stand of grass.

The dominant trees are loblolly pine, longleaf pine, turkey oak, red maple, and redbay. The understory includes waxmyrtle, gallberry, huckleberry, fetterbush, greenbrier, and threeawn. Droughtiness during the growing season can reduce the growth of trees and the survival of planted seedlings. A seasonal high water table in winter and early in spring can limit planting or harvesting operations.

This soil is limited for most urban and recreational uses because of wetness during winter and spring or after extended periods of rain and because of the poor filtering capacity, which limits the suitability for onsite

Figure 2.—In the Bladen Lakes State Forest, longleaf pine is naturally seeded on Leon sand, 0 to 3 percent slopes.

sewage disposal. Because of droughtiness during the summer, frequent irrigation can be required for proper lawn maintenance. Lawns can also require frequent applications of fertilizer. Wetness and sandiness are the main limitations affecting recreational uses.

This Leon soil is in capability subclass IVw. The woodland ordination symbol is 5W.

Ln—Lynchburg fine sandy loam. This somewhat poorly drained soil is on broad, smooth flats on uplands. It is most extensive in the southern part of the county. Slopes are less than 2 percent. Individual areas of this soil are irregular in shape and generally range from 5 to 200 acres.

Typically, the surface layer is very dark gray fine

sandy loam about 8 inches thick. The subsoil to a depth of 65 inches is sandy clay loam that is yellowish brown in the upper part, gray in the middle part, and dark gray in the lower part.

Permeability is moderate, and the available water capacity is moderate. This soil is extremely acid to strongly acid except where lime has been added. The seasonal high water table is at a depth of 0.5 to 1.5 feet from winter to early in spring.

Included with this soil in mapping are small areas of Goldsboro, Stallings, Nahunta, Dunbar, Rains, Woodington, and Coxville soils. Goldsboro soils are in higher positions on the landscape than the Lynchburg soil and are better drained. Stallings, Nahunta, and Dunbar soils are randomly intermingled on the landscape with Lynchburg soil, and Rains, Woodington, and Coxville soils are in shallow depressions and drainageways and are wetter than Lynchburg soil. Stallings and Woodington soils are less clayey, Norhunta soils are more silty, and Dunbar and Coxville soils are more clayey. The included soils make up less than 20 percent of this map unit.

About half of the acreage of this Lynchburg soil is in cultivated crops. The rest is woodland or pastureland.

The main cultivated crops are corn, soybeans, and small grains. Artificial drainage is needed for optimum production of tobacco and other crops that require good drainage. Conservation tillage, cover crops, and grasses and legumes in the cropping system help to maintain tilth and productivity.

If this soil is used for grasses and legumes for hay and pasture, proper stocking, pasture rotation, timely deferment of grazing, and restricted use during wet periods help keep the pasture and soil in good condition.

The dominant trees are red maple, sweetgum, blackgum, loblolly pine, yellow poplar, willow oak, and water oak. The main understory includes switchcane, American holly, sourwood, and greenbrier. Wetness from November to April can restrict the use of equipment for timber planting and harvesting.

This soil is limited for most urban and recreational uses because of wetness.

This Lynchburg soil is in capability subclass IIw. The woodland ordination symbol is 9W.

Ly—Lynn Haven and Torhunta soils. These poorly drained and very poorly drained soils are in low flats, slight depressions on uplands, and in Carolina bays. They are most extensive in the northeastern part of the county. Slopes are less than 2 percent. Because these soils react similarly in use and management, they were not separated in mapping. Most areas of this map unit are about 60 percent Lynn Haven soil, 20 percent Torhunta soil, and 20 percent other soils. Some areas have both Lynn Haven and Torhunta soils; others have only one of them. The areas are oval or irregular in shape and range from 5 to 300 acres.

Typically, the Lynn Haven soil has a black sand surface layer about 9 inches thick. The subsurface layer to a depth of about 12 inches is dark grayish brown sand. The subsoil is sand to a depth of 80 inches. The upper part is black and very dark grayish brown, the middle part is black, and the lower part is dark reddish brown.

Permeability is rapid, and the available water capacity is low. This soil is extremely acid to strongly acid except where lime has been added. The seasonal high water table is at or near the surface.

Typically, the Torhunta soil has a black mucky sandy loam surface layer about 8 inches thick. The subsurface layer to a depth of about 16 inches is black sandy loam. The subsoil extends to a depth of about 47 inches. The upper part is dark grayish brown sandy loam, and the lower part is dark grayish brown loamy sand. The underlying material is light brownish gray loamy sand in the upper part. The lower part to a depth of 74 inches is light gray sand.

Permeability is moderate, and the available water capacity is low. This soil is extremely acid to strongly acid. The seasonal high water table is at or near the surface for long periods from winter to early in spring. Ponding can occur in some areas. In some low-lying areas near streams, this soil is subject to rare flooding.

Included with these soils in mapping are small areas of Woodington soils, which are similar to Torhunta soil but are better drained, and small areas of Leon soils, which are similar to Lynn Haven soil but do not have a thick black surface layer. Also included are small areas of Croatan and Pamlico soils, which have a muck surface layer more than 16 inches thick.

Lynn Haven and Torhunta soils are used mainly as woodland. A few areas have been cleared for corn and soybeans.

The Torhunta soil is dominant in areas used for corn and soybeans. Wetness is the main limitation affecting crop production. If the Torhunta soil is drained, it can produce good yields; however, drainage outlets often are not readily available. The Lynn Haven soil, even if drained, does not produce well because of the very low available water capacity during the growing season; however, some varieties of blueberries grow well on this soil.

If these soils are drained, grasses and legumes can

be grown for hay and pasture. Proper stocking, pasture rotation, and restricted use during wet seasons help keep the pasture and soil in good condition.

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

These soils are limited for most urban and recreational uses because of wetness and the possible flooding on Torhunta soil.

Lynn Haven soil is in capability subclass IVw, and Torhunta soil is in capability subclass VIw (undrained) or IIIw (drained). The woodland ordination symbol is 8W for the Lynn Haven soil and 9W for the Torhunta soil.

Na—Nahunta very fine sandy loam. This somewhat poorly drained soil is on broad, smooth flats on uplands. It is most extensive in the southern part of the county and on old stream terraces in the northern part. Slopes are less than 2 percent. Individual areas of this soil are irregular in shape and range from 5 to 60 acres.

Typically, the surface layer is dark gray very fine sandy loam about 6 inches thick. The subsoil extends to a depth of at least 65 inches. It is olive yellow loam and clay loam in the upper part, gray clay loam in the middle part, and light gray clay loam in the lower part. Red and brown mottles increase with depth.

Permeability is moderate, and the available water capacity is high. This soil is very strongly acid or strongly acid except where lime has been added. The seasonal high water table is at a depth of 1 to 2.5 feet from winter to early in spring.

Included with this soil in mapping are small areas of Exum, Goldsboro, Lynchburg, Grantham, Rains, and Dunbar soils. Exum and Goldsboro soils are better drained than Nahunta soil, and Grantham and Rains soils are wetter. Goldsboro, Lynchburg, and Rains soils are less silty, and Dunbar soils are more clayey. Typically, no more than two or three of the included soils are in any one delineation. The included soils make up less than 20 percent of this map unit.

About half of the acreage of this Nahunta soil is in cultivated crops. The rest is woodland or pastureland.

The main cultivated crops are corn, soybeans, and small grains. Artificial drainage is needed for optimum production of tobacco and other crops that require good drainage. Conservation tillage, cover crops, and grasses and legumes in the conservation cropping system help to maintain tilth.

If this soil is used for grasses and legumes for hay and pasture, proper stocking, pasture rotation, timely deferment of grazing, and restricted use during wet periods help keep the pasture and soil in good condition.

The dominant trees are loblolly pine, water oak, sweetgum, and red maple. If this soil is drained, hardwoods, such as southern red oak and white oak, can be grown. The main understory includes greenbrier, American holly, sweetbay, sourwood, sassafras, and switchcane. Wetness can restrict the use of equipment and contribute to seedling mortality.

This soil is limited for most urban and recreational uses because of wetness.

This Norhunta soil is in capability subclass IIw. The woodland ordination symbol is 9W.

NoA—Norfolk loamy fine sand, 0 to 2 percent slopes. This well drained soil is on broad, smooth flats on uplands. It is most extensive in the southwestern part of the county and on old stream terraces in the northern part. Individual areas of this soil are irregular in shape and range from 5 to 400 acres or more.

Typically, the surface layer is grayish brown loamy fine sand about 7 inches thick. The subsurface layer to a depth of about 15 inches is light yellowish brown loamy fine sand. The subsoil to a depth of 65 inches is yellowish brown fine sandy loam and sandy clay loam.

Permeability is moderate, and the available water capacity is moderate. This soil is very strongly acid or strongly acid except where lime has been added. The seasonal high water table is 4 to 6 feet below the surface from winter to early in spring.

Included with this soil in mapping are small areas of Goldsboro, Aycock, Gritney, Wagram, and Butters soils. The Goldsboro soils are in slightly lower positions on the landscape than Norfolk soil and are wetter. Aycock, Gritney, Wagram, and Butters soils are scattered throughout the map unit. Aycock soils are more silty than Norfolk soil, Gritney soils are redder and more clayey, and Wagram and Butters soils are sandier. Also included in the western part of the county are small areas of soils that have more than 5 percent plinthite in the subsoil. The included soils make up less than 20 percent of this map unit.

This Norfolk soil is used mainly for cultivated crops (fig. 3). In a few small areas, it is used as woodland, pastureland, or sites for urban development.

The main cultivated crops are corn, soybeans, small grains, tobacco, peanuts, and truck crops. Limitations affecting cultivated crops are not major; however, conservation tillage, cover crops, and close-growing grasses and legumes in the conservation cropping system help to maintain tilth and conserve moisture.

Figure 3.—Norfolk loamy fine sand, 0 to 2 percent slopes, is a prime farmland soil.

Limitations affecting production of pasture or hay are not major; however, pasture rotation and prevention of overgrazing help keep the pasture and soil in good condition.

The dominant trees are loblolly pine, longleaf pine, wnite oak, southern red oak, poplar, and hickory. The main understory includes American holly, flowering dogwood, and sassafras. Limitations affecting woodland management are not significant.

This soil is limited for some urban uses because of wetness. It has few limitations affecting recreational uses.

This Norfolk soil is in capability class I. The woodland ordination symbol is 9A.

NoB—Norfolk loamy fine sand, 2 to 6 percent slopes. This well drained soil is on convex ridges and smooth side slopes on uplands. It is most extensive in the southwestern part of the county and on old stream terraces in the northern part. Individual areas of this soil are irregular in shape and range from 5 to 100 acres or more.

Typically, the surface layer is grayish brown loamy fine sand about 7 inches thick. The subsurface layer to a depth of about 15 inches is light yellowish brown loamy fine sand. The subsoil to a depth of 65 inches is yellowish brown fine sandy loam and sandy clay loam.

Permeability is moderate, and the available water capacity is moderate. This soil is very strongly acid or strongly acid except where lime has been added. The seasonal high water table is within 4 to 6 feet of the surface from winter to early in spring. Wind and water erosion are hazards.

Included with this soil in mapping are small areas of Aycock, Gritney, and Wagram soils. Also included in the western part of the county are small areas of soils that have more than 5 percent plinthite in the subsoil. Aycock soils are more silty than the Norfolk soil, Gritney soils are redder and are more clayey, and Wagram soils are more sandy. The included soils make up less than

20 percent of this map unit.

This Norfolk soil is used mainly for cultivated crops. In a few areas it is used as woodland, pastureland, or sites for urban development.

The main cultivated crops are corn, soybeans, tobacco, small grains, peanuts, and truck crops. Susceptibility to wind and water erosion is the main limitation. Conservation tillage, cover crops, stripcropping, field borders, crop residue management, and contour farming help to control erosion.

Using this soil for pasture or hay is effective in controlling erosion. Pasture rotation and preventing overgrazing help keep the pasture and soil in good condition.

The dominant trees are loblolly pine, longleaf pine, white oak, southern red oak, poplar, and hickory. The main understory includes American holly, flowering dogwood, and sassafras. Limitations affecting woodland management are not significant.

This soil is limited for some urban uses because of wetness. It has few limitations affecting most recreational uses, although slope can be a problem in some places.

This Norfolk soil is in capability subclass IIe. The woodland ordination symbol is 9A.

NuB—Norfolk-Urban land complex, 0 to 6 percent slopes. This map unit consists of intermingled areas of Norfolk soil and Urban land in Elizabethtown, Dublin, Bladenboro, and Clarkton. It is about 40 percent Norfolk soil, 30 percent Urban land, and 30 percent other soils.

The well drained Norfolk soil is in the open, relatively undisturbed areas. Typically, the surface layer is grayish brown loamy fine sand about 7 inches thick. The subsurface layer to a depth of about 15 inches is light yellowish brown loamy fine sand. The subsoil to a depth of 65 inches is yellowish brown sandy clay loam.

Permeability is moderate, and the available water capacity is moderate. This soil is very strongly acid or strongly acid. The seasonal high water table is within 4 to 6 feet of the surface from winter to early in spring.

The Urban land part of this map unit is covered with impervious material, such as shopping centers, factories, municipal buildings, apartment complexes, houses, parking lots, and roads. Slopes generally are modified to fit the needs. The extent of site modification varies greatly. Some areas have had little disturbance, while others have been reshaped through extensive cutting, grading, and land filling.

Included in mapping are small areas of Autryville, Aycock, Goldsboro, Butters, and Wagram soils and areas that have been graded and reshaped.

The Norfolk soil is limited for urban uses, such as septic tank absorption fields, shallow excavations, and dwellings with basements, because of wetness. Limitations affecting lawns and landscaping are not significant.

Neither a capability subclass nor a woodland ordination symbol has been assigned to this map unit.

Oc—Ocilla loamy fine sand. This somewhat poorly drained soil is on broad, smooth flats on uplands. It is most extensive in the western and extreme northern parts of the county. Slopes range from 0 to 2 percent. Individual areas of this soil are irregular in shape and range from 5 to 20 acres.

Typically, the surface layer is dark grayish brown loamy fine sand about 10 inches thick. The subsurface layer to a depth of about 26 inches is pale brown loamy fine sand. The subsoil to a depth of 62 inches is sandy clay loam. It is light yellowish brown in the upper part; mottled light brownish gray, light yellowish brown, and yellowish red in the middle part; and light brownish gray in the lower part.

Permeability is moderate, and the available water capacity is low to moderate. This soil is very strongly acid or strongly acid except where lime has been added. The seasonal high water table is between 1 and 2.5 feet of the surface.

Included with this soil in mapping are small areas of Blanton, Wagram, Autryville, Woodington, and Rains soils. Also included in small areas northeast of the Cape Fear River are soils in which the subsoil is less than 20 inches thick. Blanton, Wagram, Autryville, and Goldsboro soils are in higher positions on the landscape than Ocilla soil and are better drained. In addition, Blanton soils are sandier. Woodington and Rains soils are in lower positions and are wetter. Intermingled areas of Stallings and Lynchburg soils are also included. Typically, only two or three of the included soils are in any one delineation. The included soils make up less than 20 percent of this map unit.

This Ocilla soil is used mainly for cultivated crops. In some areas it is used as woodland or pastureland.

The main crops are corn, soybeans, peanuts, and tobacco. Artificial drainage is necessary for optimum production of some crops, especially tobacco.

Grasses and legumes can be grown for hay and pasture. Proper stocking, pasture rotation, timely deferment of grazing, and restricted use during wet periods help keep the pasture and soil in good condition.

The dominant trees are loblolly pine, longleaf pine, white oak, southern red oak, and hickory. The main

understory includes flowering dogwood, sassafras, and waxmyrtle. Wetness can limit the use of equipment and contribute to seedling mortality.

This soil is limited for most urban uses because of wetness. It can be used for most recreational uses; however, the thick, sandy surface layer and wetness are limitations.

This Ocilla soil is in capability subclass IIIw. The woodland ordination symbol is 8W.

Pa—Pamlico muck, rarely flooded. This very poorly drained soil is in Carolina bays and irregularly shaped depressions on low stream terraces. It is most extensive in the northeastern part of the county. Slopes are less than 1 percent. Individual areas of this soil range from 5 to 1,000 acres or more.

Typically, this soil is black and very dark gray muck to a depth of 32 inches. The underlying material to a depth of 62 inches is very dark grayish brown sand and loamy sand. In some places this soil has a mucky peat surface layer about 3 inches thick.

Permeability is moderate in the organic layers and rapid in the underlying mineral layers. This soil is extremely acid in the muck layer except where lime has been added and is extremely acid to strongly acid in the underlying material. The seasonal high water table is at or near the surface except where this soil is drained. In some areas, it is ponded for 6 to 12 months of the year.

Included with this soil in mapping are small areas of Torhunta, Lynn Haven, and Leon soils, all of which are mineral soils and occur around the edge of delineations or in slightly higher areas within the map unit. Leon soils are better drained than Pamlico soil. Also included are small areas of Croatan soils that have loamy material below the muck layers and soils that have muck layers less than 16 inches thick. The included soils make up less than 20 percent of this map unit.

This Pamlico soil is used mainly as woodland. Some areas have been cleared for cultivated crops.

The major crops are corn and soybeans. Wetness, ponding, and high acidity are the main limitations. Drainage is necessary if this soil is used for crops; however, suitable drainage outlets are not always available. Annual soil testing is needed to maintain the delicate chemical balance required for growing cultivated crops. Once properly applied, lime and fertilizer must be worked deeply into the root zone because little or no leaching occurs in this soil.

Wetness, ponding, and high acidity also limit the use of this soil for pasture and hay. Even if this soil is properly drained, grazing probably would be difficult during very wet periods.

The dominant trees are pond pine, baldcypress, loblolly pine, and Atlantic white cedar. The understory includes sweetbay, greenbrier, titi, and gallberry. Wetness, ponding, high acidity, and low strength are the main limitations affecting woodland management. However, because this soil is poorly suited to other uses, many areas probably will remain in native woodland for some time. In its natural undrained state, this soil provides good habitat for wetland wildlife.

This soil is limited for urban and recreational uses because of wetness, ponding, possible flooding, and low strength.

This Pamlico soil is in capability subclass VIIw (undrained) or IVw (drained). The woodland ordination symbol is 5W.

PC—Pamlico muck, frequently flooded. This very poorly drained soil is on flood plains, mostly in the northeastern part of the county. Slopes are less than 1 percent. Forested areas of this soil have thick, almost impenetrable undergrowth; therefore, this soil was examined mostly along canals, trails, and logging roads. In selected areas, transects were made across the land and borings were made at specific points to verify the soil. The boundaries of this soil were drawn from limited field observations using aerial photographs as aids for interpretation. Although this soil was mapped with fewer detailed observations than were most other soils in the survey area, the mapping is adequate to meet the needs for the major anticipated uses. Individual areas of this soil range from 5 to 1,000 acres or more.

Typically, this soil is black and very dark gray muck to a depth of about 32 inches. The underlying material to a depth of 62 inches is very dark grayish brown sand and loamy sand.

Permeability is moderate in the organic layers and rapid in the underlying mineral layers. This soil is extremely acid in the muck layer except where lime has been added and is extremely acid to strongly acid in the underlying material. The seasonal high water table is at or near the surface except where this soil is drained. In some areas, this soil is ponded for 6 to 12 months of the year.

Included with this soil in mapping are small areas of Johnston, Torhunta, Lynn Haven, and Leon soils, all of which are mineral soils and occur around the edge of delineations or in slightly higher areas within the map unit. Leon soils are better drained than Pamlico soil. Also included are small areas of Dorovan soils that have thicker muck layers, Croatan soils that have loamy material below the muck layers, and soils that have muck layers less than 16 inches thick. The included

soils make up less than 20 percent of this map unit.

This Pamlico soil is used mainly as woodland. Some areas have been cleared for cultivated crops.

The major crops are corn and soybeans. Wetness, flooding, and high acidity are the main limitations. Drainage and protection from flooding are necessary if this soil is used for crops; however, suitable drainage outlets are not always available. Annual soil testing is needed to maintain the delicate chemical balance required for growing cultivated crops. Once properly applied, lime and fertilizer must be worked deeply into the root zone because little or no leaching occurs in this soil.

Wetness, flooding, and high acidity also limit the use of this soil for pasture and hay. Even if this soil is properly drained, grazing probably would be difficult during very wet periods.

The dominant trees are pond pine, baldcypress, loblolly pine, swamp tupelo, and Atlantic white cedar. The understory includes sweetbay, greenbrier, titi, and gallberry. Wetness, the hazard of flooding, high acidity, and low strength are the main limitations for woodland management. However, because this soil is poorly suited to other uses, many areas probably will remain in native woodland for some time. In its natural undrained state, this soil provides good habitat for wetland wildlife.

This soil is limited for urban and recreational uses because of wetness, flooding, and low strength.

This Pamlico soil is in capability subclass VIIw. The woodland ordination symbol is 5W.

Pe—Pantego loam. This very poorly drained soil is on low flats and in shallow, oval depressions on uplands. It is most extensive in the southern part of the county, but also occurs on old stream terraces in the northern part. Slopes are less than 2 percent. Individual areas of this soil are irregular in shape or oval and range from 5 to 1,000 acres or more.

Typically, the surface layer is black loam about 10 inches thick. The subsurface layer is very dark gray loam 4 inches thick. The subsoil extends to a depth of at least 68 inches. It is very dark gray loam in the upper part, dark gray sandy clay loam in the middle part, and gray sandy clay loam in the lower part.

Permeability is moderate. This soil is extremely acid or very strongly acid except where lime has been added. The seasonal high water table is at or near the surface from winter to early in spring.

Included with this soil in mapping are small areas of Rains, Byars, Paxville, and Torhunta soils and soils that have higher silt content than is typical for Pantego soil. Also included are small areas of soils that are similar to Pantego soil but have a muck or mucky loam surface layer. Rains soils are better drained than Pantego soil, Byars soils are more clayey, Paxville soils are thinner, and Torhunta soils are less clayey. The included soils make up less than 20 percent of this map unit.

This Pantego soil is used mainly as woodland. In some areas it is used for row crops or pasture.

The major crops are corn and soybeans. Artificial drainage is needed for optimum production; however, in some areas suitable drainage outlets are not available.

Artificial drainage is needed if this soil is used for grasses and legumes for hay and pasture. Proper stocking, pasture rotation, timely deferment of grazing, and restricted use during wet periods help keep the pasture and soil in good condition.

The dominant trees are loblolly pine, water oak, sweetgum, and red maple. The main understory includes greenbrier, American holly, sweetbay, sourwood, sassafras, and switchcane. Wetness restricts the use of equipment and contributes to seedling mortality. Harvested areas are drained or bedded and planted to loblolly pine.

This soil is limited for urban and recreational uses because of wetness.

This Pantego soil is in capability subclass VIw (undrained) or IIIw (drained). The woodland ordination symbol is 10W.

Pp—Paxville sandy loam. This very poorly drained soil is on stream terraces along the South and Black Rivers and the Turnbull and Colly Creeks. Slopes are less than 2 percent. Individual areas of this soil are irregular in shape and range from 5 to 300 acres.

Typically, the surface layer is very dark brown sandy loam about 14 inches thick. The subsoil extends to a depth of about 47 inches. The upper part is very dark gray sandy loam, the middle part is dark grayish brown sandy clay loam, and the lower part is grayish brown sandy loam. The underlying material to a depth of 70 inches is light gray sand.

Permeability is moderate in the subsoil and rapid in the underlying material. The available water capacity is high. This soil is very strongly acid to slightly acid except where lime has been added. The seasonal high water table is at or near the surface. In some areas this soil is ponded in winter and early spring. It is subject to rare flooding.

Included with this soil in mapping are small areas of Johns, Wahee, Roanoke, Cape Fear, Johnston, Lynn Haven, and Torhunta soils. Johns, Wahee, and Roanoke soils are in higher positions on the landscape than Paxville soil. Johns soils are moderately well

drained, Wahee soils are somewhat poorly drained, and Roanoke soils are poorly drained. In addition, Cape Fear, Wahee, and Roanoke soils are clayey. Johnston soils are in drainageways and transition areas between the terrace and flood plain. The other soils are scattered throughout the map unit. Johnston, Lynn Haven, and Torhunta soils are sandier than Paxville soil. Also included in scattered areas throughout the map unit are some poorly drained soils and some soils in which the subsoil extends to a depth of less than 40 inches. The included soils make up about 30 percent of the map unit.

About half the acreage of this Paxville soil is in cultivated crops or pasture. The rest is mostly in forest.

The main cultivated crops are corn and soybeans. Artificial drainage is needed for optimum growth of crops. Rare flooding can occur for brief periods.

Artificial drainage is needed if this soil is used for grasses and legumes for hay and pasture. Proper stocking, pasture rotation, timely deferment of grazing, and restricted use during wet periods help keep the pasture and soil in good condition.

The dominant trees are loblolly pine, red maple, sweetgum, water oak, willow oak, and baldcypress. The main understory includes American holly, waxmyrtle, fetterbush, and blackgum. Wetness restricts the use of equipment and contributes to seedling mortality.

The soil is limited for urban and recreational uses because of ponding and possible flooding.

This Paxville soil is in capability subclass VIw (undrained) or IIIw (drained). The woodland ordination symbol is 10W.

Pt—Portsmouth mucky sandy loam. This very poorly drained soil is in troughs, depressions, and along drainageways on terraces along the Cape Fear River. Slopes are less than 2 percent. Individual areas of this soil generally are long and narrow but can be irregular in shape. They range from 5 to 100 acres.

Typically, the surface layer is very dark grayish brown mucky sandy loam about 3 inches thick. The subsurface layer to a depth of about 17 inches is very dark grayish brown sandy loam. The subsoil extends to a depth of about 32 inches. It is very dark grayish brown sandy clay loam in the upper part, light brownish gray sandy clay loam in the middle part, and light brownish gray loamy sand in the lower part. The underlying material to a depth of 70 inches is stratified sand that is light gray in the upper part and light brownish gray in the lower part. Pockets of sandy loam are in the lower part of the subsoil and in the underlying material.

Permeability is moderate in the subsoil and rapid in the underlying material. The available water capacity is moderate. Except where lime has been added, this soil is extremely acid to strongly acid in the surface and subsurface layers and in the subsoil. It is extremely acid to medium acid in the underlying material. The seasonal high water table is within 1 foot of the surface. In a few places this soil is subject to ponding. It is also subject to rare flooding.

Included with this soil in mapping are small areas of Wasda, Croatan, Cape Fear, Roanoke, and Torhunta soils. Also included are small areas of better drained, loamy soils and areas of soils that have brighter colors in the subsoil and underlying material. Wasda and Croatan soils are in lower positions on the landscape than Portsmouth soil. These soils have a muck surface layer. Roanoke and other better drained soils are in slightly higher positions on the landscape, and the other inclusions are scattered throughout the map unit. Cape Fear and Roanoke soils are more clayey than Portsmouth soil, and Torhunta soils are sandier. The included soils make up less than 35 percent of this map unit.

This Portsmouth soil is used mainly as woodland. About a third of the acreage is in cultivated crops or pasture.

The major crops are corn, soybeans, and small grains. The high water table and the hazard of flooding are the main limitations.

Artificial drainage is needed if this soil is used for grasses and legumes for hay and pasture. Proper stocking, pasture rotation, timely deferment of grazing, and restricted use during wet periods help keep the pasture and soil in good condition.

The dominant trees are loblolly pine, sweetgum, red maple, water oak, and willow oak. The main understory includes greenbrier, ironwood, redbay, and switchcane. Wetness restricts the use of equipment for harvesting and planting and increases seedling mortality. Most harvested areas are drained, bedded, and planted to loblolly pine.

This soil is limited for urban and recreational uses because of wetness and rare flooding.

This soil is in capability subclass VIw (undrained) or IIIw (drained). The woodland ordination symbol is 10W.

Ra—Rains fine sandy loam. This poorly drained soil is on broad, smooth flats and in shallow depressions on uplands and along drainageways. It is most extensive in the southwestern part of the county and on old stream terraces in the northern part. Slopes are less than 2 percent. Individual areas of this soil are oval, irregular in

shape, or long and narrow and range from 5 to 1,000 acres or more.

Typically, the surface layer is very dark gray fine sandy loam about 8 inches thick. The subsurface layer to a depth of about 13 inches is gray fine sandy loam. The subsoil to a depth of 72 inches is sandy clay loam that is gray in the upper part and light gray in the lower part.

Permeability is moderate. This soil is very strongly acid or strongly acid except where lime has been added. The seasonal high water table is at or near the surface from winter to early in spring. In Carolina bays this soil can be ponded for brief periods following heavy rains.

Included with this soil in mapping are small areas of Coxville, Woodington, Grantham, Pantego, Lynchburg, Grifton, and Meggett soils. Coxville, Woodington, and Grantham soils are scattered throughout the map unit. Coxville soils are more clayey than Rains soil, Woodington soils are sandier, and Grantham soils are more silty. Lynchburg soils are in slightly higher positions on the landscape than Rains soil and are better drained. Pantego soils are in slightly lower positions and are wetter. Grifton and Meggett soils are adjacent to drainageways or they are scattered throughout the map unit. These soils are less acid than Rains soil. Also included are small areas of soils that are similar to Rains soil but have less than 60 inches of loamy soil material underlain by sandy stratified layers. Typically, only two or three of the included soils are in any one delineation. The included soils make up less than 20 percent of this map unit.

Most areas of this Rains soil remain forested, but some areas are in cultivated crops, hay, or pasture.

The major crops are corn, soybeans, and small grains. Artificial drainage is needed for optimum production.

This soil can be used to grow grasses and legumes for hay and pasture; however, wetness is a limitation. Proper stocking, pasture rotation, timely deferment of grazing, and restricted use during wet periods help keep the pasture and soil in good condition.

The dominant trees are red maple, sweetgum, loblolly pine, willow oak, and water oak. The main understory includes switchcane, American holly, sourwood, and greenbrier. Wetness from November to April can restrict the use of equipment and damage seedlings. Harvested areas are often drained or bedded and planted to loblolly pine.

This soil is limited for urban and recreational uses because of wetness.

This Rains soil is in capability subclass IIIw. The woodland ordination symbol is 10W.

Rn—Rains-Urban land complex. This map unit consists of intermingled areas of Rains soils and areas of Urban land in Elizabethtown, Dublin, Bladenboro, and Clarkton. About 40 percent of the acreage is undisturbed Rains soil, about 30 percent is Urban land, and 30 percent is other soils.

Typically, the poorly drained Rains soil has a very dark gray fine sandy loam surface layer about 8 inches thick. The subsurface layer to a depth of about 13 inches is gray fine sandy loam. The subsoil to a depth of 72 inches is sandy clay loam that is gray in the upper part and light gray in the lower part.

Permeability is moderate. This soil is very strongly acid except where lime has been added. Unless this soil is artificially drained, the seasonal high water table is at or near the surface from winter to early in spring.

Urban land consists of areas where the original soil has been covered by concrete, asphalt, buildings, or other impervious surfaces. Slopes have been modified to fit the site needs, but commonly range from 0 to 2 percent.

Included in mapping are small areas of Goldsboro, Lynchburg, Ocilla, Grantham, Pantego, Coxville, and Dunbar soils. Goldsboro, Lynchburg, Ocilla, and Dunbar soils are in slightly higher positions on the landscape than Rains soil and are better drained. In addition, Dunbar soils are more clayey. Pantego soils are in slightly lower positions and are wetter. Grantham and Coxville soils are scattered throughout the map unit. Grantham soils are more silty than Rains soil, and Coxville soils are more clayey. The included soils make up less than 30 percent of this map unit.

This Rains soil is limited for urban uses by wetness, but some undeveloped areas are being converted to urban uses because better drained soils are not available in the vicinity. Wetness is also a limitation affecting recreational uses. Artificial drainage can improve the suitability of the soil if an outlet can be established.

Neither a capability subclass nor a woodland ordination symbol has been assigned to this map unit.

Ro—Roanoke loam. This poorly drained soil is on low flats and in depressions or along drainageways on terraces of the Cape Fear, South, and Black Rivers. Slopes range from 0 to 2 percent. Individual areas of this soil generally are long and narrow and range from 5 to 200 acres.

Typically, the surface layer is very dark grayish brown loam about 7 inches thick. The subsoil extends

to a depth of about 52 inches. The upper part is dark grayish brown loam, the middle part is dark gray and light brownish gray clay, and the lower part is light brownish gray sandy clay loam. The underlying material to a depth of 70 inches is light brownish gray sandy loam and sand.

Permeability is slow. This soil is very strongly acid or strongly acid except where lime has been added. The seasonal high water table is at or near the surface for extended periods from winter to early in spring. In some areas this soil is ponded during wet periods. It is also subject to rare flooding in some areas.

Included with this soil in mapping are small areas of Augusta, Portsmouth, Wahee, and Cape Fear soils and some poorly drained soils that have a loamy subsoil. Augusta and Wahee soils are in higher positions on the landscape than Roanoke soil and are better drained. Cape Fear and Portsmouth soils are in lower positions and are wetter. In addition, Augusta and Portsmouth soils are less clayey. Also included are small areas of sandy soils that generally are better drained than Roanoke soil, small areas of soils that have a loamy subsoil, and areas of soils in which the subsoil does not extend to a depth of 40 inches. The included soils make up less than 20 percent of this map unit.

This Roanoke soil is used mainly as woodland. In some areas it is used for crops or pasture.

The major crops are corn, soybeans, and small grains. Artificial drainage is needed for optimum growth. Open ditching is the recommended method for drainage.

This soil can be used to grow grasses and legumes for pasture or hay; however, wetness is a limitation. Proper stocking, pasture rotation, timely deferment of grazing, and restricted use during wet periods help keep the pasture and soil in good condition.

The dominant trees are loblolly pine, water oak, sweetgum, and red maple. The main understory includes greenbrier, switchcane, and poison ivy. Wetness restricts the use of equipment and contributes to seedling mortality.

This soil is limited for urban and recreational uses because of wetness, flooding, slow permeability, and low strength.

This Roanoke soil is in capability subclass IVw (undrained) or IIIw (drained). The woodland ordination symbol is 7W.

St—Stallings loamy sand. This nearly level, somewhat poorly drained soil is on broad, smooth flats and in slight depressions on uplands, mostly in the southwestern part of the county. Individual areas are irregular in shape and range from 5 to 100 acres.

Typically, the surface layer is very dark gray loamy sand about 8 inches thick. The subsoil extends to a depth of at least 62 inches. It is pale brown sandy loam in the upper part, light brownish gray sandy loam in the middle part, and grayish brown and light gray loamy sand in the lower part. Pockets of clean sand grains are in the lower part of the subsoil.

Permeability is moderately rapid, and the available water capacity is moderate. This soil is extremely acid to strongly acid except where lime has been added. The high water table is at a depth of 1 to 2.5 feet from winter to early in spring.

Included with this soil in mapping are small areas of Butters, Foreston, Woodington, and Lynchburg soils. Butters and Foreston soils are in slightly higher positions on the landscape than Stallings soil and are better drained. Woodington soils are in slightly lower positions and are wetter. Lynchburg soils are scattered throughout the map unit and are more clayey than Stallings soil. The included soils make up less than 20 percent of this map unit.

About half of the acreage of this Stallings soil is in cultivated crops. The rest is pastureland or woodland.

The major crops are corn and soybeans. Artificial drainage is necessary for optimum production of some crops.

This soil can be used to grow grasses and legumes for hay and pasture; however, wetness is a limitation. Proper stocking, pasture rotation, timely deferment of grazing, and restricted use during wet periods help keep the pasture and soil in good condition.

The dominant trees are loblolly pine, longleaf pine, sweetgum, water oak, yellow poplar, red maple, and blackgum. The main understory includes American holly, blueberry, greenbrier, sourwood, and switchcane. Wetness can restrict the use of equipment.

This soil is limited for most urban uses because of wetness and seepage. Wetness is the main limitation affecting most recreational uses.

This Stallings soil is in capability subclass IIw. The woodland ordination symbol is 8W.

To—Toisnot loam. This poorly drained soil is around the head of drainageways and in shallow depressions adjacent to drainageways. It occupies the transition area between better drained and wetter soils and is most extensive in the southwestern part of the county. Slopes are less than 2 percent. Individual areas of this soil are irregular in shape and range from 4 to 50 acres.

Typically, the surface layer is black loam about 8 inches thick. The next layer is mixed subsoil and

subsurface layer material. This material is gray sandy loam to a depth of 21 inches and is very firm, brittle pale brown loamy sand to a depth of 31 inches. The subsoil extends to a depth of about 55 inches. It is light gray sandy clay loam in the upper part and light brownish gray sandy clay in the lower part. The underlying material to a depth of 62 inches is light brownish gray loamy sand.

Permeability is slow, and the available water capacity is low to moderate. This soil is extremely acid to strongly acid except where lime has been added. The seasonal high water table is at or near the surface from winter to early in spring. The very firm, brittle subsurface layer restricts root growth and the downward movement of water. This soil is subject to rare flooding.

Included with this soil in mapping are small areas of Rains, Stallings, Lynchburg, Woodington, Leon, and Torhunta soils. Stallings and Lynchburg soils are in slightly higher positions on the landscape than Toisnot soil and are better drained. Torhunta soils are in slightly lower positions and are wetter. Rains, Woodington, and Leon soils are scattered throughout the map unit. Rains soils are more clayey than Toisnot soil, and Woodington and Leon soils are sandier. Also included are small areas of soils that have organically stained layers either in the subsurface layer or the subsoil. The included soils make up less than 30 percent of this map unit.

This Toisnot soil is used mainly as woodland. In some areas it is used for pasture or cultivated crops.

The major crops are corn and soybeans. The main limitations are wetness and the restricted root growth in the very firm, brittle subsurface layer.

This soil can be used to grow grasses and legumes for hay and pasture; however, wetness is a limitation. Proper stocking, pasture rotation, timely deferment of grazing, and restricted use during wet periods help keep the pasture and soil in good condition.

The dominant trees are loblolly pine, water oak, blackgum, swamp tupelo, redbay, sweetbay, and sweetgum. The main understory includes American holly, blueberry, greenbrier, waxmyrtle, sweet pepperbush, and switchcane. Wetness and a brittle subsurface layer that limits root growth are the main limitations affecting woodland management.

This soil is limited for urban and recreational uses because of wetness, possible flooding, and slow permeability.

This Toisnot soil is in capability subclass Vw (undrained) or IVw (drained). The woodland ordination symbol is 8W.

Tr—Torhunta mucky sandy loam. This poorly drained soil is in oval depressions, on broad, irregularly shaped flats, and in long, narrow drainageways on uplands and old stream terraces. Slopes are less than 2 percent. Individual areas range from 5 to 1,000 acres.

Typically, the surface layer is black mucky sandy loam about 8 inches thick. The subsurface layer to a depth of about 16 inches is black sandy loam. The subsoil to a depth of about 47 inches is dark grayish brown. It is sandy loam in the upper part and loamy sand in the lower part. The underlying material to a depth of 74 inches is light brownish gray loamy sand underlain by light gray sand that has pockets of loamy sand.

Permeability is moderately rapid, and the available water capacity is moderate. This soil is extremely acid to strongly acid except where lime has been added. The seasonal high water table is at or near the surface from winter to early in spring. This soil is subject to rare flooding. In a few areas, it can be ponded for brief periods.

Included with this soil in mapping are small areas of Woodington, Pantego, Paxville, Croatan, and Wasda soils and some sandier soils; some of which have organically stained layers between depths of 10 and 40 inches. Woodington soils are in slightly higher positions on the landscape than Torhunta soil and are poorly drained. The other inclusions are scattered throughout the map unit. Pantego and Paxville soils are more clayey than Torhunta soil. Also included are small areas of Johnston soils on adjacent flood plains and scattered areas of Toisnot soils. Included in some areas northeast of the Cape Fear River are Torhunta soils that are underlain by buried clayey stream terrace soils. Generally, only two or three of the included soils are in any one delineation. The included soils make up less than 25 percent of this map unit

This Torhunta soil is used mainly as woodland. In some areas it is used for cultivated crops or pasture.

The major crops are corn, soybeans, and small grains. Good yields are common in areas that have been properly drained, but droughtiness can occur if the water table is lowered too far.

This soil can be used for grasses and legumes for hay and pasture; however, wetness is a limitation. Proper stocking, pasture rotation, timely deferment of grazing, and restricted use during wet periods help keep the pasture and soil in good condition.

The dominant trees are red maple, redbay, pond pine, sweetbay, blackgum, and loblolly pine. The understory includes waxmyrtle, greenbrier, switchcane, fetterbush, and huckleberry. Wetness, which limits equipment use and contributes to seedling mortality,

can be overcome by artificial drainage. Harvested areas are often drained or bedded and planted to loblolly pine.

This soil is limited for urban and recreational uses because of wetness and flooding.

This Torhunta soil is in capability subclass VIw (undrained) or IIIw (drained). The woodland ordination symbol is 9W.

Ud—Udorthents, loamy. This map unit consists of three kinds of areas where most or all of the natural soil has been altered by digging, grading, or filling. They are borrow areas, fill areas, and landfill areas.

Borrow areas.—In these excavated areas, the soil material has been removed for use as fill for construction. The cuts are 3 to 10 feet or more deep. The base slope in these cuts is level to gently sloping. Most cuts have two or more short, nearly vertical side slopes. The exposed surface layer consists mainly of dense, loamy marine and fluvial deposits. The areas commonly range from 3 to 30 acres. Borrow areas less than 3 acres in size are shown by a special symbol on the soil map.

Included in mapping are small intermittently ponded areas and small areas of fill material that was pushed aside during the excavation.

Some of the borrow pits have been reclaimed and seeded to grass. A few areas are naturally reseeded to wild grasses, weeds, and loblolly pine. Borrow areas commonly have poor physical properties for plant growth. The available water capacity, soil fertility, and organic matter content is low. Areas that are reseeded have a potential use as habitat for wildlife.

Fill areas.—In these areas, the original soil has been covered with fill material to a depth of 1 to 4 feet. Fill areas are primarily around the perimeter of White Lake and Bay Tree Lake. They cover poorly drained and very poorly drained soils and raise the soil surface above the seasonal high water table. These areas are allowed to stabilize for some time, and as the need arises they are used for residential and recreational development. Slopes are nearly level to gently sloping. Fill areas commonly range from 3 to 200 acres or more.

Included in mapping are small areas of urban land and of sandy Centenary and Lakeland soils, which are along the edge delineations. Also included are small areas of poorly drained and very poorly drained Leon, Lynn Haven, Torhunta, Pamlico, and Croatan soils. These soils are being covered up by the fill.

Some fill areas have been planted to loblolly pine, and some areas have been converted to urban and recreational uses or seeded to grass. Other areas have naturally reseeded to wild grasses, weeds, and loblolly pine. The properties of the filled soil material, such as available water capacity, soil fertility, and organic matter content vary greatly. If these areas are converted to urban and recreational uses, a soil test is important to determine lime and fertilizer needs for establishing lawns.

Landfill areas.—In these areas, the natural soil has been altered by landfill operations. These excavated areas consist of graded trenches that are backfilled with alternate layers of solid refuse and soil material. A final cover of about 2 feet of soil is on the surface. After the final cover is added, the surface ranges from nearly level to gently sloping.

Included in mapping are areas of undisturbed soils. These soils generally are near the edge of the delineations. The soils between the trenches are relatively undisturbed except for the final cover used to smooth the entire area.

Landfill areas generally are reseeded to grass, and permanent plant cover is maintained.

The characteristics of the soil material within this map unit vary to such a degree that interpretive statements cannot be made except when onsite examinations of the individual areas are made.

Neither a capability subclass nor a woodland ordination symbol has been assigned to this map unit.

WaB—Wagram fine sand, 0 to 6 percent slopes. This well drained soil is on broad, smooth flats and hillsides on uplands. It is most extensive in the southwestern part of the county. Individual areas of this soil are irregular in shape and range from 5 to 250 acres.

Typically, the surface layer is grayish brown fine sand about 9 inches thick. The subsurface layer to a depth of about 28 inches is pale yellow fine sand. The subsoil to a depth of 62 inches is yellowish brown sandy clay loam.

Permeability is moderate, and the available water capacity is low to moderate. This soil is very strongly acid or strongly acid except where lime has been added. It does not have a seasonal high water table within a depth of 6 feet. Wind erosion is a hazard.

Included with this soil in mapping are small areas of Autryville, Blanton, Ocilla, Norfolk, and Gritney soils and some soils that have gray mottles at a depth of 40 to 60 inches. Ocilla soils are in lower positions on the landscape than Wagram soil, and the other soils are mixed randomly throughout the map unit. Autryville and Blanton soils are sandier than Wagram soil, Ocilla soils are wetter, and Gritney soils are more clayey. Typically, only two or three of the included soils are in any one

delineation. The included soils make up less than 20 percent of this map unit.

About half of the acreage of this Wagram soil is cropland. The rest is woodland or pastureland.

The main crops are corn, soybeans, tobacco, peanuts, and truck crops. Droughtiness, soil blowing, and rapid leaching of plant nutrients are the main limitations. Conservation tillage, crop residue management, winter cover crops, and windbreaks help to control soil blowing, reduce leaching of plant nutrients, and conserve moisture. Fertilizer, particularly nitrogen, should be added in split applications.

Bahiagrass, Coastal bermudagrass, and common bermudagrass can be grown on this soil; however, droughtiness is a limitation.

The dominant trees are loblolly pine, longleaf pine, white oak, southern red oak, and hickory. The main understory includes flowering dogwood, sassafras, and waxmyrtle. The thick, sandy surface layer limits use of equipment and contributes to seedling mortality.

This soil has few limitations for most urban uses. Because of droughtiness, landscape management commonly includes frequent applications of fertilizer and irrigation during long dry periods. The thick, sandy surface layer affects some recreational uses.

This Wagram soil is in capability subclass IIs. The woodland ordination symbol is 8S.

WbB—Wagram-Urban land complex, 0 to 6 percent slopes. This map unit consists of areas of Wagram soil and Urban land that are too small and too intermingled to be mapped separately at the selected scale. About 40 percent of this map unit is Wagram soil, about 30 percent is Urban land, and about 30 percent is other soils. This map unit is most extensive in and around Elizabethtown. The areas are irregular in shape and range from 10 to 250 acres or more.

Typically, Wagram soil has a grayish brown fine sand surface layer about 9 inches thick. The subsurface layer to a depth of about 28 inches is pale yellow fine sand. The subsoil to a depth of 62 inches is yellowish brown sandy clay loam.

Permeability is moderate, and the available water capacity is low to moderate. This soil is very strongly acid or strongly acid except where lime has been added. It does not have a seasonal high water table within a depth of 6 feet.

Urban land consists of areas where the original soil has been covered by concrete, asphalt, buildings, or other impervious surfaces. Slopes are modified to fit the site needs and commonly range from 0 to 3 percent.

Included in mapping are small, scattered areas of Autryville, Blanton, Norfolk, and Goldsboro soils. Autryville and Blanton soils are similar to Wagram soil except they are sandier. Norfolk soils are less sandy. Goldsboro soils generally are in small depressions and are wetter and less sandy than Wagram soil.

Some undeveloped areas of Wagram soil are being converted to urban uses. Because of droughtiness, landscape management commonly includes frequent applications of fertilizer and irrigation during long dry periods. The thick, sandy surface layer is a slight limitation affecting some urban and recreational uses.

Neither the capability subclass nor a woodland ordination symbol has been assigned to this map unit.

We—Wahee loam. This somewhat poorly drained soil is on low flats and in depressions or along drainageways on terraces of the Cape Fear, South, and Black Rivers. Slopes are less than 2 percent. Individual areas of this soil typically are long and narrow and range from 5 to 50 acres or more.

Typically, the surface layer is dark grayish brown loam about 7 inches thick. The subsoil extends to a depth of about 45 inches. The upper part is pale brown clay loam, the middle part is grayish brown clay, and the lower part is light brownish gray clay and sandy clay loam. The underlying material to a depth of 60 inches is light gray sandy loam.

Permeability is slow, and the available water capacity is high. Shrink-swell potential is moderate. This soil is very strongly acid or strongly acid except where lime has been added. The seasonal high water table is 0.5 to 1.5 feet below the surface from winter to early in spring. Surface runoff is slow, resulting in ponding of water in some areas during wet periods. This soil is subject to rare flooding.

Included with this soil in mapping are small areas of Augusta, Altavista, Roanoke, and Cape Fear soils. Augusta and Altavista soils are in slightly higher positions on the landscape than Wahee soil and are less clayey. In addition, Altavista soils are better drained. Roanoke and Cape Fear soils are in slightly lower positions on the landscape and are wetter. Also included are small areas of soils similar to Wahee soil except they are better drained. The included soils make up less than 20 percent of this map unit.

This Wahee soil is used mainly as woodland. In some areas it is used for row crops or pasture.

The major crops are corn and soybeans. Wetness is the main limitation. Open ditch drainage systems can lower the water table and remove surface water more rapidly; however, suitable outlets may not be available in some areas. Even if this soil is drained, tillage can be

delayed in spring because of wetness. If this soil is plowed when wet, large clods form on the surface and become hard and brittle upon drying.

Grasses and legumes for hay and pasture can grow on this soil, although wetness is a limitation. Proper stocking, pasture rotation, and restricted use during wet periods help keep the pasture and soil in good condition.

The dominant trees are loblolly pine, sweetgum, willow oak, water oak, blackgum, and red maple. The main understory includes ironwood, sourwood, American holly, and hawthorn. Wetness can restrict the use of equipment and damage seedlings.

This soil is limited for nearly all urban and recreational uses because of wetness, slow permeability, flooding, and high clay content in the subsoil.

This Wahee soil is in capability subclass IIw. The woodland ordination symbol is 9W.

WgB—Wakulla sand, 1 to 6 percent slopes. This somewhat excessively drained soil is on broad eolian ridges and on stream terraces, mainly throughout the northeastern part of the county and along the Big Swamp in the western part. Individual areas of this soil are irregular in shape and range from 5 to 200 acres or more.

Typically, the surface layer is grayish brown sand about 6 inches thick. The subsurface layer to a depth of about 30 inches is light yellowish brown sand. The subsoil to a depth of about 50 inches is yellowish brown loamy sand. The underlying material to a depth of 80 inches is sand that is yellow in the upper part and very pale brown in the lower part.

Permeability is rapid, and the available water capacity is low or very low. This soil is very strongly acid to medium acid except where lime has been added. It does not have a seasonal high water table within a depth of 6 feet. Wind erosion is a hazard.

Included with this soil in mapping are small areas of Lakeland, Centenary, Autryville, Blanton, and Kenansville soils. Centenary soils are in lower positions on the landscape than Wakulla soil and are wetter. Lakeland soils are sandier than Wakulla soil, and Autryville, Blanton, and Kenansville soils are more clayey. The included soils make up less than 20 percent of this map unit.

This Wakulla soil is used mainly as woodland. In some areas it is used for pasture or hay. A small acreage is cropland or idle fields.

Where this soil is cultivated, the major crops are corn, soybeans, and tobacco. Low available water capacity, soil blowing, and leaching of plant nutrients are the main limitations. Conservation tillage, crop residue management, winter cover crops, windbreaks, and close-growing grasses and legumes in the cropping system help to control soil blowing, reduce leaching, and conserve moisture. Fertilizer, especially nitrogen, should be applied in split applications for best results.

The use of this soil for pasture or hay is effective in controlling soil blowing. Coastal bermudagrass and bahiagrass are the most suitable pasture plants.

The dominant trees are loblolly pine, longleaf pine, and turkey oak. The understory includes American holly, flowering dogwood, sourwood, and sassafras. The deep sand can restrict the use of equipment, and the low available water capacity can reduce the survival of seedlings.

Because this soil is sandy throughout, it is limited for some urban and recreational uses. Rapid permeability, which results in poor filtration of effluent, is a limitation affecting onsite sewage disposal. Because of low available water capacity and rapid leaching of plant nutrients, lawns and shrubs require frequent applications of fertilizer and irrigation during long, dry periods.

This Wakulla soil is in capability subclass IIIs. The woodland ordination symbol is 7S.

Wh—Wasda muck. This nearly level, very poorly drained soil is on smooth to slightly concave slopes on terraces along the Cape Fear River. It is most extensive in the Kelly community. Individual areas of this soil are elongated to irregular in shape and range from 5 to 600 acres.

Typically, the surface layer is black and very dark brown muck about 14 inches thick. The subsurface layer to a depth of about 23 inches is very dark grayish brown sandy loam. The subsoil to a depth of about 32 inches is dark grayish brown sandy clay loam. The underlying material is dark grayish brown loamy sand in the upper part. The lower part to a depth of 62 inches is light brownish gray sand.

Permeability is moderate in the subsurface layer and subsoil and rapid in the underlying material. The available water capacity is moderate. This soil is extremely acid to strongly acid in the surface and subsurface layers and in the subsoil. It is slightly acid to moderately alkaline in the underlying material. Under natural conditions, the seasonal high water table is within a depth of 1 foot. Where this soil has been extensively drained, the seasonal high water table is 2 to 3 feet below the surface. This soil is subject to rare flooding.

Included with this soil in mapping are small areas of Croatan, Cape Fear, Portsmouth, Torhunta, and Lynn Haven soils. Croatan soils are in slightly lower positions on the landscape than Wasda soil and have a thicker muck surface layer. Cape Fear, Portsmouth, Torhunta, and Lynn Haven soils are along the edge of delineations or in slightly higher positions on the landscape. Cape Fear and Portsmouth soils are more clayey than Wasda soil, and Torhunta and Lynn Haven soils are sandier. The included soils make up about 20 percent of this map unit.

This Wasda soil is used mainly for cultivated crops. In a few areas it is used as woodland or pastureland.

The major crops are corn, soybeans, pasture, and some truck crops. Drainage is necessary for optimum yields. Because of the high organic matter content of this soil, soil samples are needed every year to determine the pH level. A very narrow pH range must be maintained to prevent micronutrient deficiencies and to maintain maximum yields.

Under natural conditions, this soil is limited for all woodland uses except for production of wetland species. If this soil is drained, timber production is good. Wetland species, such as baldcypress, sweetgum, water oak, pond pine, and upland species, such as loblolly pine, will grow, depending upon the degree of drainage. The understory generally is greenbrier, sweet pepperbush, redbay, sweetbay, waxmyrtle, sourwood, and switchcane.

This soil is limited for urban and recreational uses because of wetness, possible flooding, and the high content of organic matter.

This Wasda soil is in capability subclass VIw (undrained) or IIIw (drained). The woodland ordination symbol is 9W.

WmB—Wickham fine sandy loam, 1 to 6 percent slopes. This well drained soil is on slightly convex ridges on terraces along the Cape Fear River. Individual areas of this soil generally are long and narrow and parallel the stream channel. The areas range from 5 to 200 acres.

Typically, the surface layer is dark brown fine sandy loam about 7 inches thick. The subsoil to a depth of about 43 inches is yellowish red. It is sandy clay loam in the upper part and sandy loam in the lower part. The underlying material is reddish yellow loamy sand in the upper part. The lower part to a depth of 65 inches is reddish yellow sand that has pockets of yellowish red loamy sand.

Permeability is moderate in the subsoil and rapid in the underlying material. The available water capacity is moderate. This soil is very strongly acid to medium acid except where lime has been added. The hazard of erosion is moderate. This soil is subject to rare flooding. It does not have a seasonal high water table within a depth of 6 feet.

Included with this soil in mapping are small areas of Lakeland, Altavista, Augusta, and Dogue soils. Lakeland soils are on higher ridges and are sandier than Wickham soil. Altavista, Augusta, and Dogue soils are in slightly lower positions on the landscape than Wickham soil and are wetter. In addition, Dogue soils are more clayey. Also included are small areas of soils that are similar to Wickham soil; some have a yellow subsoil, some have a clayey subsoil, some have a thick, sandy surface layer, and others have a thinner subsoil. The included soils make up less than 20 percent of this map unit.

About half the acreage of this Wickham soil is woodland. The rest is in cultivated crops or pasture.

The major crops are corn, soybeans, tobacco, and small grains. Susceptibility to erosion is the main limitation. Conservation tillage, winter cover crops, stripcropping, field borders, contour farming, and crop residue management reduce surface runoff and maintain tilth. Using this soil for pasture maintains constant cover, which is effective in controlling erosion.

The dominant trees are loblolly pine, red maple, hickory, yellow poplar, wild cherry, American elm, American beech, southern red oak, water oak, and white oak. The understory includes flowering dogwood, sassafras, sourwood, and waxmyrtle. Limitations affecting woodland management are not significant.

This soil is limited for some urban and recreational uses because of rare flooding.

This Wickham soil is in capability subclass IIe. The woodland ordination symbol is 9A.

WN—Wilbanks loam, frequently flooded. This very poorly drained soil is on flood plains in the southern part of the county. Slopes are less than 2 percent. Forested areas of this soil have thick, almost impenetrable undergrowth; therefore, this soil was examined mostly along canals, trails, and logging roads. In selected areas, transects were made across the land and borings were made at specific points to verify the soil. The boundaries of this soil were drawn from limited field observations, using aerial photographs as aids for interpretation. Although this soil was mapped with fewer detailed observations than were most other soils in the survey area, the resulting delineations will meet the needs for the major anticipated uses. Individual areas of this soil are irregular in shape or long and narrow and

Figure 4.—The dark surface of Woodington loamy sand contrasts with the lighter surface of Norfolk loamy fine sand.

range from 5 to 1,000 acres or more.

Typically, the surface layer is 28 inches thick. It is very dark gray loam in the upper part and black clay loam in the lower part. The subsoil extends to a depth of about 65 inches. The upper part is dark gray clay that has tongues of black surface material. The middle part is grayish brown clay loam. The lower part is dark grayish brown fine sandy loam. The underlying material to a depth of 80 inches is dark grayish brown loamy sand.

Permeability is slow, and the available water capacity is high. This soil is extremely acid to strongly acid in the upper 40 inches of the profile except where lime has been added. It is very strongly acid to neutral below that depth. The seasonal high water table is at or near the surface for several months each year.

Included with this soil in mapping are small areas of Johnston, Meggett, and Grifton soils. Johnston soils are scattered throughout the map unit. Meggett and Grifton soils are along the edge of delineations or in slightly

higher positions on the landscape than Wilbanks soil and are better drained. Johnston and Grifton soils are less clayey. The included soils make up less than 20 percent of this map unit.

This Wilbanks soil is used mainly as woodland. Small acreages are in cultivated crops or pasture.

If adequately drained, this soil can be used for cultivated crops, such as corn, soybeans, and small grains. It is on the lowest part of the landscape, however, and drainage outlets may be hard to establish. Wetness and the hazard of flooding are the main limitations affecting crop production.

Grasses and legumes for hay and pasture can grow on this soil, although wetness and the hazard of flooding are limitations. Proper stocking, pasture rotation, timely deferment of grazing, and restricted use during wet periods help keep the pasture and the soil in good condition.

Water-tolerant trees, such as water oak, sweetgum, baldcypress, water tupelo, swamp chestnut oak, red maple, overcup oak, and willow oak, are dominant. The main understory includes greenbrier, sourwood, and switchcane. Wetness and the hazard of flooding are the main limitations affecting woodland management. If this soil is adequately drained, loblolly pine will grow. Bedding of the rows before planting reduces seedling mortality.

This soil is limited for urban and recreational uses because of frequent flooding and wetness.

This Wilbanks soil is in capability subclass Vlw. The woodland ordination symbol is 7W.

Wo—Woodington loamy sand. This poorly drained soil is on broad, smooth, low flats and in shallow depressions on uplands. It is most extensive in the southwestern part of the county. Slopes are less than 2 percent. Individual areas of this soil are irregular in shape and range from 5 to 100 acres.

Typically, the surface layer is very dark gray loamy sand about 6 inches thick (fig. 4). The subsurface layer to a depth of about 12 inches is light brownish gray loamy sand. The subsoil extends to a depth of at least 62 inches. It is gray sandy loam in the upper part, light brownish gray sandy loam in the middle part, and light gray loamy sand in the lower part.

Permeability is moderately rapid, and the available water capacity is moderate. This soil is extremely acid to medium acid except where lime has been added. The seasonal high water table is at a depth of 0.5 to 1 foot from winter to early in spring.

Included with this soil in mapping are small areas of Rains, Stallings, Lynchburg, Toisnot, Torhunta, and Leon soils. Also included are small areas of soils that have organically stained layers either in the subsurface layer or subsoil and small areas of soils that are bisequum. Stallings and Lynchburg soils are in slightly higher positions on the landscape than Woodington soil and are better drained. Lynchburg soils are more clayey. Torhunta soils are in slightly lower positions on the landscape and are wetter. Rains, Toisnot, and Leon soils are scattered throughout the map unit. Rains soils are more clayey than Woodington soil, Toisnot soils are brittle, and Leon soils are sandier. The included soils make up less than 20 percent of this map unit.

This Woodington soil is used mainly as woodland. In some areas it is used for pasture or cultivated crops.

The dominant crops are corn and soybeans. Artificial drainage is needed for optimum production.

Grasses and legumes for hay and pasture can grow, although wetness is a limitation. Proper stocking, pasture rotation, timely deferment of grazing, and restricted use during wet periods help keep the pasture and soil in good condition.

The dominant trees are loblolly pine, sweetgum, water oak, red maple, and blackgum. The main understory includes American holly, blueberry, greenbrier, sourwood, and switchcane. Wetness can restrict the use of equipment.

This soil is limited for urban and recreational uses because of wetness.

This Woodington soil is in capability subclass Vlw (undrained) or IIIw (drained). The woodland ordination symbol is 8W.

Prime Farmland

In this section, prime farmland is defined and discussed, and the prime farmland soils in Bladen County are listed.

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

Prime farmland soils, as defined by the U.S. Department of Agriculture, are soils that are best suited to producing food, feed, forage, fiber, and oilseed crops. Such soils have properties that are favorable for the economic production of sustained high yields of crops. The soils need only to be treated and managed using acceptable farming methods. The moisture supply, of course, must be adequate, and the growing season has to be sufficiently long. Prime farmland soils produce the highest yields with minimal inputs of energy and economic resources. Farming these soils results in the least damage to the environment.

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

Prime farmland soils usually get an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The acidity level of the soils is acceptable. The soils have few or no rocks and are permeable to water and air. They are not excessively erodible or saturated with water for long periods and are not subject to frequent flooding during the growing season. The slope ranges mainly from 0 to 6 percent.

The following map units, or soils, make up prime farmland in Bladen County. The location of each map unit is shown on the detailed soil maps at the back of this publication. The extent of each unit is given in table 4. The soil qualities that affect use and management are described in the section "Detailed Soil Map Units." This list does not constitute a recommendation for a particular land use.

Soils that have limitations, such as a high water table or flooding, may qualify as prime farmland if these limitations are overcome by such measures as drainage or flood control. In the following list, the measures needed to overcome the limitations of a map unit, if any, are shown in parentheses after the map unit name. Onsite evaluation is necessary to determine if the limitations have been overcome by the corrective measures.

AaA	Altavista fine sandy loam, 0 to 3 percent slopes
At	Augusta sandy loam
AyB	Aycock very fine sandy loam, 1 to 4 percent slopes
DgA	Dogue sandy loam, 0 to 3 percent slopes
DuA	Duplin sandy loam, 0 to 3 percent slopes
ExA	Exum very fine sandy loam, 0 to 3 percent slopes
Fo	Foreston loamy sand
GbA	Goldsboro sandy loam, 0 to 3 percent slopes
Jh	Johns fine sandy loam
KaA	Kalmia loamy fine sand, 0 to 3 percent slopes
NoA	Norfolk loamy fine sand, 0 to 2 percent slopes
NoB	Norfolk loamy fine sand, 2 to 6 percent slopes
WmB	Wickham fine sandy loam, 1 to 6 percent slopes

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 for predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as rangeland and 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 that is in harmony with nature.

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

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

Crops and Pasture

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

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

The soils in Bladen County generally are low in natural fertility, and they are naturally acid. They require additions of lime and fertilizer for most crop production.

Lime requirements are a major concern because the acidity level in the soil affects the activity of beneficial bacteria and the availability of many of the nutrient elements. Lime also neutralizes exchangeable aluminum, which counteracts the adverse effects of high levels of aluminum on many crops. Liming adds calcium (calcitic lime) or calcium and magnesium (dolomitic lime) to the soil.

A soil test is used as a guide to indicate the amount and kind of lime that should be used. In soils that have a sandy surface texture, for example, magnesium and available calcium levels can be low. The desired pH levels can differ depending upon the soil properties and the crop.

Nitrogen fertilization is required for most crops. It generally is not required for peanuts, clover, in some rotations of soybeans, or for alfalfa after it has been established. A soil test is not available for predicting nitrogen requirements. Appropriate rates are discussed in the section "Yields Per Acre." Because nitrogen can be readily leached from sandy soils, applications of nitrogen on these soils may be needed more than once during the growing season.

Phosphorus and potassium fertilizer needs can be predicted by soil tests. Requirements for these nutrients

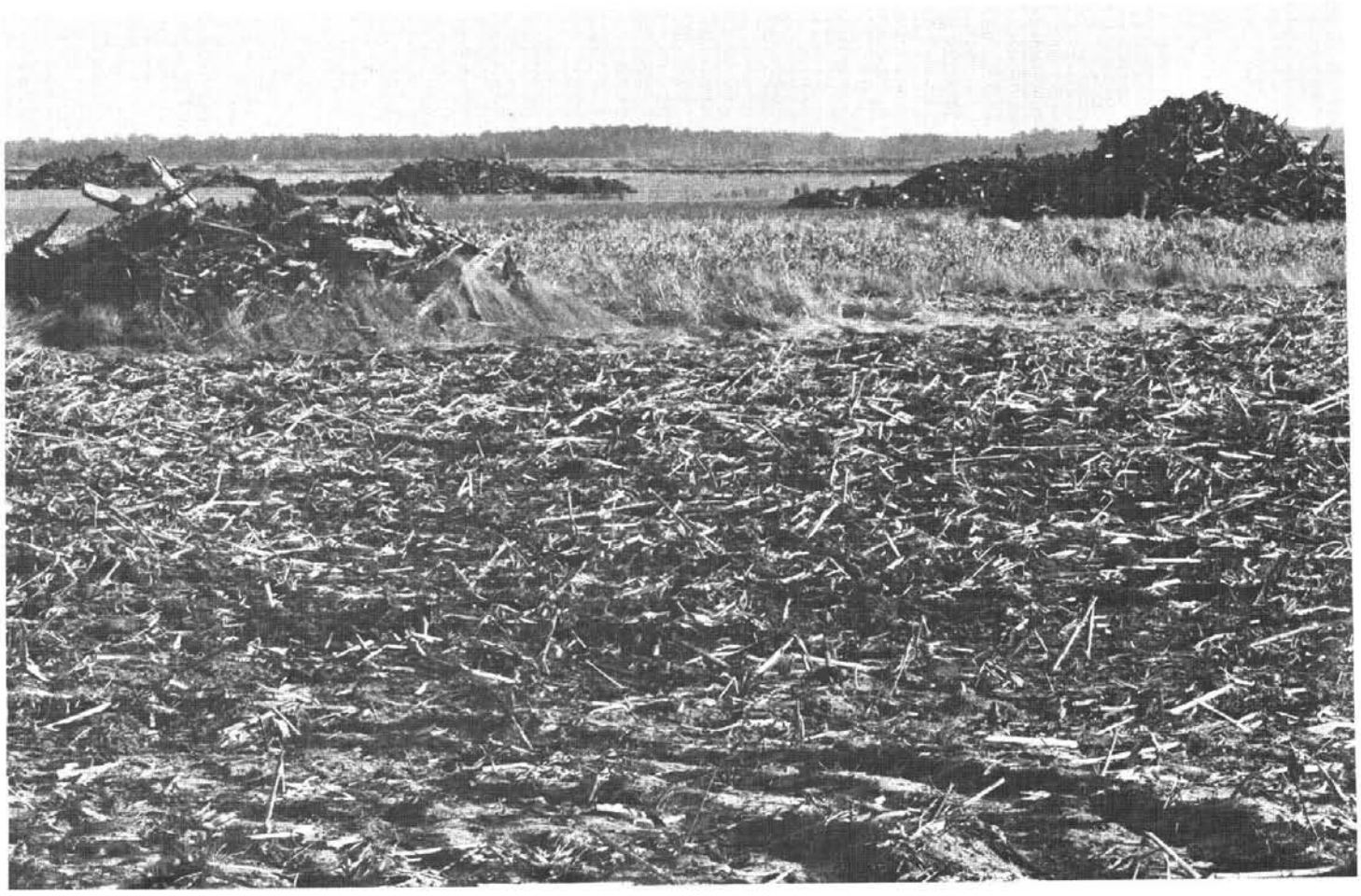


Figure 5.—Roots have been raked and piled in this recently cleared area of Torhunta mucky sandy loam. In the past few years, many woodland areas in Bladen County have been cleared for use as cropland.

are needed because past applications of phosphorus and potassium tend to build up in the soil.

Chemical Weed Control

The use of herbicides for weed control in crops is a common practice in Bladen County. Successful use leads to less tillage and is an integral part of modern farming. Soil properties, such as content of organic matter and texture of the surface layer, affect the rate of herbicide application. Estimates for these properties were determined for the soils in the county. Table 14 shows a general range of organic matter content. The surface texture is shown in table 13 in the USDA texture column.

In some cases, the content of organic matter can be outside the range shown in table 14. It can be higher in soils that have received high amounts of animal or manmade waste. Soils that have been recently brought into cultivation can have a higher content of organic matter than similar soils that have been in cultivation for a long time. Conservation tillage increases levels of organic matter in the surface layer. Lower levels are common in soils if the surface layer has been partly or completely removed by erosion, land smoothing, or other activities. Current soil tests are needed to measure the content of organic matter before determining required herbicide rates. The herbicide label shows specific application rates based on content of organic matter and texture of the surface layer.

Farming in Bladen County is following a nationwide pattern. The size of farms is increasing, and the number of farms is decreasing. Farmers are increasing acreage by using more and better machinery and other advances in agricultural technology. Many woodland

areas have been cleared for row crops during the past few years (fig. 5). Wetland areas that were previously considered unfarmable are also being cleared and drained by using improved equipment and drainage techniques, but certain fragile wildlife habitats are being destroyed in the process.

The soils in the county vary greatly in their suitability for specific crops and in their management requirements. However, the soils can mostly be placed in one of several groups for purposes of discussion. These groups are based on the dominant management practices needed for growing crops common to the survey area.

According to the 1978 North Carolina Land Utilization Survey from the North Carolina Crop and Livestock Reporting Service, Bladen County had about 91,865 acres in crops and pasture in 1977. Of this, 78,053 acres was used for row crops, 6,779 acres was used for pasture and hay, and 7,033 acres was idle cropland.

The major crops are tobacco, corn, soybeans, peanuts, and small grains. Corn and soybeans dominate the acreage planted, but flue-cured tobacco is by far the biggest income producer. The amount of truck crops, such as cucumbers, sweet peppers, sweet potatoes, tomatoes, and watermelons, is increasing each year. Blueberries are the major fruit crop. Smaller acreages are in grapes and strawberries.

Wetness is a limitation on about 70 percent of the soils in Bladen County and on 50 percent of the cropland. Excess water is removed by surface ditches or by tile placed beneath the soil surface, or both. Land smoothing is used in some areas to remove low spots where water collects. The kind of water management system used varies with the kind of soil.

Soils that have a clayey subsoil, such as Duplin, Dunbar, Coxville, Byars, Wahee, Dogue, Roanoke, Cape Fear, Meggett, and Wilbanks soils require open ditch drainage because of a poor response to tile drainage. Spacing between ditches must be fairly close to provide adequate drainage.

Soils that have a loamy subsoil but still contain an appreciable amount of clay, such as Lynchburg, Rains, Pantego, Ocilla, Nahunta, Grantham, Exum, Augusta, Portsmouth, Johns, Grifton, Altavista, Goldsboro, and Paxville soils respond well to both tile and open ditch drainage. Often, open ditches are required as an outlet for tile drains.

Soils that have a loamy subsoil and only small amounts of clay, such as Stallings, Foreston, Woodington, Johnston, and Torhunta soils, respond well to both tile and open ditch drainage; however, ditches in these soils tend to cave and fill.

Soils that are sandy throughout, such as Leon and Lynn Haven soils, generally are drained by open ditches, but the cutbanks are highly susceptible to caving and filling.

The organic soils, such as Croatan, Dorovan, and Pamlico soils, do not respond well to tile drains. These soils can be drained by a system of parallel open ditches where suitable outlets are available. To remove potholes from the field and improve surface drainage, the land between the ditches is shaped to crown in the middle and slope slightly toward the ditches.

Water erosion is a hazard on about 4 percent of the cropland in Bladen County. Some Aycock, Duplin, Exum, Goldsboro, Gritney, Norfolk, and Wickham soils are sloping and, therefore, are susceptible to water erosion.

Water erosion causes a loss of topsoil, fertilizer nutrients, and other chemicals. Much of the soil eroded from these fields enters streams as sedimentation. Reducing erosion improves crop production by retaining topsoil for moisture infiltration, nutrients for plant growth, and other chemicals for weed and insect control. Reducing erosion also improves water quality.

On cropland, sedimentation from field erosion is most noticeable in long, narrow, natural depressions. Shaping and seeding these areas in perennial grasses can prevent washing by surface runoff. Terraces and diversions are sometimes needed to complete the safe disposal of water on these soils. Field edges are also susceptible to erosion. Grassed edges of field borders with perennials, such as tall fescue, serve as protective strips. Sediment, nutrients, and other chemicals can be trapped by the field border vegetation. Minimum or no-till operations are very effective in preventing soil loss. Crop residue or a cover crop protects erodible soils, especially in winter and early in spring. Tobacco, corn, and soybeans are the major crops grown on soils susceptible to water erosion.

Wind erosion is a hazard on about 40 percent of the cropland in Bladen County. Soils that have a sandy surface layer, such as Autryville, Blanton, Butters, Centenary, Kenansville, Kureb, Lakeland, Norfolk, Wagram, and Wakulla soils, are susceptible to wind erosion. Leaving the surface layer covered with crop residue or keeping a cover crop on the land until planting time helps to control wind erosion, conserve moisture, and reduce nutrient leaching on these droughty, infertile soils. Windbreaks are used to control wind erosion in large, open areas of sandy soils. Leaving strips of small grains between vegetable or tobacco rows reduces the destructive effect of blowing sand on young seedlings. Corn, soybeans, tobacco,

peanuts, and truck crops are grown on many acres of soils subject to wind erosion.

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.

A high level of management includes maintaining proper soil reaction and fertility levels as indicated by standard soil tests. Nitrogen rates for corn on soils that have a yield potential of 125 to 150 bushels per acre should be 140 to 160 pounds of nitrogen per acre. Where the yield potential is only 100 bushels per acre, then rates of 100 to 120 pounds of nitrogen per acre should be used. Application of nitrogen in excess of potential yields generally is not a sound practice. Excess fertilizer not used by a crop causes water pollution as well as an unnecessary expense. If corn or cotton follow harvested soybeans or peanuts, nitrogen rates can be reduced 20 to 30 pounds per acre.

For yields of irrigated crops, it is assumed that the irrigation system is adapted to the soils and to the crops grown, that good quality irrigation water is uniformly applied as needed, and that tillage is kept to a minimum.

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 for those crops.

Land Capability Classification

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

In the capability system, soils are generally grouped at two levels: capability class and subclass. 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 few 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 they 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. There are no class VIII soils in Bladen county.

Capability subclasses are soil groups within one

class. They are designated by adding a small letter, *e*, *w*, or *s* to the class numeral, for example, IIw. The letter *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); and *s* shows that the soil is limited mainly because it is shallow or droughty.

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

The capability classification of each map unit is given in the section "Detailed Soil Map Units" and in table 5.

Woodland Management and Productivity

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

Forest managers are faced with the challenge of producing greater yields from smaller areas of forest land. Meeting this challenge requires an intensity of management and silvicultural practices little expected a few decades ago. Many of the silvicultural techniques applied in forestry resemble those long practiced in agriculture. The techniques include establishing, weeding, and thinning a desirable young stand; propagating more productive species and genetic varieties; planning for short rotations and complete fiber utilization; controlling insects, diseases, and weeds; and increasing growth by fertilization and drainage. Even though timber crops require decades to grow, the goal of intensive management is similar to the goal of intensive agriculture—to produce the greatest yield of the most valuable crop as quickly as possible.

Commercial forests cover 424,374 acres, or about 75 percent of the land area of Bladen County *(20)*. Commercial forest land is land that is producing or is capable of producing crops of industrial wood and is not withdrawn from timber utilization. Loblolly pine is the most important timber species in the county because it grows fast, is adapted to the soil and climate, brings the highest average sale value per acre, and is easy to establish and manage.

One of the first steps for intensively managing forest land is to determine the productive capacity of the soil for alternative tree species. The most productive and valued trees are then selected for each parcel of land. Site and yield information enables a forest manager to estimate future wood supplies. These estimates are the basis of decisions concerning expenses and profits associated with intensive forest management, land acquisition, or industrial investments.

The productive capacity of forest lands depends on physiography, soil properties, climate, and the effects of past management. Specific soil properties and site characteristics, including soil depth, texture, structure, and depth to water table, affect forest productivity primarily by influencing available water capacity, aeration, and root development. The interaction of these soil properties and site characteristics determine site productivity.

This soil survey can be used by woodland managers planning ways to increase the productivity of forest land. Some soils respond better to fertilization than others, and some are more susceptible to landslides and erosion after roads are built and timber is harvested. Some soils require special efforts to reforest. In the section "Detailed Soil Map Units," each map unit in the survey area suitable for producing timber presents information about limitations for harvesting timber and management concerns for producing timber. The common forest understory plants are also listed. Table 6 summarizes this forestry information and rates the soils for a number of factors to be considered in management. *Slight, moderate*, and *severe* are used to indicate the degree of the major soil limitations to be considered in forest management.

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

Table 6 lists the *ordination symbol* for each soil. The first part of the ordination symbol, a number, indicates the potential productivity of a soil for the indicator species in cubic meters per hectare. The larger the number, the greater the potential productivity. Potential productivity is based on the site index and the point where mean annual increment is the greatest.

The second part of the ordination symbol, a letter, indicates the major kind of soil limitation for use and management. The letter *W* indicates a soil in which excessive water, either seasonal or year-round, causes a significant limitation. The letter *S* indicates a dry, sandy soil. The letter *A* indicates a soil that has no significant restrictions or limitations for forest use and management. If a soil has more than one limitation, the priority is as follows: W and S.

Ratings of the *erosion hazard* indicate the probability that damage may occur if site preparation activities or harvesting operations expose the soil. The risk is *slight* if no particular preventive measures are needed under

ordinary conditions; *moderate* if erosion control measures are needed for particular silvicultural activities; and *severe* if special precautions are needed to control erosion for most silvicultural activities. Ratings of *moderate* or *severe* indicate the need for construction of higher standard roads, additional maintenance of roads, additional care in planning of harvesting and reforestation operations, or use of specialized equipment.

Ratings of *equipment limitation* indicate limits on the use of forest management equipment, year-round or seasonal, because of such soil characteristics as wetness or susceptibility of the surface layer to compaction. The rating is *slight* if equipment use is restricted by soil wetness for less than 2 months and if special equipment is not needed. The rating is *moderate* if soil wetness restricts equipment use from 2 to 6 months per year or if special equipment is needed to avoid or reduce soil compaction. The rating is *severe* if soil wetness restricts equipment use for more than 6 months per year or if special equipment is needed to avoid or reduce soil compaction. Ratings of *moderate* or *severe* indicate a need to choose the most suitable equipment and to carefully plan the timing of harvesting and other management operations.

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

The potential productivity of *common trees* on a soil is expressed as a *site index*. Common trees are listed in the order of their observed general occurrence. Generally, only two or three tree species dominate. The productivity of the soils in this survey is mainly based on loblolly pine *(10)*.

The *site index* is determined by taking height measurements and determining the age of selected trees within stands of a given species. This index is the average height, in feet, that the trees attain in a specified number of years. This index applies to fully stocked, even-aged, unmanaged stands. The procedure and technique for determining site index are given in the site index tables used for the Bladen County Soil Survey *(3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 19)*.

The *productivity class* represents an expected volume produced by the most important trees, expressed in cubic feet per acre. It can be converted to board feet by multiplying by a factor of about 5. For example, productivity of 114 cubic feet per acre per year at the point where mean annual increment culminates is about 568 board feet per acre per year.

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

Recreation

In table 7, the soils of the survey area are rated according to the limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 7, 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 7 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 10 and interpretations for dwellings without basements and for local roads and streets in table 9.

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

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

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is firm after rains and is not dusty when dry.

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

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

J. Phil Edwards, biologist, Soil Conservation Service, helped prepare this section.

The soils of Bladen County produce a wide variety of plants that provide food, cover, and protection for many species of wildlife. Upland game species, such as squirrels, rabbits, quail, mourning doves, and foxes, are abundant throughout the county. Furbearers, such as raccoon, muskrat, mink, beaver, and opossum, also are plentiful. Several species of waterfowl, such as mallards, black ducks, and wood ducks, frequent the Cape Fear, South, and Black Rivers and their tributaries. Large populations of deer are throughout the county. The Carolina bays, or pocosins, northeast of the Cape Fear River provide habitat for many species of wildlife, including black bear. Large populations of the red-cockaded woodpecker, an endangered species, are in pine forests throughout the county.

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

In table 8, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

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

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

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, and flood

hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, barley, rye, millet, buckwheat, soybeans, cowpeas, and sunflowers.

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

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

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

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

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

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

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

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

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

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

Engineering

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

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

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

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

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution,

liquid limit, plasticity index, soil reaction, 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 and mineralogy of the sand and silt fractions. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

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

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

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

Building Site Development

Table 9 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the soil texture and slope. The time of the year that excavations can be made is affected by the depth to the 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. Depth to the high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. Depth to the 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. Depth to the 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 the high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, depth to the high water table, and the available water capacity in the upper 40 inches 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 10 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 10 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and that good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

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

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

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

Table 10 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, depth to the 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. Steep slopes can cause construction problems.

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

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

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

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over 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 11 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 depth to the high water table and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

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

Sand 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 11, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil) 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 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, depth to the water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope and depth to the water table.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches and have slopes of less than 8 percent. They are naturally fertile or respond well to fertilizer and are not so wet that excavation is difficult.

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

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

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

Water Management

Table 12 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed

ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

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

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

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

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

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of organic matter. Depth to the high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on permeability, depth to the 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 performance of a system is affected by the depth of the root zone and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope and wetness affect the construction of terraces and diversions. A severe hazard of wind or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Wetness and slope affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

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

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 16.

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

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

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

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

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

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

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 16.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

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

Physical and Chemical Properties

Table 14 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

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

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

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

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

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

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

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

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

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

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

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

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

In table 14, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

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

Soil and Water Features

Table 15 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

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

The four hydrologic soil groups are:

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

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

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

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

Some soils in table 15 are assigned two hydrologic groups, such as B/D. These soils qualify for hydrologic group B if they are artificially drained, but they are in hydrologic group D in their natural undrained condition.

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

Table 15 gives the frequency and duration of flooding and the time of year when flooding is most likely to occur.

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

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

Also considered is local information about the extent and levels of flooding and the relation of each soil on

the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 15 are the depth to the seasonal high water table; the kind of water table, that is, *perched* or *apparent;* and the months of the year that the water table commonly is highest. A water table that is seasonally high for less than 1 month is not indicated in table 15.

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

The two numbers in the "High water table-Depth" column indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. "More than 6.0" indicates that the water table is below a depth of 6 feet or that the water table exists for less than a month.

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

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

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

Engineering Index Test Data

Table 16 shows laboratory test data for several pedons sampled at carefully selected sites in the survey area. The pedons are typical of the series and are described in the section "Soil Series and Their Morphology." The soil samples were tested by the North Carolina Department of Transportation and Highway Safety, Materials and Test Unit.

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

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

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(18)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or on laboratory measurements. Table 17 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

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

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

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

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

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

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

Soil Series and Their Morphology

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

Characteristics of the soil and the material in which it formed are identified for each series. 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 (17)*. Many of the technical terms used in the descriptions are defined in *Soil Taxonomy (18)*. 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 fluvial sediment. These soils

are on terraces along the Cape Fear River. Slope ranges from 0 to 3 percent.

Typical pedon of Altavista fine sandy loam, 0 to 3 percent slopes; 2.5 miles northwest of Tar Heel, 2.3 miles northwest of the intersection of North Carolina Highway 87 and secondary road 1316, 0.4 mile northeast on a farm road, 150 feet west of road, in forest (370,500N; 2,059,000E):

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

E—5 to 7 inches; yellowish brown (10YR 5/4) fine sandy loam; weak medium granular structure; very friable; few fine and medium roots; very strongly acid; clear wavy boundary.

Bt1—7 to 10 inches; yellowish brown (10YR 5/6) sandy clay loam; common medium distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine roots; few faint clay films on faces of peds; few flakes of mica; very strongly acid; clear wavy boundary.

Bt2—10 to 20 inches; yellowish brown (10YR 5/6) sandy clay loam; many medium distinct strong brown (7.5YR 5/6) mottles and common medium prominent yellowish red (5YR 5/8) mottles; moderate medium subangular blocky structure; friable; few fine roots; common distinct clay films on faces of peds; few grains of feldspar; few flakes of mica; very strongly acid; gradual wavy boundary.

Bt3—20 to 32 inches; yellowish brown (10YR 5/4) sandy clay loam; common medium distinct grayish brown (10YR 5/2) mottles and common medium prominent yellowish brown (10YR 5/8) and red (2.5YR 4/8) mottles; weak medium subangular blocky structure; friable; few distinct clay films on faces of peds; common grains of feldspar; few flakes of mica; very strongly acid; gradual smooth boundary.

BC—32 to 39 inches; yellowish brown (10YR 5/8) sandy loam; many medium prominent red (2.5YR 4/8) and gray (10YR 6/1) mottles; weak medium subangular blocky structure; friable; few distinct clay bridges between sand grains; common grains of feldspar; a few flakes of mica; very strongly acid; clear smooth boundary.

2C—39 to 55 inches; mottled light brownish gray (10YR 6/2) and strong brown (7.5YR 5/8) loamy sand; pockets of sandy loam; massive; very friable; few grains of feldspar; few flakes of mica; very strongly acid; clear smooth boundary.

2Cg—55 to 70 inches; gray (10YR 5/1) loamy sand; pockets of sandy loam and sandy clay loam; common medium prominent strong brown (7.5YR 5/8) and yellowish red (5YR 4/8) mottles; massive; very friable; few grains of feldspar; few flakes of mica; medium acid.

Altavista soils have loamy horizons 30 to 60 inches thick over stratified sandy material. Reaction is very strongly acid to medium acid except where lime has been added to the soil.

The A or Ap horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 1 to 4. The E horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 3 or 4. Some pedons do not have an E horizon

Some pedons have a BE or BA horizon that has the same range in colors as that of the Bt horizon. The texture is fine sandy loam, sandy loam, or sandy clay loam. The Bt horizon has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 3 to 8. The lower part of the Bt horizon, below a depth of 20 inches, has gray mottles, and some pedons are dominantly gray. The texture is sandy clay loam, clay loam, or loam. The BC horizon is similar in color to the Bt horizon or it is gray. The texture is sandy loam or sandy clay loam. Some pedons do not have a BC horizon.

The C horizon is in shades of gray or brown. The texture is commonly stratified sand or loamy sand that often has pockets of loamy or clayey material. Coarse sand or gravel is in some pedons.

Augusta Series

The Augusta series consists of somewhat poorly drained soils that formed in fluvial sediment. These soils are on terraces along the Cape Fear River. Slope ranges from 0 to 2 percent.

Typical pedon of Augusta sandy loam; 1 mile east of the Kelly community, 1 mile east of the intersection of North Carolina Highway 53 and secondary road 1539, 700 feet south of the highway, in a field (257,000N; 2,207,000E):

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) sandy loam; weak medium granular structure; very friable; many fine roots; strongly acid; abrupt wavy boundary.

Bt—8 to 22 inches; yellowish brown (10YR 5/6) sandy clay loam; common medium prominent light gray (10YR 7/1) mottles and many medium prominent reddish yellow (7.5YR 6/8) mottles; weak medium subangular blocky structure; friable, slightly sticky

and slightly plastic; few distinct clay films on faces of peds; few fine roots; few fine flakes of mica; medium acid; gradual wavy boundary.

Btg—22 to 28 inches; light gray (10YR 7/1) sandy clay loam; common medium faint gray (10YR 6/1) mottles, common medium distinct light yellowish brown (10YR 6/4) mottles, and many medium prominent strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few distinct clay films on faces of peds; few fine roots; few fine flakes of mica; very strongly acid; gradual wavy boundary.

BCg1—28 to 34 inches; light gray (10YR 7/2) sandy clay loam; pockets of sandy loam; common medium prominent strong brown (7.5YR 5/8) and yellow (10YR 7/6) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few distinct clay bridges between sand grains; few fine flakes of mica; few fine grains of feldspar; very strongly acid; clear wavy boundary.

BCg2—34 to 41 inches; light gray (10YR 7/2) fine sandy loam; very weak fine subangular blocky structure; loose; few fine flakes of mica; very strongly acid; abrupt wavy boundary.

2Cg—41 to 70 inches; light gray (10YR 7/2) sand; single grained; loose; very strongly acid.

Augusta soils have loamy horizons 40 to 60 inches thick over stratified sandy material. Reaction is very strongly acid to medium acid except where lime has been added to the soil.

The A or Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 1 to 3; or hue of 2.5Y, value of 5, and chroma of 2.

The Bt horizon has hue of 10YR, value of 5 or 6, and chroma of 4 to 6. The Btg horizon has hue of 10YR, value of 6 or 7, and chroma of 1 or 2; or hue of 2.5Y, value of 6, and chroma of 2. The texture of the Bt and Btg horizons is sandy clay loam or clay loam. The BCg horizon has hue of 10YR, value of 6 to 7, and chroma of 2; or hue of 2.5Y, value of 6, and chroma of 2. The texture is fine sandy loam or sandy clay loam.

The 2Cg horizon has hue of 10YR, value of 6 to 8, and chroma of 2; or hue of 2.5Y, value of 6 or 7, and chroma of 2. The texture is loamy sand, sand, or coarse sand.

Autryville Series

The Autryville series consists of well drained soils that formed in moderately coarse textured sediment. These soils are on uplands. Slope ranges from 0 to 3 percent.

Typical pedon of Autryville loamy sand, 0 to 3 percent slopes; 2 miles southwest of Tar Heel, 275 yards southeast of the end of secondary road 1315, in a cultivated field (348,000N; 2,055,000E):

Ap—0 to 10 inches; dark grayish brown (10YR 4/2) loamy sand; weak medium granular structure; very friable; common fine roots; strongly acid; abrupt smooth boundary.

E—10 to 24 inches; light yellowish brown (10YR 6/4) loamy sand; weak medium granular structure; very friable; few fine roots; strongly acid; clear smooth boundary.

Bt—24 to 38 inches; yellowish brown (10YR 5/6) sandy loam; weak medium subangular blocky structure; friable; few fine roots; common fine pores; sand grains coated and bridged with clay; strongly acid; clear wavy boundary.

E'—38 to 50 inches; yellowish brown (10YR 5/6) sand; single grained; loose; common medium pockets of clean sand grains; strongly acid; clear wavy boundary.

B't—50 to 62 inches; brownish yellow (10YR 6/8) sandy loam; pockets of sandy clay loam; weak fine subangular blocky structure; very friable; common medium lenses of clean sand grains; strongly acid.

Autryville soils have sandy and loamy horizons more than 60 inches thick over stratified Coastal Plain deposits. Reaction is very strongly acid or strongly acid except where lime has been added to the soil.

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

The E horizon has hue of 10YR or 2.5Y, value of 5 to 8, and chroma of 1 to 6. The texture is loamy sand or fine sand.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 4 to 8. The texture is sandy clay loam or sandy loam.

The E' horizon has hue of 10YR or 2.5Y, value of 5 to 8, and chroma of 2 to 8. The texture is sand or loamy sand.

The B't horizon has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 2 to 8; or it is mottled in shades of brown, yellow, red, or gray. The texture is sandy clay loam or sandy loam.

Aycock Series

The Aycock series consists of well drained soils that formed in loamy sediment. These soils are on uplands. Slope ranges from 1 to 4 percent.

Typical pedon of Aycock very fine sandy loam, 1 to 4

percent slopes; 1 mile south of Clarkton, 0.4 mile east of the intersection of U.S. Highway 701 and secondary road 1542, 25 feet north of the road, in wooded area (261,000N; 2,087,000E):

A—0 to 4 inches; grayish brown (10YR 5/2) very fine sandy loam; weak medium granular structure; very friable; many fine and medium roots; medium acid; clear wavy boundary.
E—4 to 10 inches; light yellowish brown (10YR 6/4) very fine sandy loam; weak medium granular structure; very friable; common fine roots; medium acid; clear wavy boundary.
Bt1—10 to 16 inches; brownish yellow (10YR 6/6) clay loam; weak fine subangular blocky structure; friable; common fine and medium roots; strongly acid; clear wavy boundary.
Bt2—16 to 31 inches; strong brown (7.5YR 5/8) clay loam; weak medium subangular blocky structure; friable, sticky and slightly plastic; few faint clay films on faces of peds; strongly acid; gradual wavy boundary.
Bt3—31 to 45 inches; strong brown (7.5YR 5/8) clay loam; few medium distinct dark yellowish brown (10YR 4/6) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few faint clay films on faces of peds; strongly acid; gradual wavy boundary.
Bt4—45 to 55 inches; brownish yellow (10YR 6/8) clay loam; common medium prominent light gray (10YR 7/2) and yellowish red (5YR 5/6) mottles; weak medium subangular blocky structure; friable, slightly sticky; few faint clay films on faces of peds; strongly acid; gradual wavy boundary.
Bt5—55 to 75 inches; yellowish brown (10YR 5/8) clay loam; many medium prominent light gray (10YR 7/1) mottles and common medium prominent yellowish red (5YR 5/6) mottles; weak fine subangular blocky structure; friable, slightly sticky; few faint clay films on faces of peds; strongly acid.

Aycock soils have loamy horizons more than 60 inches thick over stratified Coastal Plain sediment. Reaction is very strongly acid or strongly acid except where lime has been added to the soil.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4.

The E horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 3 or 4. The texture is very fine sandy loam or silt loam.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 4 to 8. Brown, red, and gray mottles are common below a depth of about 30 inches. The texture is silty clay loam, clay loam, or silt loam.

Some pedons have a BC horizon that is similar in color and texture to the Bt horizon.

Some pedons have a C horizon that is mottled in shades of brown, gray, and red. The texture is variable. Plinthite makes up 1 to 5 percent of the C horizon in some pedons.

Blanton Series

The Blanton series consists of moderately well drained soils that formed in sandy and loamy sediments. These soils are on uplands. Slope ranges from 2 to 7 percent.

Typical pedon of Blanton sand, 2 to 7 percent slopes; 1 mile south of Elizabethtown on secondary road 1700, 0.25 mile southeast of the intersection of secondary roads 1700 and 1774, 100 feet west of the road, in a pine forest (315,000; 2,120,000E):

Oi—1 to 0 inches; pine needle litter.
A—0 to 8 inches; brown (10YR 5/3) sand; weak fine granular structure; very friable; common fine roots; strongly acid; clear smooth boundary.
E1—8 to 23 inches; very pale brown (10YR 7/4) sand; common medium distinct brownish yellow (10YR 6/6) mottles; single grained; loose; few fine roots; few fine pockets of clean sand grains; strongly acid; gradual smooth boundary.
E2—23 to 45 inches; light yellowish brown (10YR 6/4) sand; common medium distinct yellowish brown (10YR 5/6) mottles; single grained; loose; few fine roots; common medium pockets of clean sand grains; strongly acid; gradual smooth boundary.
E3—45 to 52 inches; pale brown (10YR 6/3) sand; few fine faint mottles; single grained; loose; common medium pockets of clean sand grains; strongly acid; clear smooth boundary.
E4—52 to 60 inches; white (10YR 8/2) sand; common medium distinct brown (10YR 5/3) mottles; single grained; loose; strongly acid; clear smooth boundary.
Bt1—60 to 68 inches; yellowish brown (10YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable; sand grains coated and bridged with clay; few distinct clay films on faces of peds; very strongly acid; clear smooth boundary.
Bt2—68 to 83 inches; yellowish brown (10YR 5/6) sandy loam; common medium prominent light gray (10YR 7/2) mottles; weak medium subangular blocky structure; very friable; sand grains coated

and bridged with clay; few fine lenses of clean sand grains; very strongly acid; clear smooth boundary.

Blanton soils have sandy and loamy horizons more than 60 inches thick over stratified Coastal Plain deposits. Reaction is very strongly acid to medium acid in the A and E horizons and very strongly acid or strongly acid in the Bt and Cg horizons.

The A or Ap horizon has hue of 10YR, value of 4 to 6, and chroma of 1 to 3.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 3 to 8, or value of 6 to 8 and chroma of 1 or 2. The texture is sand or loamy sand.

The Bt horizon has hue of 10YR, value of 5 to 7, and chroma of 3 to 8; or it has hue of 7.5YR, value of 5, and chroma of 8. It commonly has mottles in shades of brown, yellow, red, or gray in the lower part. The texture is sandy clay loam or sandy loam.

Butters Series

The Butters series consists of well drained soils that formed in sandy and loamy sediments. These soils are on uplands. Slope ranges from 0 to 2 percent.

Typical pedon of Butters fine sand, 0 to 2 percent slopes; 3 miles northeast of Bladenboro, 1.3 miles northeast of the intersection of North Carolina Highway 242 and secondary road 1117, 200 feet south on a farm road, 5 feet west of the road, in a cultivated field (296,500N; 2,078,000E):

Ap—0 to 11 inches; dark grayish brown (10YR 4/2) fine sand; weak fine granular structure; very friable; many fine roots; slightly acid; abrupt smooth boundary.

E—11 to 18 inches; light yellowish brown (2.5Y 6/4) fine sand; weak fine granular structure; very friable; common fine roots; medium acid; clear wavy boundary.

Bt—18 to 29 inches; yellowish brown (10YR 5/8) fine sandy loam; few medium distinct yellowish red (5YR 5/8) mottles; weak medium subangular blocky structure; very friable; few medium roots; common fine pores; sand grains coated and bridged with clay; very strongly acid; gradual wavy boundary.

BC—29 to 35 inches; brownish yellow (10YR 6/8) loamy fine sand; few coarse distinct white (10YR 8/2) pockets of clean sand; weak medium subangular blocky structure; very friable; few fine roots; common fine pores; strongly acid; gradual wavy boundary.

E'—35 to 48 inches; yellow (10YR 7/6) fine sand; few medium faint yellow (10YR 8/8) mottles; common coarse distinct white (10YR 8/2) pockets of clean sand; weak fine granular structure; very friable; strongly acid; clear smooth boundary.

Btg—48 to 52 inches; light gray (2.5Y 7/2) fine sandy loam; few medium distinct reddish yellow (7.5YR 7/8) mottles and many medium distinct brownish yellow (10YR 6/6) mottles; weak medium subangular blocky structure; very friable; few fine pores; sand grains coated and bridged with clay; strongly acid; gradual wavy boundary.

B't—52 to 70 inches; brownish yellow (10YR 6/8) fine sandy loam; many coarse distinct light gray (10YR 7/2) mottles; weak medium subangular blocky structure; friable; few fine roots; few iron concretions; strongly acid.

Butters soils have sandy and loamy horizons more than 60 inches thick over stratified sediment. Reaction is strongly acid or very strongly acid except where lime has been added to the soil. In a few pedons, reaction in the BC and E' horizons ranges to slightly acid.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 1 to 3. The E horizon has hue of 10YR or 2.5Y, value of 5 to 8, and chroma of 3 to 6. The texture of the E horizon is dominantly fine sand but may be loamy sand, sand, fine sand, or loamy fine sand.

The Bt horizon has hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 4 to 8. Some pedons have mottles in shades of brown, yellow, and red. The texture is sandy loam or fine sandy loam. The upper 20 inches of the argillic horizon has an average clay content of 10 to 18 percent.

The BC horizon is similar in color to the Bt horizon. Some pedons have mottles in shades of brown and yellow. Pockets and lenses of clean sand are in some pedons. The texture is loamy sand or loamy fine sand.

The E' horizon has hue of 10YR or 2.5Y, value of 6 to 8, and chroma of 1 to 8. Some pedons have mottles in shades of gray, brown, yellow, and red. The texture is sand, fine sand, loamy sand, or loamy fine sand.

Some pedons have an E/B, B/E, EB, or BE horizon that has pockets and lenses of sandy loam within a matrix of sand, fine sand, loamy sand, or loamy fine sand.

The Btg or B't horizon has hue of 5YR to 2.5Y, value of 5 to 8, and chroma of 1 to 8, or it is mottled in shades of these colors. Where chroma is 3 or more, mottles of gray are normally present. The texture is fine sandy loam, sandy loam, or sandy clay loam.

Byars Series

The Byars series consists of very poorly drained soils that formed in clayey sediment. These soils are on uplands. Slope is less than 2 percent.

Typical pedon of Byars loam; 6.5 miles southwest of Elizabethtown, 0.5 mile southwest of the intersection of secondary roads 1111 and 1003, 0.6 mile south on International Paper Company road, 100 feet west of the road, in a wooded area (312,500N; 2,087,000E):

A—0 to 10 inches; black (10YR 2/1) loam; weak medium granular structure; friable; common fine and medium and few coarse roots; extremely acid; gradual smooth boundary.

BA—10 to 14 inches; very dark gray (10YR 3/1) clay loam; weak medium subangular blocky structure; firm, slightly sticky and slightly plastic; few fine, medium, and coarse roots; few distinct clay films on faces of peds; extremely acid; clear irregular boundary.

Btg1—14 to 33 inches; dark grayish brown (10YR 4/2) clay; common coarse distinct very dark gray (10YR 3/1) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; few fine and medium roots; common distinct clay films on faces of peds; extremely acid; gradual smooth boundary.

Btg2—33 to 50 inches; dark gray (10YR 4/1) clay; few medium distinct strong brown (7.5YR 4/6) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; few fine and medium roots; common distinct clay films on faces of peds; extremely acid; gradual wavy boundary.

B/Cg—50 to 70 inches; dark gray (10YR 4/1) sandy clay (B) with pockets of loamy sand (C); common medium faint grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; firm, sticky and plastic; few fine roots; common distinct clay films on faces of peds; extremely acid.

Byars soils have loamy and clayey horizons 60 to 80 inches or more thick over stratified Coastal Plain sediment. Reaction is extremely acid to strongly acid except where lime has been added to the soil.

The A or Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1; or it is neutral and has value of 2 or 3.

The BA horizon has hue of 10YR, value of 2 or 3, and chroma of 0 or 1. The texture is loam, clay loam, silty clay loam, or silt loam. The Btg horizon has hue of 10YR, value of 2 to 7, and chroma of 1 or 2. The texture is clay, sandy clay, clay loam, silty clay, or silty clay loam. Some pedons have few to common yellowish brown and yellowish red mottles throughout the subsoil.

The B/Cg horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. The texture is variable. Some pedons do not have a B/Cg horizon.

Some pedons have a C horizon that is gray. The texture ranges from sand to clay.

Cape Fear Series

The Cape Fear series consists of very poorly drained soils that formed in fluvial sediment. These soils are on terraces of the Cape Fear, South, and Black Rivers. Slope is less than 2 percent.

Typical pedon of Cape Fear loam; 1.75 miles southeast of Kelly, 0.5 mile southeast of the intersection of secondary roads 1539 and 1540, 0.25 mile south on a farm road across drainage canal, 700 feet northwest on a farm road, 0.4 mile southwest, in a cultivated field (253,000N; 2,204,000E):

Ap—0 to 9 inches; very dark gray (10YR 3/1) loam; weak fine granular structure; friable; common fine roots; common fine pores; few clean sand grains; strongly acid; clear smooth boundary.

A—9 to 12 inches; very dark gray (10YR 3/1) loam; weak medium granular structure; friable; common fine roots; common fine pores; few clean sand grains; strongly acid; clear smooth boundary.

Btg1—12 to 18 inches; dark gray (10YR 4/1) clay; few fine prominent yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; firm, sticky and plastic; few fine roots; few fine pores; few fine organic fragments; few clean sand grains; few fine flakes of mica; very strongly acid; clear smooth boundary.

Btg2—18 to 30 inches; gray (10YR 5/1) clay; common coarse faint dark gray (10YR 4/1) mottles and common fine prominent yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; firm, very sticky and very plastic; few fine roots; common flakes of mica; few fine grains of feldspar; very strongly acid; gradual wavy boundary.

Btg3—30 to 40 inches; light brownish gray (10YR 6/2) clay; common medium pockets of sand and sandy clay loam; common coarse distinct dark gray (10YR 4/1) mottles and few fine distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; firm, sticky and plastic; common flakes of mica; few fine grains of feldspar; very strongly acid; gradual wavy boundary.

BCg—40 to 46 inches; light brownish gray (10YR 6/2)

sandy clay loam; common pockets of sand and loamy sand; common medium distinct gray (10YR 4/1, 5/1) mottles; weak medium subangular blocky structure; friable; few flakes of mica; few fine grains of feldspar; very strongly acid; clear smooth boundary.

2Cg—46 to 60 inches; light brownish gray (10YR 6/2) sand; common pockets of loamy sand; few fine distinct gray (10YR 4/1, 5/1) mottles; single grained; loose; few flakes of mica; few fine grains of feldspar; strongly acid.

Cape Fear soils have loamy and clayey horizons 40 to 60 inches thick. Reaction is very strongly acid to medium acid except where lime has been added to the soil. Flakes of mica, feldspar, and other weatherable minerals are common in most pedons.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 1 or 2; or it is neutral and has value of 2 or 3.

Some pedons have a BA horizon that has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The texture is clay loam, silty clay loam, or loam. The Btg horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. Some pedons have few to common mottles of higher chroma. The texture of the Btg horizon is clay, sandy clay, clay loam, or silty clay. The upper 20 inches of this horizon is 35 to 55 percent clay. The BCg horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. The texture is sandy clay loam, clay loam, or sandy clay with pockets of sandy loam, loamy sand, or sand.

The 2Cg horizon is similar in color to the BCg horizon. The texture is sand, coarse sand, or loamy sand. The content of gravel ranges up to 10 percent.

Centenary Series

The Centenary series consists of moderately well drained soils that formed in sandy eolian and fluvial sediments. These soils are on uplands and stream terraces. Slope is less than 2 percent.

Typical pedon of Centenary sand; 0.6 mile west of White Lake, 600 feet east of the junction of North Carolina Highway 53 with U.S. Highway 701, 400 feet north of the highway in an area sparsely forested with pines with a ground cover of grasses and broomsedge (327,500N; 2,144,000E):

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) sand; single grained; loose; many fine and medium roots; few clean sand grains; strongly acid; clear smooth boundary.

E1—6 to 16 inches; yellowish brown (10YR 5/4) sand; single grained; loose; few fine roots; strongly acid; gradual wavy boundary.

E2—16 to 25 inches; brownish yellow (10YR 6/6) sand; single grained; loose; few fine roots; strongly acid; gradual wavy boundary.

E3—25 to 35 inches; pale brown (10YR 6/3) sand; common medium faint light brownish gray (10YR 6/2) mottles; single grained; loose; few fine roots; strongly acid; gradual wavy boundary.

E4—35 to 58 inches; white (10YR 8/1) sand; single grained; loose; strongly acid; clear wavy boundary.

Bh1—58 to 62 inches; dark grayish brown (10YR 4/2) loamy sand; weak medium subangular blocky structure; very friable; strongly acid; gradual wavy boundary.

Bh2—62 to 80 inches; very dark gray (10YR 3/1) loamy sand; massive; very friable or slightly brittle; organic matter coating on most sand grains; strongly acid.

Centenary soils are sandy throughout. Reaction is medium acid to very strongly acid except where lime has been added to the soil.

The A or Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 1 or 2.

The upper part of the E horizon has hue of 10YR, value of 5 to 7, and chroma of 3 to 8; or it has hue of 2.5Y, value of 6, and chroma of 4. The lower part of the E horizon, immediately above the the Bh horizon, has hue of 10YR, value of 5 to 8, and chroma of 1 or 2. The texture of the E horizon is sand or loamy sand.

The Bh horizon has hue of 5YR to 10YR, value of 2 to 4, and chroma of 1 to 3. The texture is sand or loamy sand.

Some pedons have a C horizon that has hue of 10YR, value of 4 to 8, and chroma of 2 to 6. The texture is sand or loamy sand.

Chastain Series

The Chastain series consists of poorly drained soils that formed in loamy and clayey fluvial sediments. These soils are along the Cape Fear River. Slope is less than 2 percent.

Typical pedon of Chastain silty clay loam, from an area of Chewacla and Chastain soils, frequently flooded; 4 miles northeast of East Arcadia, 0.1 mile southeast of Bladen County line on North Carolina Highway 87, 1 mile northeast of the intersection of North Carolina Highway 87 and secondary road 1810, northeast on secondary road 1735, 0.4 mile northeast on a farm road, 50 feet southeast of road (236,500N; 2,219,000E):

A—0 to 5 inches; grayish brown (10YR 5/2) silty clay loam; common fine prominent yellowish red (5YR 4/6) mottles; weak coarse granular structure; friable; many fine and medium roots; few coarse roots; strongly acid; gradual wavy boundary.

Bg1—5 to 10 inches; grayish brown (2.5Y 5/2) silty clay loam; many coarse prominent yellowish red (5YR 4/6) mottles; weak medium subangular blocky structure; friable; common fine and medium roots; very strongly acid; gradual smooth boundary.

Bg2—10 to 21 inches; grayish brown (2.5Y 5/2) silty clay; common medium prominent yellowish red (5YR 4/6) mottles; weak coarse subangular blocky structure; firm; few fine roots; very strongly acid; clear smooth boundary.

Bg3—21 to 62 inches; gray (10YR 5/1) silty clay; few medium distinct yellow (2.5Y 7/8) mottles; weak coarse subangular blocky structure; firm; few fine roots; few fine flakes of mica; very strongly acid; clear smooth boundary.

Bg4—62 to 80 inches; greenish gray (5BG 5/1) silty clay; common medium prominent yellowish red (5YR 4/6) and few medium prominent reddish brown (2.5YR 4/4) mottles; weak coarse subangular blocky structure; firm; few fine roots; few fine flakes of mica; very strongly acid.

Chastain soils have loamy and clayey horizons 40 to 72 or more inches thick over stratified fluvial sediment. Reaction is very strongly acid to medium acid.

The A horizon has hue of 7.5YR to 5Y, value of 4 to 6, and chroma of 1 to 4; or it is neutral and has value of 4 to 6. Value includes 3 if the A horizon is less than 6 inches thick.

The Bg horizon has hue of 10YR to 5Y, 5GY, or 5BG, value of 4 to 7, and chroma of 1 or 2; or it is neutral and has value of 4 to 7. Mottles are in shades of yellow, brown, and red. The texture is silty clay loam, silty clay, clay, or clay loam.

Chewacla Series

The Chewacla series consists of somewhat poorly drained soils that formed in loamy fluvial sediment. These soils are along the Cape Fear River. Slope ranges from 0 to 2 percent.

Typical pedon of Chewacla loam, from an area of Chewacla and Chastain soils, frequently flooded; just north of Elizabethtown, 0.4 mile north of the intersection of U.S. Highway 701 and North Carolina Highway 87, on north side of Cape Fear River, 400 feet east of river bridge, in a wooded area (321,000N; 2,120,000E):

A—0 to 5 inches; yellowish brown (10YR 5/4) loam; common fine prominent yellowish red (5YR 4/8) mottles; weak coarse granular structure; friable; few fine flakes of mica; medium acid; gradual wavy boundary.

BA—5 to 13 inches; light yellowish brown (10YR 6/4) loam; common medium prominent yellowish red (5YR 4/8) mottles; weak medium subangular blocky structure; friable; common black manganese concretions; few fine flakes of mica; strongly acid; distinct wavy boundary.

Bg1—13 to 32 inches; grayish brown (10YR 5/2) clay loam; common medium prominent yellowish red (5YR 4/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine flakes of mica; common black manganese concretions; strongly acid; clear smooth boundary.

Bg2—32 to 47 inches; light brownish gray (10YR 6/2) clay loam; common medium distinct strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine flakes of mica; common black manganese concretions; medium acid; gradual wavy boundary.

Bg3—47 to 80 inches; light brownish gray (10YR 6/2) clay loam; common coarse distinct strong brown (7.5YR 5/8) mottles; weak coarse subangular blocky structure; firm, slightly sticky and slightly plastic; few fine flakes of mica; common black manganese concretions; medium acid.

Chewacla soils have loamy horizons 36 to 72 inches or more thick over stratified sediment. Reaction is very strongly to slightly acid.

The A horizon has hue of 5YR to 10YR, value of 3 to 5, and chroma of 1 to 4.

The BA horizon has hue of 7.5YR to 2.5Y, value of 4 to 7, and chroma of 3 to 8. The texture is loam or silt loam. Some pedons do not have a BA horizon. Some pedons have a Bw horizon that has the same range in colors as that of the BA horizon but also includes hue of 5YR. The Bg horizon has hue of 7.5YR to 2.5Y, value of 4 to 7, and chroma of 1 or 2. The texture of the Bg horizon is sandy clay loam, sandy loam, loam, silt loam, or clay loam. Dark concretions are common in some pedons. Some pedons do not have a Bg horizon. In this case the lower part of the Bw horizon typically has more gray mottles than the upper part. Gray colors indicative of wetness are within 24 inches of the surface.

Some pedons have a C horizon that is stratified loam, sandy loam, loamy sand, or sand and gravel.

Congaree Series

The Congaree series consists of well drained and moderately well drained soils that formed in loamy fluvial sediment. These soils are on the flood plain along the Cape Fear River. Slope is less than 2 percent.

Typical pedon of Congaree silt loam, frequently flooded; 0.3 mile north of Elizabethtown, 0.3 mile north of the intersection of U.S. Highway 701 and North Carolina Highway 87, 1,000 feet northwest from the south bank of the Cape Fear River where U.S. Highway 701 crosses, in an area of mixed hardwoods (322,000N; 2,118,000E):

A—0 to 5 inches; dark brown (7.5YR 3/4) silt loam; weak medium granular structure; friable; many fine and medium roots; common coarse roots; common fine pores; few fine flakes of mica; medium acid; clear wavy boundary.

C1—5 to 18 inches; brown (7.5YR 4/4) silt loam; massive; friable; common fine and medium roots; few coarse roots; few fine pores; few fine flakes of mica; medium acid; gradual wavy boundary.

C2—18 to 30 inches; brown (7.5YR 4/4) silty clay loam; massive; friable; few fine roots; few fine pores; few flakes of mica; strongly acid; gradual wavy boundary.

C3—30 to 42 inches; brown (7.5YR 5/4) silty clay loam; massive; friable; few fine roots; few fine flakes of mica; strongly acid; gradual wavy boundary.

C4—42 to 50 inches; strong brown (7.5YR 5/6) silty clay loam; common medium distinct light yellowish brown (10YR 6/4) mottles; massive; friable; few fine roots; few fine flakes of mica; strongly acid; gradual wavy boundary.

C5—50 to 90 inches; brown (7.5YR 4/4) silty clay loam; massive; friable; few fine charcoal fragments; common fine flakes of mica; strongly acid.

Congaree soils have a loamy surface horizon 5 to 10 inches thick over loamy sediment. Reaction is very strongly acid to neutral, but some part of the 10- to 40-inch control section is medium acid or higher.

The A horizon has hue of 5YR to 10YR, value of 3 to 5, and chroma of 2 to 6. If the A horizon is less than 6 inches thick, the value can be less than 3.5.

The C horizon has hue of 5YR to 10YR, value of 3 to 5, and chroma of 3 to 6. Some pedons have red, brown, or yellow mottles, and some pedons have gray mottles at a depth of more than 20 inches. At a depth of more than 60 inches, colors range from brown to gray, or the horizon is mottled in these colors. Texture of the particle-size control section (10 to 40 inches) is silty clay loam, fine sandy loam, or loam; commonly with strata of sandier or more clayey material. At a depth of more than 40 inches, the texture is variable, ranging from loamy sand to silty clay.

Coxville Series

The Coxville series consists of poorly drained soils that formed in clayey sediment. These soils are on uplands. Slope is less than 2 percent.

Typical pedon of Coxville loam; about 3 miles east of Lisbon, 1.9 miles south of the intersection of secondary roads 1721 and 1712, 0.5 mile northwest along powerline on a timber company road, 0.6 mile northeast on timber company road, 40 feet north from end of road, in woodland (277,000N; 2,156,000E):

A—0 to 6 inches; very dark grayish brown (10YR 3/2) loam; weak fine subangular blocky structure; friable; many fine, medium, and coarse roots; common fine pores; very strongly acid; clear wavy boundary.

E—6 to 11 inches; dark gray (10YR 4/1) fine sandy loam; weak fine subangular blocky structure; friable; many fine, medium, and coarse roots; common fine pores; very strongly acid; gradual wavy boundary.

BEg—11 to 17 inches; gray (10YR 5/1) sandy clay loam; common medium distinct brownish yellow (10YR 6/8) mottles; weak medium angular blocky structure; friable, slightly sticky; common fine, medium, and coarse roots; common fine pores; very strongly acid; gradual wavy boundary.

Btg1—17 to 23 inches; gray (10YR 5/1) clay; common medium distinct reddish yellow (7.5YR 6/8) mottles and few fine prominent red (10YR 5/8) mottles; moderate medium angular blocky structure; firm, sticky; few fine, medium, and coarse roots; common fine pores; common faint clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg2—23 to 41 inches; gray (10YR 5/1) clay; common medium distinct reddish yellow (7.5YR 6/8) mottles and common medium prominent red (10R 5/8) mottles; strong medium angular blocky structure; firm; sticky; few fine and medium roots; common fine pores; few faint clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg3—41 to 53 inches; gray (10YR 5/1) clay; common medium distinct reddish yellow (7.5YR 6/8) mottles, common medium prominent red (10R 5/8) mottles, and common coarse distinct dark grayish brown (10YR 4/2) mottles; weak medium angular blocky

structure; firm, slightly sticky; few fine roots; very strongly acid; clear wavy boundary.

Btg4—53 to 70 inches; light gray (10YR 7/1) sandy clay; common coarse distinct gray (10YR 5/1) mottles, many medium distinct reddish yellow (7.5YR 6/8) mottles, and common medium prominent red (10R 5/8) mottles; weak coarse angular blocky structure; few fine roots; very strongly acid.

Coxville soils have loamy and clayey horizons more than 60 inches thick over stratified Coastal Plain deposits. Reaction is very strongly acid or strongly acid except where lime has been added to the soil.

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

The E horizon has hue of 10YR, value of 4 or 5, and chroma of 1. The texture is loam or fine sandy loam.

The BEg horizon has hue of 10YR, value of 5, and chroma of 1 or 2. The texture is loam or sandy clay loam. Some pedons do not have a BEg horizon. The Btg horizon has hue of 10YR, value of 4 to 7, and chroma of 1 or 2, or hue of 2.5Y, value of 4, and chroma of 2. The texture is clay loam or clay. Yellow and red mottles are common throughout the subsoil in most pedons.

Croatan Series

The Croatan series consists of very poorly drained soils that formed in highly decomposed organic material underlain by loamy sediment. These soils are in oval and irregularly shaped depressions, on flood plains, and on stream terraces. Slope is less than 2 percent.

Typical pedon of Croatan muck, rarely flooded; about 2 miles west of White Lake, 0.5 mile south of the intersection of secondary road 1511 and U.S. Highway 701 on the North Carolina Forest Service's Sugarloaf Road, 0.5 mile east on Timber Road, 2,000 feet southeast into Sawmill Bay (271,000N; 2,224,000E):

Oa1—0 to 22 inches; black (10YR 2/1) muck; 30 percent fibers unrubbed, 5 percent rubbed; weak medium granular structure; friable; many fine and medium and few coarse roots; extremely acid; gradual wavy boundary.

Oa2—22 to 32 inches; very dark grayish brown (10YR 3/2) muck; 25 percent fibers unrubbed, 8 percent rubbed; massive; friable; few fine roots; extremely acid; gradual smooth boundary.

2Ag—32 to 45 inches; brown (10YR 5/3) loam; massive; friable, sticky; many fine and medium partly decomposed roots; extremely acid; gradual wavy boundary.

2Cg—45 to 62 inches; brown (10YR 5/3) clay loam; massive; friable, sticky; common fine and medium partly decomposed roots; very strongly acid.

Croatan soils have organic material that is 16 to 51 inches thick. Logs, stumps, and wood fragments make up as much as 10 percent of the organic layers. Reaction is extremely acid in the organic material except where lime has been added to the soil. It is extremely acid to slightly acid in the underlying mineral horizons.

The organic horizon has hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 0 to 2; or it has hue of 2.5Y, value of 2, and chroma of 0. It typically is weakly structured or massive under natural conditions. If these soils are drained and cultivated, granular or blocky structural development increases in all parts of the organic horizon.

The 2Ag horizon has hue of 10YR or 7.5YR, value of 2 to 5, and chroma of 1 to 3. The texture is mucky sandy loam, mucky loam, loam, clay loam, sandy clay loam, or sandy loam. The texture of the upper 12 inches or more of the mineral horizon generally is loam, but some pedons have thin strata of sand or loamy sand.

The 2Cg horizon has hue of 10YR or 7.5YR, value of 3 to 7, and chroma of 1 to 3; hue of 5YR and 5Y, value of 3, and chroma of 3; or hue of 2.5Y, value of 7, and chroma of 2. The texture ranges from clay to coarse sand.

Dogue Series

The Dogue series consists of moderately well drained soils that formed in loamy and clayey sediments. These soils are on terraces of the Cape Fear, South, and Black Rivers. Slope ranges from 0 to 3 percent.

Typical pedon of Dogue sandy loam, 0 to 3 percent slopes; about 5.5 miles north of Elizabethtown, 0.8 mile north of the intersection of secondary roads 1510 and 1511, 0.3 mile west of secondary road 1510 on a Forest Service road, 100 feet north of the Forest Service road, in cutover area (347,500N; 2,122,000E):

Oi—1 to 0 inches; mixture of undecomposed pine needles and hardwood leaves.

A—0 to 3 inches; dark grayish brown (10YR 4/2) sandy loam; moderate fine granular structure; very friable; many fine and medium roots; very strongly acid; clear smooth boundary.

E—3 to 10 inches; light yellowish brown (10YR 6/4) sandy loam; weak medium granular structure; very friable; many fine and medium roots; very strongly acid; gradual smooth boundary.

Bt1—10 to 16 inches; brownish yellow (10YR 6/6) clay loam; common medium faint light yellowish brown (10YR 6/4) mottles and few fine prominent yellowish red (5YR 5/8) mottles; weak medium subangular blocky structure; friable, slightly sticky; common fine and medium roots; very strongly acid; gradual smooth boundary.

Bt2—16 to 24 inches; brownish yellow (10YR 6/6) clay loam; common medium faint brownish yellow (10YR 6/8) mottles and common medium prominent yellowish red (5YR 5/6) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; common fine and few medium roots; few thin discontinuous clay films on vertical faces of peds; very strongly acid; gradual wavy boundary.

Bt3—24 to 32 inches; brownish yellow (10YR 6/6) clay; common fine distinct light gray (10YR 7/2) mottles, common medium distinct strong brown (7.5YR 5/8) mottles, and common medium prominent red (2.5YR 4/8) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; few fine and medium roots; few thin discontinuous clay films on vertical faces of peds; very strongly acid; gradual wavy boundary.

Bt4—32 to 53 inches; strong brown (7.5YR 5/8) clay; common medium distinct brownish yellow (10YR 6/6) and light gray (10YR 7/2) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; few fine roots; few thin discontinuous clay films on vertical faces of peds; very strongly acid; gradual smooth boundary.

BCg—53 to 62 inches; light gray (10YR 7/2) sandy clay loam; pockets of sandy clay; few fine distinct brownish yellow (10YR 6/6) mottles and few medium prominent red (10R 4/8) mottles; weak coarse subangular blocky structure; friable, sticky; few fine roots; very strongly acid.

Dogue soils have loamy and clayey horizons 40 to 60 inches or more thick over stratified sediment. Reaction is extremely acid to strongly acid except where lime has been added to the soil.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 2 to 6, and chroma of 2 to 4. The A horizon is less than 7 inches thick where value is 3 or less.

The E horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 3 to 6. The texture is sandy loam. Some pedons do not have an E horizon.

Some pedons have a BA or BE horizon that has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 4 to 8; or it has hue of 7.5YR, value of 5, and chroma of 6. The texture is clay loam or sandy clay loam. The Bt horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8. The lower part of the Bt horizon typically is mottled in shades of gray, brown, or red. The texture is clay, clay loam, sandy clay, or sandy clay loam. The BCg horizon has hue and value similar to those of the Bt horizon, but the chroma is 1 or 2. Some pedons have a BC horizon that has colors similar to those of the Bt horizon. The texture of the BCg or BC horizon is sandy clay loam, but it can range to clay loam, sandy clay, or sandy loam.

Some pedons have a C horizon that has highly variable colors but typically is strong brown with gray mottles or is gray with red or brown mottles. The texture ranges from sand to sandy clay loam.

Dorovan Series

The Dorovan series consists of very poorly drained organic soils that formed in highly decomposed organic material. These soils are on flood plains. Slope is less than 2 percent.

Typical pedon of Dorovan muck; about 3.5 miles northwest of Dublin, 0.2 mile northwest of the intersection of North Carolina Highway 131 and secondary road 1101, 130 feet west of the highway opposite Bryant's millpond, in a forested area (337,500N; 2,063,000E):

Oa1—0 to 12 inches; very dark gray (10YR 3/1) broken face and rubbed muck; about 40 percent fiber, less than 7 percent rubbed; massive; friable; common roots and partly decomposed leaves and twigs; extremely acid; diffuse wavy boundary.

Oa2—12 to 25 inches; very dark gray (10YR 3/1) broken face and rubbed muck; about 30 percent fiber, less than 5 percent rubbed; massive, friable; common roots and partly decomposed leaves and twigs; extremely acid; gradual wavy boundary.

Oa3—25 to 53 inches; black (10YR 2/1) broken face and rubbed muck; about 30 percent fiber, less than 5 percent rubbed; massive; friable; common fine roots and partly decomposed twigs; extremely acid; abrupt wavy boundary.

2Cg1—53 to 57 inches; dark gray (10YR 4/1) fine sandy loam; massive; friable; few fine roots; extremely acid; gradual wavy boundary.

2Cg2—57 to 62 inches; dark grayish brown (10YR 4/2) fine sand; single grained; loose; extremely acid.

Dorovan soils have organic material that is more than 51 inches thick. Reaction is extremely acid in this material except where lime has been added to the soil. It is extremely acid to slightly acid in the underlying material.

The Oa horizon has hue of 10YR or 7.5YR, value of 2 or 3, and chroma of 1 to 3. It contains logs, stumps, plant fragments, and highly decomposed organic matter. The Oa horizon has 10 to 40 percent fiber, less than 7 percent rubbed. This horizon typically is massive under natural conditions. If this soil is drained and cultivated, granular or blocky structure develops after several years in all or part of the organic horizon.

The 2Cg horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. The texture is loam, sandy loam, fine sandy loam, fine sand, or sand.

Dunbar Series

The Dunbar series consists of somewhat poorly drained soils that formed in loamy and clayey sediment. These soils are on uplands. Slope ranges from 0 to 2 percent.

Typical pedon of Dunbar fine sandy loam; 3 miles southeast of Bladenboro, 0.6 mile east of the intersection of secondary roads 1171 and 1172, 0.3 mile south of a farm road, 150 feet east in forest (286,000N; 2,066,000E):

O—1 to 0 inches; partly decomposed leaves of mixed hardwoods, pine needles, and other organic matter.

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

E—4 to 11 inches; pale brown (10YR 6/3) fine sandy loam; common fine faint brownish yellow mottles; weak medium granular structure; very friable; many fine and common medium and coarse roots; very strongly acid; gradual wavy boundary.

BE—11 to 15 inches; light yellowish brown (10YR 6/4) sandy clay loam; few medium faint brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; friable, slightly sticky; common fine and medium roots; very strongly acid; gradual wavy boundary.

Bt—15 to 23 inches; pale brown (10YR 6/3) clay loam; few medium prominent red (2.5YR 4/8) mottles, common coarse faint light brownish gray (10YR 6/2) mottles, and common medium distinct brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; friable, sticky and plastic; few fine roots; common clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg1—23 to 35 inches; light brownish gray (10YR 6/2) clay; common medium distinct brownish yellow (10YR 6/6) mottles, few medium prominent red (2.5YR 4/8) mottles, and few medium faint pale brown (10YR 6/3) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; few fine roots; common distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg2—35 to 54 inches; gray (10YR 6/1) clay; common coarse distinct brownish yellow (10YR 6/8) and strong brown (7.5YR 5/8) mottles and common coarse prominent red (10R 4/8) mottles; moderate medium subangular blocky structure; very firm, very sticky and very plastic; few fine roots; common distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg3—54 to 65 inches; dark gray (10YR 4/1) clay; common coarse distinct yellow (10YR 7/8) mottles, common coarse prominent red (10R 4/8) mottles, and common fine distinct white (10YR 8/1) mottles; weak coarse subangular blocky structure; very firm, very sticky and very plastic; few fine roots; very strongly acid.

Dunbar soils have loamy and clayey horizons more than 60 inches thick over stratified Coastal Plain deposits. Reaction is very strongly acid or strongly acid except where lime has been added to the soil.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 or 2. Where the A or Ap horizon is less than 10 inches thick, this horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2.

The E horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 3. The texture is fine sandy loam or sandy loam. Some pedons do not have an E horizon.

The BE horizon has hue of 10YR, value of 5 or 6, and chroma of 4 to 6. The texture is sandy clay loam. Some pedons do not have a BE horizon. The Bt horizon has hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 3 to 8. It has few to many gray mottles indicative of wetness. The Btg horizon has hue of 7.5YR to 2.5Y, value of 4 to 7, and chroma of 1 or 2. It has few to many mottles in shades of yellow, brown, or red. The texture of the Bt and Btg horizons is clay, sandy clay, or clay loam.

Duplin Series

The Duplin series consists of moderately well drained

soils that formed in clayey sediment. These soils are on uplands. Slope ranges from 0 to 3 percent.

Typical pedon of Duplin sandy loam, 0 to 3 percent slopes; south of Clarkton, 0.4 mile south of the intersection of West Perimeter Street and North Carolina Highway 211, 150 feet west of street, in grass field (282,000N; 2,052,000E):

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) sandy loam; weak medium granular structure; friable; many fine roots; slightly acid; clear smooth boundary.

Bt1—7 to 13 inches; brownish yellow (10YR 6/8) clay loam; common medium distinct yellowish red (5YR 5/8) mottles; weak medium subangular blocky structure; firm, sticky and plastic; few fine roots; very strongly acid; clear wavy boundary.

Bt2—13 to 18 inches; dark yellowish brown (10YR 4/8) clay loam; common medium prominent red (2.5YR 4/8) mottles; weak medium subangular blocky structure; firm, sticky and plastic; few fine roots; few thin discontinuous clay films on faces of peds; very strongly acid; clear wavy boundary.

Bt3—18 to 33 inches; brownish yellow (10YR 6/6) clay; common coarse prominent red (10R 4/8) mottles and common medium distinct light gray (10YR 7/1) mottles; weak medium subangular blocky structure; firm, sticky and plastic; few thin discontinuous clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg1—33 to 45 inches; light gray (10YR 7/1) clay; common medium prominent red (10R 4/8) mottles and common medium distinct reddish yellow (7.5YR 6/8) mottles; few medium distinct dark gray (10YR 4/1) mottles in root channels; weak medium subangular blocky structure; firm, sticky and plastic; very strongly acid; gradual wavy boundary.

Btg2—45 to 62 inches; light gray (10YR 7/1) clay; few medium distinct dark gray (10YR 4/1) mottles in root channels; common medium distinct reddish yellow (7.5YR 6/8) mottles; weak coarse subangular blocky structure; firm, sticky and very plastic; very strongly acid.

Duplin soils have loamy and clayey horizons more than 60 inches thick over stratified Coastal Plain deposits. Reaction is very strongly acid or strongly acid except where lime has been added to the soil.

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

Some pedons have an E horizon that has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 or 3. The texture is sandy loam.

Some pedons have a BE or BA horizon that has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 4 to 6. The texture is sandy clay loam or clay loam. The Bt horizon has hue of 7.5YR to 2.5Y, value of 4 to 7, and chroma of 3 to 8. Gray mottles that have value of 5 to 7 and chroma of 2 or less are within 30 inches of the surface. The Btg horizon has hue of 7.5YR to 2.5Y, value of 4 to 7, and chroma of 1 or 2. Some pedons do not have a Btg horizon. The texture of the Bt and Btg horizons is sandy clay, clay loam, or clay.

Some pedons have a C horizon that is mottled light gray, pale brown, and yellowish red; or it is dominantly gray. The texture ranges from sandy loam to clay.

Exum Series

The Exum series consists of moderately well drained soils that formed in loamy sediment. These soils are on uplands. Slope ranges from 0 to 3 percent.

Typical pedon of Exum very fine sandy loam, 0 to 3 percent slopes; 3.3 miles southeast of Bladenboro, 1.3 miles south of the intersection of secondary roads 1171 and 1172, 0.3 mile south on a farm road, 50 feet east of a farm road in a pine forest (274,000N; 2,064,000E):

O1—2 to 0 inches; litter layer of pine needles.

Ap—0 to 9 inches; dark gray (10YR 4/1) very fine sandy loam; weak medium granular structure; very friable; common fine and few medium roots; strongly acid; abrupt smooth boundary.

BA—9 to 15 inches; brownish yellow (10YR 6/6) loam; weak medium granular structure; friable; few fine roots; few fine pores; very strongly acid; clear smooth boundary.

Bt1—15 to 24 inches; brownish yellow (10YR 6/6) loam; few fine distinct light yellowish brown (10YR 6/4) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; common fine pores; few distinct clay films on faces of peds; very strongly acid; clear smooth boundary.

Bt2—24 to 34 inches; yellowish brown (10YR 5/6) clay loam; common medium distinct gray (10YR 6/1) mottles and few fine distinct dark red (2.5YR 3/6) and brownish yellow (10YR 6/6) mottles; weak medium subangular blocky structure; friable, slightly sticky and plastic; few fine roots; few fine pores; few distinct clay films on faces of peds; very strongly acid; gradual smooth boundary.

Bt3—34 to 56 inches; yellowish brown (10YR 5/6) clay loam; common medium distinct gray (10YR 6/1) and reddish brown (2.5YR 4/4) mottles and few fine distinct brownish yellow (10YR 6/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and plastic; few fine pores; few distinct clay films on faces of peds; very strongly acid; gradual smooth boundary.

Btg—56 to 62 inches; gray (10YR 5/1) clay loam; common medium distinct brownish yellow (10YR 6/8) mottles and few fine distinct reddish brown (2.5YR 4/4) mottles; weak medium subangular blocky structure; firm; sticky and plastic; few distinct clay films on faces of peds; few fine lenses of clean sand grains; very strongly acid.

Exum soils have loamy horizons more than 60 inches thick over stratified Coastal Plain sediment. Reaction is very strongly acid or strongly acid except where lime has been added to the soil.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 2 to 6, and chroma of 1 to 3.

Some pedons have an E horizon that has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 2 to 4.

The BA or BE horizon and the Bt horizon have hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 3 to 8. Gray mottles are within 30 inches of the surface. The Btg horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 3 to 8. The texture of the BA, BE, Bt, and Btg horizons is loam, clay loam, or silty clay loam. In some pedons, the lower part of the Bt horizon and the Btg horizon are silty clay or clay. Some pedons do not have a BA, BE, or Btg horizon.

Foreston Series

The Foreston series consists of moderately well drained soils that formed in loamy sediment. These soils are on uplands. Slope is less than 2 percent.

Typical pedon of Foreston loamy sand; 6 miles north, northwest of Bladenboro, 0.2 mile north of the intersection of secondary roads 1101 and 1102, 1,000 feet east of the road and 100 feet north of drainage ditch, in a cultivated field (317,000N; 2,054,000E):

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) loamy sand; weak fine granular structure; very friable; common fine and medium roots; medium acid; abrupt smooth boundary.

Bt1—9 to 20 inches; yellowish brown (10YR 5/4) sandy loam; weak medium subangular blocky structure; very friable; few fine roots; sand grains coated and bridged with clay; very strongly acid; gradual smooth boundary.

Bt2—20 to 25 inches; yellowish brown (10YR 5/6) sandy loam; common medium distinct light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; very friable; few fine roots; sand grains coated and bridged with clay; very strongly acid; gradual smooth boundary.

Bt3—25 to 35 inches; light yellowish brown (10YR 6/4) and yellowish brown (10YR 5/6) sandy loam; common medium distinct light gray (10YR 7/2) mottles; weak medium subangular blocky structure; very friable; few fine roots; sand grains coated and bridged with clay; very strongly acid; gradual wavy boundary.

Bt4—35 to 50 inches; light yellowish brown (10YR 6/4) sandy loam; many coarse distinct light gray (10YR 7/2) mottles; weak medium subangular blocky structure; very friable; sand grains coated and bridged with clay; very strongly acid; gradual wavy boundary.

BCg—50 to 62 inches; light gray (10YR 6/1) loamy sand; few pockets of clean sand grains; common fine distinct brownish yellow (10YR 6/8) mottles; weak fine granular structure; very friable; very strongly acid.

Foreston soils have sandy and loamy horizons more than 60 inches thick over stratified Coastal Plain sediment. Reaction is very strongly acid to slightly acid in the A horizon and very strongly acid or strongly acid throughout the remaining profile except where lime has been added to the soil.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 1 or 2.

Some pedons have an E horizon that has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 3 to 6.

Some pedons have a BA horizon that has hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 3 or 4. The texture is loamy sand, loamy fine sand, sandy loam, or fine sandy loam. The Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 4 to 6. Mottles that have chroma of 2 or less are 18 to 30 inches below the surface. The texture of the Bt horizon is sandy loam or fine sandy loam that has less than 20 percent silt. The BC horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 to 8. Pockets of clean sand grains are few to common. The texture of the BC horizon is loamy sand, sand, fine sand, loamy fine sand, sandy loam, or fine sandy loam.

Goldsboro Series

The Goldsboro series consists of moderately well drained soils that formed in loamy sediment. These soils are on uplands. Slope ranges from 0 to 3 percent.

Typical pedon of Goldsboro sandy loam, 0 to 3 percent slopes; 4.5 miles northwest of Tar Heel, 1 mile north of the intersection of secondary roads 1300 and 1005, 0.7 mile northeast on secondary road 1310 from the intersection with secondary road 1300, 400 feet east of the road, in a cultivated field (376,000N; 2,046,000E):

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

BE—10 to 13 inches; yellowish brown (10YR 5/4) sandy loam; common fine faint brown mottles; weak medium subangular blocky structure; friable; many fine roots; strongly acid; clear smooth boundary.

Bt1—13 to 28 inches; yellowish brown (10YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; common fine roots; common distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt2—28 to 40 inches; yellowish brown (10YR 5/8) sandy clay loam; many medium distinct light yellowish brown (10YR 6/4) mottles and few medium distinct light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; common distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt3—40 to 55 inches; yellowish brown (10YR 5/8) sandy clay loam; common coarse distinct light brownish gray (10YR 6/2) mottles, few medium prominent red (2.5YR 4/8) mottles, and common coarse faint strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few faint clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg—55 to 62 inches; gray (10YR 6/1) sandy clay loam; streaks and pockets of sandy loam; few medium distinct strong brown (7.5YR 5/8) mottles and common coarse distinct brownish yellow (10YR 6/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; very strongly acid.

Goldsboro soils have loamy horizons more than 60 inches thick over stratified Coastal Plain sediment. Reaction is very strongly acid or strongly acid except where lime has been added to the soil.

The A or Ap horizon has hue of 10YR, value of 2 to 6, and chroma of 1 or 2; or it has hue of 2.5Y, value of 4 to 6, and chroma of 2.

Some pedons have an E horizon that has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 2 to 6. The texture is sandy loam or loamy fine sand.

The BA or BE horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 3 to 6. The texture is sandy loam or fine sandy loam. The Bt horizon has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 3 to 8. The Btg horizon has chroma of 1 or 2 and mottles with higher chroma. Some pedons do not have a Btg horizon. Low chroma mottles indicative of wetness range from few to common between 18 and 30 inches of the surface. The texture of the Bt horizon is sandy clay loam, sandy loam, loam, or clay loam. Some pedons have clay in the lower part of the Bt horizon. Some pedons have a BC or BCg horizon that has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 to 5. Mottles of high contrast range from few to many. The texture is sandy clay loam, sandy loam, or loam.

Some pedons have a Cg horizon that has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2, and it has mottles of high contrast. The texture ranges from sand to clay.

Grantham Series

The Grantham series consists of poorly drained soils that formed in loamy sediment. These soils are on uplands. Slope ranges from 0 to 2 percent.

Typical pedon of Grantham very fine sandy loam; 2.8 miles south of Bladenboro, 1.4 miles south of the intersection of North Carolina Highway 131 and secondary road 1171, 150 feet east of highway, in a grassy area that has been clear-cut (275,000N; 2,063,000E):

A—0 to 8 inches; very dark gray (10YR 3/1) very fine sandy loam; weak medium granular structure; very friable; many fine and medium roots and few coarse roots; very strongly acid; abrupt irregular boundary.

Eg—8 to 11 inches; gray (10YR 6/1) very fine sandy loam; common fine distinct yellowish brown (10YR 5/8) mottles; weak medium granular structure; very friable; many fine and medium roots and few coarse roots; very strongly acid; clear wavy boundary.

BEg—11 to 14 inches; light brownish gray (2.5Y 6/2) loam; many medium distinct brownish yellow (10YR

6/6) mottles; weak medium subangular blocky structure; very friable; common fine and medium roots; very strongly acid; clear wavy boundary.

Btg1—14 to 20 inches; light brownish gray (2.5Y 6/2) clay loam; common medium distinct pale yellow (2.5Y 7/4) mottles and common fine distinct strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable; common fine and medium roots; very strongly acid; gradual wavy boundary.

Btg2—20 to 30 inches; light brownish gray (2.5Y 6/2) clay loam; common medium distinct yellowish brown (10YR 5/8) and very pale brown (10YR 7/4) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; common fine and medium roots; few discontinuous clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg3—30 to 48 inches; gray (10YR 6/1) clay loam; common coarse distinct strong brown (7.5YR 5/8) mottles and few medium prominent red (2.5YR 4/8) mottles; weak medium subangular blocky structure; friable, sticky and plastic; few fine roots; few discontinuous clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg4—48 to 58 inches; gray (10YR 6/1) clay loam; common coarse distinct brownish yellow (10YR 6/6) and strong brown (7.5YR 5/8) mottles and common fine prominent red (2.5YR 5/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; very strongly acid; gradual wavy boundary.

BCg—58 to 60 inches; light brownish gray (2.5Y 6/2) loam; common coarse faint pale yellow (2.5Y 7/4) mottles and few medium distinct yellowish brown (10YR 5/8) mottles; massive; very friable; very strongly acid.

Grantham soils have loamy layers more than 60 inches thick over stratified Coastal Plain deposits. Reaction is very strongly acid or strongly acid except where lime has been added to the soil.

The A or Ap horizon has hue of 10YR, value of 2 to 5, and chroma of 1 or 2.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. The texture is very fine sandy loam, loam, or silt loam. Some pedons do not have an E horizon.

The BEg horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. Few to common mottles in shades of yellow and brown are in some pedons. The texture is loam or silt loam. Some pedons do not have a BEg horizon. The Btg horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2; or it has hue of 2.5Y, value of 5 or 6, and chroma of 2. Mottles are in shades of yellow, brown, or red. The texture is clay loam, silty clay loam, or loam. The BCg horizon is similar to the Btg horizon in color and texture.

Some pedons have a Cg horizon that is gray and has mottles in shades of yellow, brown, and red in most pedons. The texture is variable and consists of layers of sand, sandy loam, sandy clay loam, silty clay loam, or clay.

Grifton Series

The Grifton series consists of poorly drained soils that formed in loamy fluvial and marine sediments. These soils are on flood plains, low terraces, and adjacent flats. Slope is less than 2 percent.

Typical pedon of Grifton fine sandy loam, from an area of Grifton-Meggett complex, occasionally flooded; 1 mile east of Clarkton, 1.2 miles east of the intersection of North Carolina Highway 211 and U.S. Highway 701 Business, 300 feet north of the highway, in a wooded area (266,000N; 2,109,000E):

A—0 to 6 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak medium granular structure; very friable; many fine and medium roots; few coarse roots; common fine pores; strongly acid; abrupt smooth boundary.

E—6 to 13 inches; light brownish gray (10YR 6/2) fine sandy loam; common medium distinct brownish yellow (10YR 6/8) mottles; weak medium granular structure; very friable; many fine and medium roots; few coarse roots; many fine pores; slightly acid; gradual wavy boundary.

BEg—13 to 20 inches; light brownish gray (2.5Y 6/2) fine sandy loam; common medium distinct brownish yellow (10YR 6/8) mottles; weak medium subangular blocky structure; friable; few fine and medium roots; slightly acid; gradual smooth boundary.

Btg—20 to 49 inches; light brownish gray (10YR 6/2) sandy clay loam; common medium distinct brownish yellow (10YR 6/8) mottles; weak medium subangular blocky structure; friable; few fine and medium roots; few distinct clay films on faces of peds; few fine calcium carbonate concretions; slightly acid; gradual wavy boundary.

BCg—49 to 65 inches; light brownish gray (10YR 6/2) fine sandy loam; few medium distinct brownish yellow (10YR 6/8) mottles; weak fine subangular blocky structure; friable; few fine faint clay coatings

of sand grains; moderately alkaline; gradual irregular boundary.

Cg—65 to 80 inches; light brownish gray (10YR 6/2) fine sandy loam; pockets of loamy fine sand; few medium distinct brownish yellow (10YR 6/8) mottles and common coarse faint light gray (10YR 7/2) mottles; massive; friable; moderately alkaline.

Grifton soils are loamy to a depth of 40 to 70 inches. Reaction is very strongly acid to slightly acid in the surface and subsurface layers and medium acid to moderately alkaline in the subsoil and underlying material.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2, or it has hue of 2.5Y, value of 4 or 5, and chroma of 2. Where the value is 3, the A horizon is 7 inches or less thick.

The E horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2. The texture is fine sandy loam, sandy loam, or loamy fine sand. Some pedons do not have an E horizon.

The BE horizon has hue of 10YR or 2.5Y, value of 6, and chroma of 2. The texture is fine sandy loam or loamy fine sand. Some pedons do not have a BE horizon.

The Bt horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2, or it has hue of 2.5Y, value of 6 to 7, and chroma of 2. The texture is sandy clay loam, sandy loam, or clay loam.

The BC horizon has colors similar to those of the Bt horizon. The texture is fine sandy loam or sandy loam. Some pedons do not have a BC horizon.

The C horizon is in shades of gray. The texture is sand, loamy sand, or sandy loam. Some pedons have lenses of clay.

Gritney Series

The Gritney series consists of well drained and moderately well drained soils that formed in loamy or clayey sediment. These soils are on uplands. Slope ranges from 2 to 15 percent.

Typical pedon of Gritney fine sandy loam, 2 to 7 percent slopes; 2.5 miles southeast of Dublin, 0.5 mile east of the junction of North Carolina Highways 87 and 41, 0.2 mile north on a farm road, 0.5 mile east of intersecting farm road, 400 yards east from farmhouse, in a hardwood forest (328,500N; 2,096,000E):

A—0 to 6 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; very friable; many fine and medium roots; very strongly acid; abrupt smooth boundary.

E—6 to 10 inches; light yellowish brown (10YR 6/4) fine sandy loam; weak medium granular structure; very friable; few fine and medium roots; strongly acid; clear wavy boundary.

Bt1—10 to 15 inches; yellowish brown (10YR 5/4) sandy clay; weak medium subangular blocky structure; friable; few fine roots; few discontinuous clay films on faces of peds; very strongly acid; gradual smooth boundary.

Bt2—15 to 22 inches; yellowish brown (10YR 5/4) clay; few medium distinct brown (10YR 5/3) mottles, common medium prominent red (2.5YR 4/6) mottles, and common fine distinct brownish yellow (10YR 6/8) mottles; weak medium subangular blocky structure; firm, plastic; few fine roots; few distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt3—22 to 32 inches; yellowish brown (10YR 5/4) clay; common medium distinct gray (10YR 5/1) and brownish yellow (10YR 6/8) mottles and common medium prominent red (2.5YR 4/6) mottles; weak medium subangular blocky structure; very firm, plastic; few fine roots; few distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt4—32 to 50 inches; mottled gray (10YR 5/1), yellowish brown (10YR 5/8), reddish yellow (7.5YR 6/8), and dark red (2.5YR 3/6) clay; weak medium subangular blocky structure; very firm, plastic; few fine roots; few distinct clay films on faces of peds; few lenses of sand; very strongly acid; gradual wavy boundary.

C—50 to 60 inches; brownish yellow (10YR 6/8) clay; common medium distinct gray (10YR 5/1) and dark red (2.5YR 3/6) mottles; massive; very firm; few lenses of sand; very strongly acid.

Gritney soils have loamy and clayey horizons 40 to 72 inches thick over marine sediment. Reaction is strongly acid or very strongly acid except where lime has been added to the soil.

The A or Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 1 to 4; or it has hue of 2.5Y, value of 4 or 5, and chroma of 2.

The E horizon has hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 3 or 4. Some pedons do not have an E horizon.

The upper part of the Bt horizon has hue of 5YR to 10YR, value of 5 or 6, and chroma of 4 to 8; or it has hue of 2.5YR, value of 4 or 5, and chroma of 6 to 8. The texture is sandy clay loam, clay loam, sandy clay,

or clay. The middle part of the Bt horizon has hue of 2.5YR to 10YR, value of 4 to 6, and chroma of 4 to 8. It has few to many mottles in shades of red, brown, yellow, and gray. The gray mottles are relict and increase with depth. The lower part of the Bt horizon, which generally is mottled, has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 2 to 8; or it has hue of 10YR, value of 5 to 7, and chroma of 1 to 8. The texture is sandy clay loam, clay loam, sandy clay, or clay. Some pedons have a BC horizon that is similar in color to the lower part of the Bt horizon. The texture ranges from sandy loam to clay.

The C horizon, which generally is mottled, has hue of 2.5YR to 10YR, value of 3 to 6, and chroma of 2 to 8; or it has hue of 10YR, value of 5 to 7, and chroma of 1 to 8. The texture ranges from sandy clay loam to clay, but some pedons have lenses of sandy loam, loamy sand, or sand.

Johns Series

The Johns series consists of moderately well drained soils that formed in loamy fluvial sediment. These soils are on stream terraces along the South and Black Rivers. Slope ranges from 0 to 2 percent.

Typical pedon of Johns fine sandy loam; 8.5 miles east of White Lake, 2.7 miles southeast of the intersection of North Carolina Highways 210 and 41, 120 feet northeast of highway, in forested area (333,000N; 2,198,000E):

A—0 to 7 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak medium granular structure; very friable; many fine and few medium and coarse roots; strongly acid; clear irregular boundary.

E—7 to 11 inches; pale brown (10YR 6/3) fine sandy loam; weak coarse granular structure; very friable; common fine and medium and few coarse roots; strongly acid; gradual wavy boundary.

Bt—11 to 20 inches; yellowish brown (10YR 5/4) sandy clay loam; common medium faint yellowish brown (10YR 5/8) mottles, common medium distinct light brownish gray (10YR 6/2) mottles, and common medium prominent red (2.5YR 5/8) mottles; weak medium subangular blocky structure; friable; few faint clay films on faces of peds; common fine and few medium roots; few fine flakes of mica; strongly acid; gradual wavy boundary.

Btg—20 to 28 inches; light brownish gray (10YR 6/2) sandy clay loam; many medium distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable; few fine roots; few patchy clay films on faces of peds; few fine flakes of mica; strongly acid; gradual wavy boundary.

BCg—28 to 37 inches; light brownish gray (10YR 6/2) fine sandy loam; common medium faint yellowish brown (10YR 5/4) mottles and common medium distinct brownish yellow (10YR 6/8) mottles; weak coarse subangular blocky structure; very friable; few pockets of loamy fine sand between peds; few fine flakes of mica; strongly acid; gradual wavy boundary.

2Cg1—37 to 50 inches; light brownish gray (10YR 6/2) loamy sand; common fine distinct brownish yellow (10YR 6/8) mottles; massive; very friable; few pockets of clean sand grains; few fine flakes of mica; strongly acid; clear smooth boundary.

2Cg2—50 to 72 inches; white (10YR 8/2) sand; few fine pockets of brownish yellow (10YR 6/8) sandy loam and loamy sand; strongly acid.

Johns soils are loamy to a depth of 20 to 40 inches. Reaction is very strongly acid or strongly acid.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 0 to 3.

The E horizon has hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 3 or 4. The texture is fine sandy loam, sandy loam, or loamy sand.

The Bt horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 4 to 8. The lower part of this horizon can have chroma of 1 or 2. The texture is sandy clay loam or sandy loam and averages between 18 and 35 percent clay. The BC horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 to 8. The texture is fine sandy loam, sandy loam, or loamy sand. Some pedons do not have a BC horizon.

The C horizon has hue of 10YR, value of 5 to 8, and chroma of 1 to 3. The texture is sand, loamy sand, or coarse sand, and some pedons have few to common gravel.

Johnston Series

The Johnston series consists of very poorly drained soils that formed in loamy stratified fluvial sediment. These soils are on flood plains. Slope is less than 2 percent.

Typical pedon of Johnston mucky loam, frequently flooded; about 13 miles north of White Lake, 0.9 mile northwest of the intersection of North Carolina Highway 210 and secondary road 1502, 0.4 mile northeast on a farm road, 400 feet north of road (324,000N; 2,067,000E):

Oi—2 to 0 inches; black (10YR 2/1) root mat and partly decomposed leaf litter and twigs.
A—0 to 38 inches; black (10YR 2/1) mucky loam; weak medium granular structure; friable; very strongly acid; clear smooth boundary.
Cg1—38 to 48 inches; dark gray (10YR 4/1) fine sandy loam; massive; friable; very strongly acid; abrupt smooth boundary.
Cg2—48 to 62 inches; dark gray (10YR 4/1) fine sand; lenses and pockets of loamy fine sand; single grained; loose; very strongly acid.

Johnston soils have loamy horizons 24 to 50 inches or more thick over stratified Coastal Plain deposits. Reaction is very strongly acid or strongly acid.

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

The Cg1 horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 or 2. The texture is sandy loam, fine sandy loam, loamy sand, or loamy fine sand.

The Cg2 horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. The texture is sandy loam, fine sandy loam, loamy sand, fine sand, sand, or sandy clay loam.

Kalmia Series

The Kalmia series consists of well drained soils that formed in loamy and sandy fluvial sediments. These soils are on stream terraces along the South and Black Rivers. Slope ranges from 0 to 3 percent.

Typical pedon of Kalmia loamy fine sand, 0 to 3 percent slopes; 9 miles east of White Lake, 1.9 miles northwest of the intersection of North Carolina Highway 210 and secondary road 1007, 0.6 mile northeast on road in wooded area, 50 feet south of South River, on south side of the road (333,000N; 2,202,000E):

A—0 to 5 inches; dark grayish brown (10YR 4/2) loamy fine sand; weak coarse granular structure; very friable; many fine and medium roots; very strongly acid; gradual wavy boundary.
E—5 to 11 inches; light yellowish brown (10YR 6/4) loamy fine sand; weak coarse granular structure; very friable; many fine and medium roots; very strongly acid; gradual wavy boundary.
Bt1—11 to 18 inches; strong brown (7.5YR 5/6) sandy clay loam; moderate medium subangular blocky structure; friable; common fine roots; few faint clay films on faces of peds; slightly sticky; very strongly acid; gradual wavy boundary.
Bt2—18 to 26 inches; yellowish brown (10YR 5/8) sandy clay loam; weak moderate subangular blocky structure; friable; few faint clay films on faces of peds; common fine roots; few fine flakes of mica; few fine grains of feldspar; slightly sticky; very strongly acid; gradual wavy boundary.
BC—26 to 34 inches; brownish yellow (10YR 6/6) sandy loam; weak coarse subangular blocky structure; very friable; few faint clay bridging of sand grains; few fine roots; few fine flakes of mica; few fine grains of feldspar; very strongly acid; clear smooth boundary.
2C1—34 to 65 inches; yellow (10YR 7/6) sand; single grained; loose; few fine pockets of loamy sand; very strongly acid; clear smooth boundary.
2C2—65 to 80 inches; light gray (10YR 7/2) sand; single grained; loose; very strongly acid.

Kalmia soils have sandy and loamy horizons 20 to 40 inches thick over stratified stream deposits. Reaction is very strongly acid to medium acid except where lime has been added to the soil.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2.

The E horizon has hue of 10YR, value of 6 to 8, and chroma of 3 or 4; or it has hue of 2.5Y, value of 6, and chroma of 4.

The Bt horizon has hue of 10YR, value of 5 or 6, and chroma of 6 to 8; or it has hue of 7.5YR, value of 5, and chroma of 6 to 8. The texture is sandy clay loam, loam, or sandy loam. The BC horizon has colors similar to those of the Bt horizon. The texture is sandy loam or fine sandy loam. Some pedons do not have a BC horizon.

The C horizon has hue of 10YR, value of 6 or 7, and chroma of 2 to 6; or it has hue of 7.5YR, value of 6, and chroma of 8. The texture is sand, loamy sand, loamy fine sand, fine sand, or gravelly sand.

Few to common flakes of mica are throughout the B and C horizons of some pedons.

Kenansville Series

The Kenansville series consists of well drained soils that formed in sandy and loamy fluvial sediment. These soils are on terraces of the South and Black Rivers and on sandy and loamy eolian flats. Slope ranges from 0 to 3 percent.

Typical pedon of Kenansville sand, 0 to 3 percent slopes; 10 miles north of Elizabethtown, 2 miles west of the intersection of secondary road 1325 and North Carolina Highway 242, 0.5 mile southwest on a farm road, 200 feet southeast of road, in a cultivated field (371,500N; 2,107,000E):

Ap—0 to 10 inches; dark grayish brown (10YR 4/2) sand; weak fine granular structure; very friable; common fine roots; medium acid; abrupt smooth boundary.
E—10 to 23 inches; yellowish brown (10YR 6/4) sand; single grained; loose; few fine roots; strongly acid; clear wavy boundary.
Bt—23 to 36 inches; strong brown (7.5YR 5/6) sandy loam; weak fine subangular blocky structure; very friable; sand grains coated and weakly bridged with clay; strongly acid; gradual wavy boundary.
BC—36 to 45 inches; strong brown (7.5YR 5/8) loamy sand; weak fine subangular blocky structure; very friable; sand grains coated and weakly bridged with clay; strongly acid; gradual wavy boundary.
C—45 to 72 inches; very pale brown (10YR 7/4) sand; common coarse distinct strong brown (7.5YR 5/8) mottles; single grained; loose; strongly acid.

Kenansville soils have sandy and loamy horizons 40 to 60 inches thick over stratified fluvial and eolian deposits. Reaction is very strongly acid to medium acid except where lime has been added to the soil.

The Ap or A horizon has hue of 10YR, value of 3 to 6, and chroma of 1 or 2.

The E horizon has hue of 10YR, value of 5 to 8, and chroma of 4 to 6, or it has hue of 2.5Y, value of 6 or 7, and chroma of 4. The texture is sand, loamy sand, or fine sand.

Some pedons have a BE horizon that has hue of 10YR, value of 6 or 7, and chroma of 3 to 6, or it has hue of 7.5YR, value of 5, and chroma of 6. The texture is loamy sand or loamy fine sand. The Bt horizon has hue of 7.5YR, value of 5, and chroma of 6 to 8, or it has hue of 10YR, value of 5 to 7, and chroma of 6 to 8. The texture generally is sandy loam or fine sandy loam; some pedons have thin layers of sandy clay loam. The BC horizon is similar in color to the Bt horizon. The texture is loamy sand or loamy fine sand.

The C horizon has hue of 10YR, value of 5 to 8, and chroma of 2 to 8; or it has hue of 7.5YR, value of 5, and chroma of 6. The texture is sand or loamy sand.

Kureb Series

The Kureb series consists of excessively drained soils that formed in sandy deposits. These soils are on Carolina bay rims. Slope ranges from 1 to 8 percent.

Typical pedon of Kureb sand, 1 to 8 percent slopes; 2 miles south of White Lake, 2.25 miles southeast of the intersection of North Carolina Highway 53 and U.S. Highway 701, 1,200 feet south of road, on a sand ridge between Carolina bays (319,000N; 2,151,000E):

A—0 to 4 inches; gray (10YR 6/1) sand; single grained; loose; common fine and medium roots; strongly acid; clear wavy boundary.
E—4 to 28 inches; white (10YR 8/1) sand; single grained; loose; common fine and few medium roots; slightly acid; clear irregular boundary.
C/Bh—28 to 45 inches; light yellowish brown (10YR 6/4) sand (C); single grained; loose; few tongues of white extend from above horizon; common medium lumps and streaks of dark brown (10YR 3/3) and dark reddish brown (5YR 3/2) organically coated sand grains (Bh); many clean sand grains; few fine roots; medium acid; gradual irregular boundary.
C1—45 to 70 inches; brownish yellow (10YR 6/6) sand; single grained; loose; medium acid; gradual irregular boundary.
C2—70 to 85 inches; light yellowish brown (10YR 6/4) sand; single grained; loose; medium acid.

Kureb soils have sandy horizons more than 80 inches thick. The 10- to 40-inch control section has less than 5 percent silt plus clay. Reaction ranges from very strongly acid to neutral.

The A horizon has hue of 10YR, value of 3 to 6, and chroma of 1.

The E horizon has hue of 10YR, value of 5 to 8, and chroma of 1 or 2. The texture is sand or fine sand.

The C part of the C/Bh horizon has hue of 10YR, value of 5 or 6, and chroma of 4 to 8, or it has hue of 7.5YR, value of 4 or 5, and chroma of 4 or 5. The Bh part of the C/Bh horizon has hue of 7.5YR, value of 4, and chroma of 2 to 4, or it has hue of 5YR to 10YR, value of 2 to 4, and chroma of 2 or 3.

The C horizon has hue of 10YR, value of 4 to 8, and chroma of 1 to 8.

Lakeland Series

The Lakeland series consists of excessively drained soils that formed in sandy eolian deposits. These soils are on uplands, stream terraces, and Carolina bay rims. Slope ranges from 1 to 7 percent.

Typical pedon of Lakeland sand, 1 to 7 percent slopes; about 3 miles northeast of Elizabethtown, 0.1 mile southwest of the intersection of U.S. Highway 701 and secondary road 1513, 0.3 mile north on a housing development road, 270 feet west of road, in a wooded area (357,000N; 2,142,000E):

Ap—0 to 6 inches; very dark grayish brown (10YR 3/2) sand; weak moderate granular structure; very

friable; few fine roots; many clean sand grains; strongly acid; abrupt wavy boundary.

C1—6 to 12 inches; yellowish brown (10YR 5/8) sand; single grained; loose; few fine roots; strongly acid; gradual wavy boundary.

C2—12 to 50 inches; brownish yellow (10YR 6/8) sand; single grained; loose; strongly acid; gradual wavy boundary.

C3—50 to 68 inches; yellow (10YR 7/8) sand; single grained; loose; strongly acid; gradual wavy boundary.

C4—68 to 75 inches; yellow (10YR 7/6) sand; single grained; loose; very strongly acid; gradual wavy boundary.

C5—75 to 88 inches; very pale brown (10YR 7/4) sand; few medium faint white (10YR 8/2) pockets of uncoated sand; single grained; loose; very strongly acid.

Lakeland soils are sandy to a depth of more than 80 inches. The 10- to 40-inch control section contains 5 to 10 percent silt plus clay. Reaction is very strongly acid to medium acid except where lime has been added to the soil.

The Ap or A horizon has hue of 10YR, value of 3 to 5, and chroma of 1 to 3, or it has hue of 2.5Y, value of 4 or 5, and chroma of 2.

The C horizon has hue of 10YR, value of 5 to 8, and chroma of 3 to 8; hue of 7.5YR, value of 5 or 6, and chroma of 6 to 8; hue of 5YR, value of 5 or 6, and chroma of 6 to 8; or hue of 2.5Y, value of 7 or 8, and chroma of 3 or 4. Small pockets of gray or white sand are common below a depth of 40 inches in some pedons.

Leon Series

The Leon series consists of poorly drained soils that formed in sandy sediment. These soils are on low flats and in depressions on uplands. Slope ranges from 0 to 3 percent.

Typical pedon of Leon sand, 0 to 3 percent slopes; 7 miles north of Elizabethtown in Bladen Lakes State Forest, 1 mile east of the intersection of secondary roads 1511 and 1510, 0.7 mile north on Bethel Church Trail from the intersection with secondary road 1511, 0.3 mile east on Little Bethel Trail from the intersection with Bethel Church Trail, 20 feet south of trail (345,700N; 2,134,500E):

A—0 to 3 inches; very dark gray (10YR 3/1) sand; weak fine granular structure; very friable; common fine and medium roots; many uncoated sand grains; very strongly acid; clear smooth boundary.

E1—3 to 14 inches; grayish brown (10YR 5/2) sand; single grained; loose; common fine and few medium and coarse roots; very strongly acid; gradual wavy boundary.

E2—14 to 21 inches; white (10YR 8/1) sand; single grained; loose; few fine and medium roots; very strongly acid; abrupt wavy boundary.

Bh1—21 to 30 inches; very dark brown (10YR 2/2) loamy sand; many coarse distinct light brownish gray (10YR 6/2) and dark grayish brown (10YR 4/2) mottles; few tongues of white sand 8 inches wide and 10 inches deep in old stump holes; massive; hard (difficult to cut with spade); extremely acid; clear wavy boundary.

Bh2—30 to 80 inches; black (10YR 2/1) sand; single grained; loose; extremely acid.

Leon soils are sandy to a depth of 80 inches or more. Reaction is extremely acid to strongly acid.

The Ap or A horizon has hue of 10YR, value of 2 to 4, and chroma of 1. When dry, this horizon has a salt and pepper appearance caused by the mixture of organic matter and white sand grains.

The E horizon has hue of 10YR or 2.5Y, value of 5 to 8, and chroma of 1 or 2.

The Bh horizon has hue of 10YR, value of 2 to 4, and chroma of 1 to 3; hue of 5YR, value of 2 or 3, and chroma of 1 or 2; or hue of 7.5YR, value of 3 or 4, and chroma of 2 to 4. The Bh horizon is sand or loamy sand. Some pedons have a BC horizon that has hue of 10YR, value of 4 or 5, and chroma of 2 to 4.

Lynchburg Series

The Lynchburg series consists of somewhat poorly drained soils that formed in loamy sediment. These soils are on uplands. Slope is less than 2 percent.

Typical pedon of Lynchburg fine sandy loam; about 1.25 miles northeast of Bladenboro, 0.25 mile northeast of the intersection of North Carolina Highways 211 By-Pass and 242, 500 feet south of the road, in a pasture (290,000N; 2,068,500E):

Ap—0 to 8 inches; very dark gray (10YR 3/1) fine sandy loam; weak medium granular structure; very friable; many fine roots; few fine pores; medium acid; clear smooth boundary.

Bt—8 to 15 inches; yellowish brown (10YR 5/4) sandy clay loam; few medium distinct light brownish gray

(10YR 6/2) mottles; weak medium subangular blocky structure; friable; common fine roots; few fine pores; very strongly acid; gradual wavy boundary.

Btg1—15 to 28 inches; gray (10YR 6/1) sandy clay loam; many medium distinct yellow (10YR 7/8) mottles and few medium distinct yellowish red (5YR 5/8) mottles; weak medium subangular blocky structure; friable; few fine roots; common fine pores; very strongly acid; gradual wavy boundary.

Btg2—28 to 42 inches; gray (10YR 6/1) sandy clay loam; common medium distinct brownish yellow (10YR 6/8) mottles; weak medium subangular blocky structure; friable; few fine roots; few fine pores; very strongly acid; gradual wavy boundary.

Btg3—42 to 60 inches; gray (10YR 6/1) sandy clay loam; few pockets of light gray (10YR 7/2) sandy loam; common medium distinct brownish yellow (10YR 6/8) mottles and few fine distinct yellowish red (5YR 5/8) mottles; weak medium subangular blocky structure; friable; very strongly acid; gradual wavy boundary.

BCg—60 to 65 inches; dark gray (10YR 4/1) sandy clay loam; common medium distinct brownish yellow (10YR 6/8) and light gray (10YR 7/1) mottles; weak coarse subangular blocky structure; firm; very strongly acid.

Lynchburg soils have loamy horizons more than 60 inches thick over stratified Coastal Plain sediment. Reaction is extremely acid to strongly acid except where lime has been added to the soil.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 2 to 4, and chroma of 1 or 2.

Some pedons have an E horizon that has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 2 to 4. The texture is fine sandy loam or sandy loam.

Some pedons have a BA horizon that has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 to 6, and it has few to many gray mottles. The texture is sandy loam or fine sandy loam. The Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 to 8, and it has few to many gray mottles. The Btg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. It has common mottles of higher chroma. The texture of the Bt and Btg horizon typically is sandy clay loam, but it ranges to clay loam or sandy loam. The BCg horizon is similar in color and texture to the Btg horizon. The BCg horizon typically has less clay than the horizon above it.

Some pedons have a Cg horizon that is in shades of gray. The texture ranges from sand to clay.

Lynn Haven Series

The Lynn Haven series consists of poorly drained soils that formed in sandy sediment. These soils are on uplands. Slope is less than 2 percent.

Typical pedon of Lynn Haven sand, from an area of Lynn Haven and Torhunta soils; about 6 miles northeast of the intersection of secondary road 1509 and North Carolina Highway 242, 0.4 mile south on Forest Service trail, 30 feet east of trail (354,000N; 2,127,500E):

O—1 to 0 inches; layer of partly decomposed organic matter.

A—0 to 9 inches; black (10YR 2/1) sand; weak fine granular structure; friable; high in organic matter; many clean sand grains; many fine and medium roots; strongly acid; clear wavy boundary.

E—9 to 12 inches; dark grayish brown (10YR 4/2) sand; single grained; loose; common fine and medium roots; strongly acid; gradual wavy boundary.

Bh1—12 to 18 inches; black (10YR 2/1) sand; weak medium subangular blocky structure; friable, weakly cemented; few fine and medium roots; common fine pockets of clean sand; strongly acid; gradual wavy boundary.

Bh2—18 to 21 inches; very dark grayish brown (10YR 3/2) sand; weak medium subangular blocky structure; friable, weakly cemented; few fine and medium roots; sand grains coated or stained with organic matter; very strongly acid; abrupt wavy boundary.

Bh3—21 to 62 inches; black (10YR 2/1) sand; weak fine granular structure; friable; sand grains stained with organic matter; very strongly acid; clear wavy boundary.

Bh4—62 to 80 inches; black (5YR 2/1) sand; weak fine granular structure; friable; sand grains coated or stained with organic matter; extremely acid.

Lynn Haven soils are sandy to a depth of 80 inches or more. Reaction is extremely acid to strongly acid.

The Ap or A horizon has hue of 10YR, value of 2 or 3, and chroma of 1. When dry, this horizon has a salt and pepper appearance caused by the mixing of organic matter and white sand grains.

The E horizon has hue of 10YR, value of 4 to 7, and chroma of 1 or 2, or it has hue of 2.5Y, value of 5 or 6, and chroma of 2.

The Bh horizon has hue of 5YR to 10YR, value of 2 or 3, and chroma of 1 or 2, or it has hue of 7.5YR, value of 2 or 3, and chroma of 2 to 4. The texture is sand or loamy sand. Sand grains are coated with organic matter.

Some pedons have a C/Bh horizon that has hue of 10YR, value of 2 to 5, and chroma of 1 to 4; hue of 7.5YR, value of 4, and chroma of 4; or hue of 5YR, value of 2, and chroma of 2. The texture is sand.

Some pedons have a Cg horizon that has hue of 10YR, value of 4 to 7, and chroma of 2, or it has hue of 2.5Y, value of 5 or 6, and chroma of 2. The texture is sand.

Meggett Series

The Meggett series consists of poorly drained soils that formed in loamy and clayey fluvial and marine sediments. These soils are on flood plains, low terraces, and adjacent flats. Slope is less than 2 percent.

Typical pedon of Meggett fine sandy loam, from an area of Grifton-Meggett complex, occasionally flooded; 2 miles southeast of Clarkton, 0.1 mile northwest of the intersection of North Carolina Highway 211 and secondary road 1759, 500 feet north of the highway, in a wooded area (263,000N; 2,112,000E):

A—0 to 5 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak fine granular structure; very friable; many fine and medium roots; few coarse roots; very strongly acid; clear wavy boundary.

E—5 to 12 inches; grayish brown (10YR 5/2) fine sandy loam; common medium faint dark grayish brown (10YR 4/2) mottles; weak fine granular structure; very friable; many fine and medium roots; few coarse roots; slightly acid; abrupt wavy boundary.

Btg1—12 to 36 inches; gray (10YR 5/1) clay; common coarse distinct brownish yellow (10YR 6/8) mottles and common coarse faint light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; firm; common fine and medium roots; common distinct clay films on vertical faces of peds; few fine calcium carbonate concretions; moderately alkaline; gradual wavy boundary.

Btg2—36 to 43 inches; gray (10YR 5/1) sandy clay; common coarse distinct brownish yellow (10YR 6/8) mottles and common medium faint light brownish gray (10YR 6/2) mottles; moderate medium angular blocky structure; firm; few fine and medium roots; common distinct clay films on vertical faces of peds; common clean fine sand grains between peds; neutral; abrupt wavy boundary.

2Cg1—43 to 60 inches; gray (10YR 6/1) fine sandy loam; few medium distinct brownish yellow (10YR 6/6) mottles; massive; very friable; few fine roots; neutral; gradual wavy boundary.

2Cg2—60 to 80 inches; light brownish gray (10YR 6/2) fine sand; few fine distinct light yellowish brown (10YR 6/4) mottles; single grained; loose; neutral.

Meggett soils have a loamy surface layer and subsurface layer underlain by a clayey and loamy subsoil that extends to a depth of 40 to 80 inches or more. These soils are underlain by stratified marine sediment. Reaction is very strongly acid to slightly acid in the surface and subsurface layers unless lime has been added to the soil. It is strongly acid to moderately alkaline in the upper part of the subsoil and slightly acid to moderately alkaline in the lower part of the subsoil and in the underlying material.

The A or Ap horizon has hue of 10YR, value of 2 to 5, and chroma of 1 or 2. Where the value is 2 or less, the A or Ap horizon is 7 inches or less thick.

The E horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. The texture is fine sandy loam, loam, or loamy fine sand. Some pedons do not have an E horizon.

The Btg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. The texture is clay loam, sandy clay, or clay.

Some pedons have a BCg horizon that has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. The texture is sandy clay loam or sandy clay.

The 2Cg horizon has hue of 7.5YR to 5Y, value of 2 to 6, and chroma of 1 or 2, or it has hue of 5G, value of 5, and chroma of 2. The texture is variable, ranging from sand to sandy clay loam.

Nahunta Series

The Nahunta series consists of somewhat poorly drained soils that formed in loamy sediment. These soils are on uplands. Slope is less than 2 percent.

Typical pedon of Nahunta very fine sandy loam; 2.5 miles east of Clarkton, 1.5 miles north of the intersection of North Carolina Highway 211 and secondary road 1710, 0.5 mile west on a farm road, 800 feet north of the road, in an area of mixed pine and hardwoods (269,000N; 2,118,000E):

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

BE—6 to 10 inches; olive yellow (2.5Y 6/6) loam; common medium distinct grayish brown (10YR 5/2) mottles and few fine distinct yellowish red (5YR 5/8) mottles; weak medium granular structure; friable;

common fine and medium roots; very strongly acid; gradual wavy boundary.

Bt—10 to 20 inches; olive yellow (2.5Y 6/6) clay loam; common medium distinct gray (10YR 6/1) mottles and common medium prominent yellowish red (5YR 5/8) mottles; moderate medium subangular blocky structure; friable, slightly sticky and plastic; few fine and medium roots; common fine pores; thin patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg1—20 to 28 inches; gray (10YR 6/1) clay loam; common coarse distinct brownish yellow (10YR 6/8) mottles and common coarse prominent red (2.5YR 4/8) mottles; moderate medium subangular blocky structure; friable, sticky and plastic; few fine roots; common fine pores; few patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg2—28 to 48 inches; light gray (10YR 7/1) clay loam; common medium distinct yellowish brown (10YR 5/8) mottles and few fine prominent red (2.5YR 5/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine pores; few patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg3—48 to 60 inches; light gray (10YR 7/1) clay loam; common coarse prominent red (2.5YR 4/6) mottles and common medium distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; thin patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

BCg—60 to 65 inches; mottled gray (10YR 6/1), red (2.5YR 4/6), and yellowish brown (10YR 5/8) clay loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; very strongly acid.

Nahunta soils have loamy horizons 60 to 80 inches or more thick over stratified Coastal Plain sediment. Reaction is very strongly acid or strongly acid except where lime has been added to the soil.

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

Some pedons have an E horizon that has hue of 10YR or 2.5Y, value of 6 to 7, and chroma of 2 to 4. The texture is loam, silt loam, or very fine sandy loam.

The BE horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 to 8, and it generally has few to many gray mottles. The texture is loam, silty clay loam, or silt loam. Some pedons do not have a BE horizon. The upper part of the Bt horizon is similar in color to the BE horizon. The lower part has hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 1 or 2, or it is neutral and has value of 6 or 7. The texture of the Bt horizon is clay loam, loam, or silty clay loam. The BCg horizon is similar in color to the lower part of the Bt horizon. The texture is clay, clay loam, or loam. Some pedons do not have a BCg horizon.

Norfolk Series

The Norfolk series consists of well drained soils that formed in loamy sediment. These soils are on uplands. Slope ranges from 0 to 6 percent.

Typical pedon of Norfolk loamy fine sand, 0 to 2 percent slopes; 3 miles southwest of Dublin, 600 feet northwest of the intersection of secondary roads 1104 and 1100, 100 feet north of the road, in a cultivated field (321,000N; 2,072,000E):

Ap—0 to 7 inches; grayish brown (10YR 5/2) loamy fine sand; weak fine granular structure; very friable; common fine roots; very strongly acid; clear smooth boundary.

E—7 to 15 inches; light yellowish brown (2.5Y 6/4) loamy fine sand; weak fine granular structure; very friable; few fine roots; very strongly acid; clear smooth boundary.

BE—15 to 18 inches; yellowish brown (10YR 5/4) fine sandy loam; weak fine subangular blocky structure; friable; few fine roots; few faint clay bridges between sand grains; very strongly acid; clear smooth boundary.

Bt1—18 to 35 inches; yellowish brown (10YR 5/8) sandy clay loam; weak medium subangular blocky structure; friable, slightly sticky; few fine pores; few distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt2—35 to 50 inches; yellowish brown (10YR 5/8) sandy clay loam; few medium distinct yellowish red (5YR 4/8) mottles; weak medium subangular blocky structure; friable, slightly sticky; few fine pores; few distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt3—50 to 55 inches; yellowish brown (10YR 5/8) sandy clay loam; pockets of loamy sand; common medium distinct light yellowish brown (10YR 6/4) and yellowish red (5YR 5/8) mottles; weak medium subangular blocky structure; friable; few fine pores; few distinct clay films on faces of peds; few plinthite nodules; very strongly acid; gradual wavy boundary.

Bt4—55 to 65 inches; yellowish brown (10YR 5/8) sandy clay loam; pockets of sandy loam; common fine distinct yellowish red (5YR 4/8) mottles and few fine distinct pale brown (10YR 6/4) mottles; weak

medium subangular blocky structure; friable; few distinct clay films on faces of peds; few plinthite nodules; very strongly acid.

Norfolk soils have sandy and loamy horizons 60 to 90 inches thick over stratified Coastal Plain sediment. Reaction is strongly acid or very strongly acid except where lime has been added to the soil.

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

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 3 or 4, or it has hue of 2.5Y, value of 6, and chroma of 4. Some pedons do not have an E horizon.

The BE horizon has hue of 10YR, value of 5, and chroma of 4 to 8, or it has hue of 2.5Y, value of 6, and chroma of 4. The texture is sandy loam or fine sandy loam. Some pedons do not have a BE horizon. The Bt horizon has hue of 10YR, value of 5 or 6, and chroma of 6 to 8; hue of 7.5YR, value of 5, and chroma of 6 or 8; or hue of 2.5Y, value of 5, and chroma of 2 or 4. The texture is sandy clay loam or clay loam. Some pedons have a BC horizon that has matrix colors similar to those of the Bt horizon and generally has strong brown and red mottles. Gray mottles are few to common below a depth of 30 inches. The texture of the BC horizon is sandy clay loam or sandy loam.

Ocilla Series

The Ocilla series consists of somewhat poorly drained soils that formed in loamy sediment. These soils are on uplands. Slope ranges from 0 to 2 percent.

Typical pedon of Ocilla loamy fine sand; 1.5 miles northeast of Dublin, 0.5 mile northwest of the intersection of secondary roads 1336 and 1338, 0.34 mile south on a farm road, 400 feet southeast of tobacco barn, in a pasture (334,500N; 2,093,000E):

Ap—0 to 10 inches; dark grayish brown (10YR 4/2) loamy fine sand; weak fine granular structure; very friable; common fine roots; slightly acid; clear smooth boundary.

E—10 to 26 inches; pale brown (10YR 6/3) loamy fine sand; weak fine granular structure; very friable; common fine roots; strongly acid; gradual wavy boundary.

Bt1—26 to 32 inches; light yellowish brown (10YR 6/4) sandy clay loam; common medium distinct strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable; common fine roots; few distinct clay films on faces of some peds; very strongly acid; clear wavy boundary.

Bt2—32 to 46 inches; light yellowish brown (10YR 6/4) sandy clay loam; common medium distinct light brownish gray (10YR 6/2) mottles and common medium prominent red (2.5YR 4/6) mottles; weak medium subangular blocky structure; friable; few fine roots; few distinct clay films on faces of peds; very strongly acid; clear wavy boundary.

Btg1—46 to 52 inches; mottled light brownish gray (10YR 6/2), light yellowish brown (10YR 6/4), and yellowish red (5YR 5/8) sandy clay loam; weak medium subangular blocky structure; friable; few fine roots; few distinct clay films on faces of peds; very strongly acid; clear wavy boundary.

Btg2—52 to 62 inches; brownish gray (10YR 6/2) sandy clay loam; common medium distinct light yellowish brown (10YR 6/4) and yellowish red (5YR 5/8) mottles; weak medium subangular blocky structure; friable; few fine roots; very strongly acid.

Ocilla soils have sandy and loamy horizons 60 to 80 inches or more thick over stratified Coastal Plain sediment. Reaction is strongly acid or very strongly acid except where lime has been added to the soil.

The A or Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2.

The E horizon has hue of 10YR, value of 4 to 7, and chroma of 1 to 4. The texture is loamy sand or loamy fine sand.

Some pedons have a BE horizon that has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 4 to 8. Mottles are in shades of gray, yellow, brown, and red.

The Bt horizon has hue of 10YR, value of 5 to 7, and chroma of 4 to 8, or it has hue of 7.5YR, value of 5, and chroma of 6 to 8. Low chroma mottles range from none to common in the upper part of the Bt horizon. The lower part of the Bt horizon has few to many mottles in shades of gray, brown, yellow, and red. The texture typically is sandy clay loam, but it ranges to sandy loam or sandy clay in the lower part of the horizon.

The Btg horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 to 8, or it is neutral and has value of 5 to 7. The texture is sandy loam, sandy clay loam, and sandy clay.

Some pedons have a BCg horizon that has hue of 10YR or 7.5YR, value of 5, and chroma of 6, or it has a gray matrix. The texture is sandy loam or loamy sand.

Pamlico Series

The Pamlico series consists of very poorly drained soils that formed in highly decomposed organic material

underlain by sandy sediment. These soils are in Carolina bays and on low terraces and flood plains. Slope is less than 1 percent.

Typical pedon of Pamlico muck, rarely flooded; at Lagoon, 0.6 mile northwest of the intersection of North Carolina Highway 53 and secondary road 1532, 75 feet east of highway, in a blueberry field (294,000N; 2,172,000E):

Oap—0 to 6 inches; black (N 2/0) muck; 15 percent twig and wood fragment fibers unrubbed, 8 percent rubbed; weak coarse granular structure; friable; extremely acid; gradual wavy boundary.

Oa—6 to 32 inches; very dark gray (10YR 3/1) muck; 10 percent twig, root, and wood fragment fibers unrubbed, 5 percent rubbed; massive; friable; extremely acid; gradual wavy boundary.

2Cg1—32 to 42 inches; very dark grayish brown (10YR 3/2) sand; very dark gray (10YR 3/1) bodies of loamy sand; single grained; loose; few medium roots; common clean sand grains; extremely acid; gradual wavy boundary.

2Cg2—42 to 62 inches; very dark grayish brown (10YR 3/2) loamy sand; single grained; loose; few medium roots; common clean sand grains; extremely acid.

Pamlico soils have organic material that is 16 to 51 inches thick. This material is underlain by sand. Reaction is extremely acid in the organic material except where lime has been added to the soil. It is extremely acid to strongly acid in the underlying material. Logs, stumps, plant fragments, and highly decomposed organic matter make up the organic material.

The Oa or Oap horizon has hue of 10YR or 7.5YR, value of 2 or 3, and chroma of 2, or it is neutral and has value of 2 or 3. Fiber content of the Oa horizon is 10 to 33 percent unrubbed and less than 10 percent rubbed. The Oa horizon is typically massive under natural wet conditions. Upon drainage and cultivation, a granular or blocky structure develops in part or all of the organic material, depending upon the nature and depth of the organic material as well as duration of drainage. When this material dries, it reabsorbs moisture very slowly.

Some pedons have a 2A or 2Ag horizon that has hue of 10YR or 7.5YR, value of 2 or 3, and chroma of 0 to 2. The texture is sand or loamy sand.

The 2Cg horizon has hue of 10YR, value of 3 to 6, and chroma of 1 or 2. The texture is loamy sand or sand. Some pedons have loamy layers at a depth of more than 48 inches.

Pantego Series

The Pantego series consists of very poorly drained soils that formed in loamy sediment. These soils are on uplands. Slope is less than 2 percent.

Typical pedon of Pantego loam; 4 miles southeast of the Carver community, 0.6 mile south of the intersection of secondary roads 1787 and 1744, 0.8 mile southwest of the end of secondary road 1787 on a timber company road, 0.8 mile northwest on timber company's pump road, 0.7 mile southwest on timber company's road, 30 feet east of road, in forested area of wetland hardwoods (237,000N; 2,160,000E):

A1—0 to 10 inches; black (10YR 2/1) loam; weak fine granular structure; friable; many fine and medium roots; very strongly acid; gradual wavy boundary.

A2—10 to 14 inches; very dark gray (10YR 3/1) loam; weak fine granular structure; friable; common fine and medium and few coarse roots; very strongly acid; gradual wavy boundary.

BAg—14 to 19 inches; very dark gray (10YR 3/1) loam; weak fine subangular blocky structure; friable; common fine and medium and few coarse roots; very strongly acid; gradual wavy boundary.

Btg1—19 to 35 inches; dark gray (10YR 4/1) sandy clay loam; weak medium subangular blocky structure; friable; common fine and medium and few coarse roots; very strongly acid; gradual wavy boundary.

Btg2—35 to 44 inches; dark gray (10YR 4/1) sandy clay loam; common medium distinct reddish yellow (7.5YR 6/8) mottles; weak medium subangular blocky structure; friable; few fine, medium, and coarse roots; very strongly acid; gradual wavy boundary.

Btg3—44 to 60 inches; gray (10YR 5/1) sandy clay loam; many coarse distinct yellowish brown (10YR 5/6) mottles and common medium distinct reddish yellow (7.5YR 6/8) mottles; weak medium subangular blocky structure; friable; few fine and medium roots; very strongly acid; gradual wavy boundary.

BCg—60 to 68 inches; gray (10YR 5/1) sandy clay loam; pockets and streaks of sandy clay and loamy sand; common coarse faint dark gray (10Y 4/1) mottles, common medium distinct reddish yellow (7.5YR 6/8) mottles, and many coarse distinct brownish yellow (10YR 6/8) mottles; weak coarse subangular blocky structure; friable; few fine roots; very strongly acid.

Pantego soils have loamy horizons more than 60 inches thick over stratified Coastal Plain sediment. Reaction is extremely acid or very strongly acid except where lime has been added to the soil.

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

The BAg horizon has hue of 10YR or 2.5Y, value of 2 to 5, and chroma of 0 to 2. The texture is loam, sandy loam, or sandy clay loam. Some pedons do not have a BAg horizon. The Btg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. The texture is sandy clay loam, sandy loam, sandy clay, or clay loam. This horizon has few to common red and brown mottles. The BCg horizon is similar in color to the Btg horizon. The texture is sandy clay loam, clay loam, or sandy clay. Some pedons do not have a Btg horizon.

Some pedons have a Cg horizon that has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. The texture is sandy clay loam, sandy loam, loamy sand, or sand.

Paxville Series

The Paxville series consists of very poorly drained soils that formed in loamy fluvial sediment. These soils are on stream terraces along the South and Black Rivers and along Turnbull and Colly Creeks. Slope is less than 2 percent.

Typical pedon of Paxville sandy loam; near Rowan Community, 1.5 miles north of the intersection of North Carolina Highway 210 and secondary road 1550, 0.2 mile south from North Carolina Highway 210 on a farm road, 400 feet west, in a cultivated field (297,000N; 2,216,000E):

Ap—0 to 7 inches; very dark brown (10YR 2/2) sandy loam; weak coarse granular structure; very friable; many fine roots; slightly acid; clear smooth boundary.

A—7 to 14 inches; very dark brown (10YR 2/2) sandy loam; weak coarse granular structure; very friable; many fine roots; slightly acid; gradual wavy boundary.

BA—14 to 17 inches; very dark gray (10YR 3/1) sandy loam; common coarse faint very dark grayish brown (10YR 3/2) mottles and common faint distinct brownish yellow (10YR 6/8) mottles; weak medium subangular blocky structure; friable; common fine roots; very strongly acid; gradual wavy boundary.

Btg—17 to 42 inches; dark grayish brown (10YR 4/2) sandy clay loam; common medium prominent reddish yellow (7.5YR 6/8) mottles; weak medium subangular blocky structure; friable; common fine roots; few fine flakes of mica; few faint clay films on faces of peds; very strongly acid; gradual irregular boundary.

BCg—42 to 47 inches; dark grayish brown (10YR 4/2) sandy loam; pockets of sandy clay loam; common medium distinct very dark gray (10YR 3/1) mottles; weak medium subangular blocky structure; very friable; few fine roots; few fine flakes of mica; very strongly acid; gradual irregular boundary.

2Cg—47 to 70 inches; light gray (10YR 7/2) sand; single grained; loose; very strongly acid.

Paxville soils have loamy horizons 40 to 60 inches or more thick over stratified fluvial sand. Reaction is very strongly acid to slightly acid except where lime has been added to the soil.

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

Some pedons have an E horizon that has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. The texture is sandy loam, fine sandy loam, or loam.

Some pedons have an AB horizon that has hue of 10YR, value of 3 to 6, and chroma of 1 or 2. The texture is fine sandy loam or sandy loam.

The BA horizon has hue of 10YR, value of 3 to 6, and chroma of 1 or 2. The texture is sandy loam, fine sandy loam, or loam. Some pedons do not have a BA horizon. The Btg horizon has hue of 10YR or 2.5Y, value of 3 to 6, and chroma of 1 or 2. The texture is loam, sandy clay loam, sandy loam, or clay loam. The BCg horizon has hue of 10YR or 2.5Y, value of 3 to 6, and chroma of 1 to 3. The texture is sandy loam, fine sandy loam, sandy clay loam, or loamy sand. Some pedons do not have a BCg horizon.

The 2Cg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 to 3. The texture is sand, loamy sand, fine sand, or coarse sand. Some pedons have few to common gravel, and some have loamy or clayey material.

Portsmouth Series

The Portsmouth series consists of very poorly drained soils that formed in loamy and sandy sediments. These soils are on terraces of the Cape Fear River. Slope is less than 2 percent.

Typical pedon of Portsmouth mucky sandy loam; 7.5 miles northwest of White Oak Community, 1.4 miles north of the intersection of secondary roads 1318 and 1320, 50 feet west of road, in a forest (390,500N; 2,060,000E):

A1—0 to 3 inches; very dark grayish brown (10YR 3/2) mucky sandy loam; weak medium granular structure; friable; many fine and medium roots; extremely acid; clear wavy boundary.
A2—3 to 17 inches; very dark grayish brown (10YR 3/2) mucky sandy loam; weak medium granular structure; friable; many fine and medium roots; extremely acid; clear wavy boundary.
Btg1—17 to 21 inches; very dark grayish brown (10YR 3/2) sandy clay loam; common fine distinct light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable; few faint clay films on faces of peds; common fine flakes of mica; very strongly acid; gradual irregular boundary.
Btg2—21 to 27 inches; brownish gray (10YR 6/2) sandy clay loam; few pockets of sandy loam; common medium distinct dark grayish brown (10YR 4/2) mottles and few coarse distinct brownish yellow (10YR 6/8) mottles; weak medium subangular blocky structure; friable, slightly sticky; common faint clay films on faces of peds; few fine roots; few fine flakes of mica; few fine grains of feldspar; very strongly acid; gradual wavy boundary.
BCg—27 to 32 inches; light brownish gray (10YR 6/2) loamy sand; few streaks and pockets of sandy loam; common medium distinct dark grayish brown (10YR 4/2) mottles and few coarse distinct brownish yellow (10YR 6/8) mottles; very friable; sand grains coated and faintly bridged with clay; very strongly acid; clear smooth boundary.
2Cg1—32 to 50 inches; light gray (10YR 7/2) sand; single grained; loose; very strongly acid; gradual wavy boundary.
2Cg2—50 to 72 inches; light brownish gray (10YR 6/2) sand; pockets of sandy loam; single grained; loose; very strongly acid.

Portsmouth soils have loamy horizons 24 to 40 inches thick over stratified sandy sediment. Reaction is extremely acid to strongly acid in the A and B horizons except where lime has been added to the soil. It is extremely acid to medium acid in the C horizon.

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

Some pedons have a BA horizon that has hue of 10YR, value of 3 to 6, and chroma of 1 or 2. The texture is sandy loam, fine sandy loam, or loam. The umbric extends into the upper Btg horizon. The Btg horizon has hue of 10YR, value of 3 to 6, and chroma of 1 or 2. The texture is sandy clay loam, clay loam, or loam. In some pedons, this horizon has thin layers of sandy clay or sandy loam.

The BCg horizon has hue of 10YR, value of 5 or 6, and chroma of 2, or it has hue of 2.5Y, value of 5, and chroma of 2. The texture is sandy loam or loamy sand. Some pedons do not have a BCg horizon.

The 2Cg horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2, or it has hue of 2.5Y, value of 4, and chroma of 2. The texture is stratified sand or loamy sand. Some horizons have streaks or pockets of loamy or clayey material, and others have thin layers of gravel.

Rains Series

The Rains series consists of poorly drained soils that formed in loamy sediment. These soils are on uplands. Slope is less than 2 percent.

Typical pedon of Rains fine sandy loam; about 8 miles north of Tar Heel, 0.4 mile southwest of the intersection of secondary roads 1302 and 1303, 270 feet north of the road, in a wooded area (392,000N; 2,037,000E):

Ap—0 to 8 inches; very dark gray (10YR 3/1) fine sandy loam; moderate medium granular structure; very friable; many fine and medium roots; very strongly acid; clear smooth boundary.
Eg—8 to 13 inches; gray (10YR 5/1) fine sandy loam; weak medium granular structure; friable; few fine and medium roots; very strongly acid; clear smooth boundary.
Btg1—13 to 35 inches; gray (10YR 5/1) sandy clay loam; weak medium subangular blocky structure; friable; few fine and medium roots; very strongly acid; gradual wavy boundary.
Btg2—35 to 49 inches; gray (10YR 5/1) sandy clay loam; few medium distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable; very strongly acid; gradual wavy boundary.
Btg3—49 to 60 inches; light gray (10YR 7/1) sandy clay loam; few streaks of sandy loam between peds; few medium distinct strong brown (7.5YR 5/8) mottles and many medium distinct grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; friable; very strongly acid; gradual wavy boundary.
Btg4—60 to 72 inches; light gray (10YR 7/1) sandy clay loam; many coarse distinct grayish brown (10YR 5/2) mottles; weak coarse subangular blocky structure; firm; very strongly acid.

Rains soils have loamy horizons more than 60 inches

thick over stratified Coastal Plain sediment. Reaction is very strongly acid or strongly acid except where lime has been added to the soil.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 2 to 4, and chroma of 1 or 2.

The E horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. The texture is fine sandy loam or sandy loam. Some pedons do not have an E horizon.

Some pedons have a BEg horizon that has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. The texture is sandy loam or fine sandy loam. The Btg horizon has matrix colors similar to those of the BEg horizon. In addition, it has few to many high chroma mottles. The texture is sandy clay loam or clay loam. Some pedons have a BCg horizon that has hue of 10YR, value of 4 to 7, and chroma of 1 or 2, and has few to many high chroma mottles. The texture is sandy loam, sandy clay loam, or sandy clay.

Some pedons have a Cg horizon that has hue of 10YR, value of 5 to 7, and chroma of 1. The texture is variable, ranging from loamy sand to sandy clay.

Roanoke Series

The Roanoke series consists of poorly drained soils that formed in clayey sediment. These soils are on terraces of the Cape Fear, South, and Black Rivers. Slope ranges from 0 to 2 percent.

Typical pedon of Roanoke loam; about 6.5 miles northwest of White Oak, 0.5 mile north of the intersection of secondary roads 1318 and 1320, 100 feet east of road, in plantation of loblolly pine (385,500N; 2,061,500E):

A—0 to 7 inches; very dark grayish brown (10YR 3/2) loam; weak medium granular structure; friable; many fine and few medium and coarse roots; very strongly acid; clear smooth boundary.

BAg—7 to 10 inches; dark grayish brown (10YR 4/2) loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; common fine, medium, and coarse roots; few fine flakes of mica; very strongly acid; clear smooth boundary.

Btg1—10 to 36 inches; dark gray (10YR 4/1) clay; common medium distinct reddish yellow (7.5YR 6/8) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; common fine and medium and few coarse roots; few fine flakes of mica; very strongly acid; abrupt wavy boundary.

Btg2—36 to 42 inches; light brownish gray (2.5Y 6/2) clay; common coarse distinct dark gray (10YR 4/1) mottles and common medium prominent yellowish red (5YR 5/8) mottles; weak medium subangular blocky structure; firm, sticky and plastic; common fine and few medium and coarse roots; common fine flakes of mica; very strongly acid; gradual wavy boundary.

BCg—42 to 52 inches; light brownish gray (2.5Y 6/2) sandy clay loam; weak coarse subangular blocky structure; friable, very sticky and plastic; few fine roots; common fine flakes of mica; very strongly acid; gradual wavy boundary.

2Cg1—52 to 58 inches; light brownish gray (2.5Y 6/2) sandy loam; massive; friable, sticky and slightly plastic; common fine flakes of mica; very strongly acid; gradual smooth boundary.

2Cg2—58 to 70 inches; light brownish gray (2.5Y 6/2) sand; single grained; loose; very strongly acid.

Roanoke soils have loamy and clayey horizons 40 to 60 inches thick over stratified river sediment. Reaction is very strongly acid or strongly acid except where lime has been added to the soil. Mica flakes are few to common throughout the Btg2 and C horizons.

The A or Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2.

The BA horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. The texture is loam, clay loam, or silty clay loam. Some pedons do not have a BA horizon. The Btg horizon has hue of 10YR, value of 4 to 8, and chroma of 1 or 2; or it has hue of 2.5Y, value of 6, and chroma of 2. The texture is clay, clay loam, or silty clay. The BCg horizon has colors similar to those of the Btg horizon. The texture is sandy clay loam or clay. Some pedons do not have a BCg horizon.

The 2Cg horizon has colors similar to those of the Btg horizon. The texture typically is stratified sand to clay. This horizon has many quartz pebbles. Some 2Cg horizons are massive gray clay.

Stallings Series

The Stallings series consists of somewhat poorly drained soils that formed in loamy and sandy sediments. These soils are on uplands. Slope is less than 2 percent.

Typical pedon of Stallings loamy sand; about 2 miles southwest of Dublin, 0.5 mile east of the intersection of North Carolina Highways 87 and 41, 50 feet south of the road (326,000N; 2,093,000E):

Ap—0 to 8 inches; very dark gray (10YR 3/1) loamy sand; weak medium granular structure; very friable; many fine roots; medium acid; clear smooth boundary.

Bt—8 to 15 inches; pale brown (10YR 6/3) sandy loam;

common medium distinct brownish yellow (10YR 6/6) mottles and common medium faint light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; very friable; few fine roots; medium acid; gradual wavy boundary.

Btg—15 to 35 inches; brownish gray (2.5Y 6/2) sandy loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; very friable; few fine roots; strongly acid; gradual wavy boundary.

BCg1—35 to 55 inches; grayish brown (10YR 5/2) loamy sand; weak medium granular structure; very friable; sand grains coated and weakly bridged with clay; few faint pockets of clean sand grains; strongly acid; gradual wavy boundary.

BCg2—55 to 62 inches; light gray (10YR 7/2) loamy sand; weak fine granular structure; very friable; clay coatings on sand grains; some weakly bridged with clay; common faint pockets of clean sand grains; very strongly acid.

Stallings soils have sandy and loamy horizons more than 60 inches thick over Coastal Plain sediment. Reaction is extremely acid to strongly acid except where lime has been added to the soil.

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

Some pedons have an E horizon that has hue of 10YR to 2.5Y, value of 5 to 8, and chroma of 2 to 4. The texture is loamy sand, loamy fine sand, or sandy loam.

The Bt horizon has hue of 10YR to 2.5Y, value of 6 or 7, and chroma of 3 to 8. Gray mottles are common in the Bt horizon. The Btg horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. Brown mottles are common in the Btg horizon. The texture of the Bt and Btg horizons is sandy loam or fine sandy loam.

The BCg horizon is similar in color to the Btg horizon. The texture is loamy sand, loamy fine sand, sandy loam, or fine sandy loam.

Toisnot Series

The Toisnot series consists of poorly drained soils that formed in loamy sediment. These soils are around the head of drainageways and in shallow depressions adjacent to drainageways. Slope is less than 2 percent.

Typical pedon of Toisnot loam; 2.5 miles west of Dublin, 0.1 mile west of the intersection of secondary road 1191 and North Carolina Highway 131, 70 feet north of road, in forested area (329,000N; 2,070,000E):

O—1 to 0 inches; undecomposed leaf litter.

A—0 to 8 inches; black (10YR 2/1) loam; moderate medium granular structure; friable; few fine and medium roots; few clean sand grains; strongly acid; abrupt wavy boundary.

Bt/E—8 to 21 inches; gray (10YR 5/1) sandy loam; about 20 percent, by volume, very dark gray (10YR 3/1) loamy sand; weak coarse subangular blocky structure; very friable; few fine and medium roots; common small bodies of clean sand grains; strongly acid; abrupt wavy boundary.

Ex—21 to 31 inches; pale brown (10YR 6/3) loamy sand; common coarse distinct light gray (10YR 7/2) mottles; massive; very firm and brittle; strongly acid; gradual wavy boundary.

Btg1—31 to 40 inches; light gray (10YR 6/1) sandy clay loam; common coarse faint light gray (10YR 7/2) mottles; common coarse subangular blocky structure; friable; streaks of loamy sand between peds; very strongly acid; gradual wavy boundary.

Btg2—40 to 55 inches; light brownish gray (10YR 6/2) sandy clay; common coarse faint light gray (10YR 7/2) mottles; weak coarse subangular blocky structure; firm; streaks of loamy sand between peds; very strongly acid; gradual wavy boundary.

2Cg—55 to 62 inches; light brownish gray (10YR 6/2) loamy sand; common coarse distinct brown (10YR 5/3) mottles; massive; very friable; common pockets of sandy loam and sand; very strongly acid.

Toisnot soils formed in loamy fluvial and marine sediments. The upper boundary of a cemented pan generally is between depths of 20 and 40 inches, but ranges between depths of 10 and 45 inches. Reaction is extremely acid to strongly acid except where lime has been added to the soil.

The A or Ap horizon has hue of 10YR, value of 2 to 4, and chroma of 1 or 2, or it has hue of 2.5Y, value of 2, and chroma of 0.

The Bt/E horizon has hue of 10YR, value of 4 to 7, and chroma of 1 or 2. Texture is sandy loam or fine sandy loam.

Some pedons have an Eg horizon that has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. The texture is loamy sand, fine sand, or fine sandy loam.

The Ex horizon has hue of 10YR, value of 6 or 7, and chroma of 1 to 3. The texture is loamy sand, loamy fine sand, sandy loam, fine sandy loam, or fine sand.

Some pedons have a Bx horizon that has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. The texture is fine sandy loam or sandy clay loam.

The Btg horizon has hue of 10YR, value of 4 to 7, and chroma of 1 or 2. The texture generally is sandy clay loam, but ranges to fine sandy loam, sandy loam, and sandy clay.

The Cg or 2Cg horizon is in shades of gray. Mottles of higher chroma are in some pedons. The texture is stratified sand to clay, and some pedons are gravelly.

Torhunta Series

The Torhunta series consists of very poorly drained soils that formed in loamy sediment. These soils are on uplands and on old stream terraces. Slope is less than 2 percent.

Typical pedon of Torhunta mucky sandy loam; about 6 miles west of Elizabethtown, 2.9 miles south of the intersection of secondary road 1003 and North Carolina Highway 41, 500 feet northeast of road, in Rake Shin Bay (310,500N; 2,090,000E):

A1—0 to 8 inches; black (10YR 2/1) mucky sandy loam; moderate medium granular structure; friable; many fine and common medium roots; extremely acid; gradual wavy boundary.

A2—8 to 16 inches; black (10YR 2/1) sandy loam; weak medium granular structure; friable; few fine roots; extremely acid; clear irregular boundary.

Bg—16 to 33 inches; dark grayish brown (10YR 4/2) sandy loam; weak fine subangular blocky structure; friable; few fine roots; very strongly acid; gradual wavy boundary.

BC—33 to 47 inches; dark grayish brown (10YR 4/2) loamy sand; weak fine granular structure; very friable; very strongly acid; gradual wavy boundary.

Cg1—47 to 52 inches; light brownish gray (10YR 6/2) loamy sand; massive; very friable; very strongly acid; gradual wavy boundary.

Cg2—52 to 74 inches; light gray (10YR 7/2) sand; pockets of light brownish gray (10YR 6/2) loamy sand; single grained; loose; very strongly acid.

Torhunta soils have loamy and sandy horizons 20 to 50 inches thick over stratified Coastal Plain sediment. Reaction is extremely acid to strongly acid except where lime has been added to the soil.

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

The Bg horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 0 to 2. The texture is sandy loam or fine sandy loam. The BCg horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 0 to 2. The texture is sandy loam, fine sandy loam, loamy sand, or loamy fine sand.

The Cg horizon is similar in color to the BCg horizon, but in addition has value of 7. The texture is sandy loam, loamy sand, loamy fine sand, sand, fine sand, or coarse sand. Some pedons are gravelly.

Wagram Series

The Wagram series consists of well drained soils that formed in loamy sediment. These soils are on uplands. Slope ranges from 0 to 6 percent.

Typical pedon of Wagram fine sand, 0 to 6 percent slopes; 2.5 miles southwest of Elizabethtown on North Carolina Highway 701, 300 feet west of the intersection of North Carolina Highways 242 and 701, in a cultivated field (309,000N; 2,114,500E):

Ap—0 to 9 inches; grayish brown (10YR 5/2) fine sand; single grained; very friable; common fine roots; slightly acid; abrupt smooth boundary.

E—9 to 28 inches; pale yellow (2.5Y 7/4) fine sand; single grained; loose; few fine roots; slightly acid; gradual smooth boundary.

Bt1—28 to 50 inches; yellowish brown (10YR 5/8) sandy clay loam; weak medium subangular blocky structure; friable; few fine roots; few faint clay films on faces of peds; few clean sand grains; strongly acid; gradual smooth boundary.

Bt2—50 to 62 inches; yellowish brown (10YR 5/8) sandy clay loam; few fine distinct reddish yellow (7.5YR 6/8) and brown (10YR 5/3) mottles; weak medium subangular blocky structure; friable; few yellowish red iron nodules; very strongly acid.

Wagram soils have sandy horizons 20 to 40 inches thick over a loamy subsoil that extends to a depth of 60 to 80 inches or more. Reaction is very strongly acid or strongly acid except where lime has been added to the soil.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 4.

The E horizon has hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 2 to 4.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 4 to 8. In most pedons, red, brown, and gray mottles are in the lower part of this horizon. The texture is sandy clay loam or sandy loam.

Wahee Series

The Wahee series consists of somewhat poorly drained soils that formed in loamy and clayey fluvial sediments. These soils are on terraces of the Cape

Fear, South, and Black Rivers. Slope is less than 2 percent.

Typical pedon of Wahee loam; about 3 miles northeast of Tar Heel, 0.8 mile north of the intersection of secondary roads 1320 and 1316, 0.4 mile west on a farm road, 400 feet west of point where farm road turns south, in a cultivated field (373,000N; 2,068,000E):

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) loam; weak medium granular structure; friable; common fine roots; slightly acid; clear smooth boundary.

BA—7 to 11 inches; pale brown (10YR 6/3) clay loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; common fine roots; few fine pores; thin discontinuous clay films on faces of peds; common fine flakes of mica; few fine feldspar; strongly acid; gradual wavy boundary.

Btg1—11 to 28 inches; grayish brown (10YR 5/2) clay; common medium distinct yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; common fine roots; few fine pores; common thin continuous clay films on faces of peds; common fine flakes of mica; few fine grains of feldspar; very strongly acid; gradual wavy boundary.

Btg2—28 to 42 inches; light brownish gray (10YR 6/2) clay; many medium distinct strong brown (7.5YR 5/8) mottles and few medium prominent yellowish red (5YR 4/8) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; few fine roots; few fine pores; few thin discontinuous clay films on faces of peds; common fine flakes of mica; few fine grains of feldspar; very strongly acid; gradual wavy boundary.

BCg—42 to 45 inches; light brownish gray (2.5Y 6/2) sandy clay loam; common medium prominent yellowish red (5YR 5/8) mottles and common medium distinct strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable, slightly sticky; few fine roots; common fine flakes of mica; few fine grains of feldspar; very strongly acid; gradual wavy boundary.

2Cg—45 to 60 inches; light gray (10YR 7/1) sandy loam; common medium distinct reddish yellow (7.5YR 6/8) mottles; massive; friable; few fine flakes of mica; very strongly acid.

Wahee soils have loamy and clayey horizons 40 to 80 inches thick over stratified river sediment. Reaction is very strongly acid or strongly acid except where lime has been added to the soil.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 0 to 6.

Some pedons have an E horizon that has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 2 to 4. The texture is loam or silt loam.

The BA or BE horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 to 8. In some pedons it is mottled with gray. The texture is sandy clay loam or clay loam. Some pedons do not have a BA or BE horizon. If there is no BA or BE horizon, the upper part of the Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 to 8 and has few to many gray mottles. In pedons that have a BA or BE horizon, the Bt horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. The lower part of the Bt horizon is mottled in shades of gray, yellow, brown, or red. The texture of the Bt horizon is clay, sandy clay, clay loam, or silty clay. The BCg horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2. The texture is sandy clay, silty clay loam, clay loam, sandy clay loam, or fine sandy loam. Some pedons do not have a BCg horizon.

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

Wakulla Series

The Wakulla series consists of somewhat excessively drained soils that formed in sandy eolian sediment. These soils are on uplands and stream terraces. Slope ranges from 1 to 6 percent.

Typical pedon of Wakulla sand, 1 to 6 percent slopes; 3.5 miles northeast of Elizabethtown, 1.5 miles north of the intersection of secondary road 1511 and U.S. Highway 701, 0.5 mile southwest of secondary road 1511 on Chamblee Camp Road, 250 feet south, in longleaf pine plantation (351,000N; 2,054,500E):

A—0 to 6 inches; grayish brown (10YR 5/2) sand; single grained; loose; common fine roots; strongly acid; clear wavy boundary.

E—6 to 30 inches; light yellowish brown (10YR 6/4) sand; single grained; loose; few fine roots; very strongly acid; gradual wavy boundary.

Bt—30 to 50 inches; yellowish brown (10YR 5/6) loamy sand; weak medium granular structure; very friable; sand grains coated and bridged with clay; very strongly acid; gradual wavy boundary.

C1—50 to 60 inches; yellow (10YR 7/6) sand; few pockets of very pale brown (10YR 8/3) uncoated sand; single grained; loose; very strongly acid; gradual wavy boundary.

C2—60 to 80 inches; very pale brown (10YR 7/4) sand;

single grained; loose; very strongly acid.

Wakulla soils are sandy in all horizons. Reaction is very strongly acid to medium acid except where lime has been added to the soil.

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

The E horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 4 to 8. The texture is sand or loamy sand.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 6 to 8. The texture is loamy sand that has a silt plus clay content of 10 to 20 percent.

The C horizon has hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 1 to 8. The texture is sand or fine sand.

Wasda Series

The Wasda series consists of very poorly drained soils that formed in highly decomposed organic matter over loamy mineral layers. These soils are on stream terraces. Slope is less than 2 percent.

The Wasda soils in Bladen County are taxadjuncts to the Wasda series because in most places the sandy 2C horizon is at a depth that is less than the defined range for the series.

Typical pedon of Wasda muck; 0.8 mile north of Kelly, 0.2 mile east of the intersection of North Carolina Highway 53 and secondary road 1539, 0.7 mile north on a farm road, 150 feet west of the road, in a cultivated field (264,000N; 2,211,000E):

Oap—0 to 8 inches; black (10YR 2/1) muck; less than 1 percent fiber unrubbed and rubbed; weak medium granular structure; very friable; common clean sand grains; many fine roots; strongly acid; clear wavy boundary.

Oa—8 to 14 inches; very dark brown (10YR 2/2) muck; less than 1 percent fiber unrubbed and rubbed; weak medium subangular blocky structure; friable; common clean sand grains; common fine roots; very strongly acid; clear wavy boundary.

2Ag—14 to 23 inches; very dark grayish brown (10YR 3/2) sandy loam; weak medium subangular blocky structure; friable, slightly sticky; few fine roots; very strongly acid; gradual smooth boundary.

2Bg—23 to 32 inches; dark grayish brown (10YR 4/2) sandy clay loam; weak coarse subangular blocky structure; friable, slightly sticky and slightly plastic; few fine flakes of mica; very strongly acid; gradual wavy boundary.

2Cg1—32 to 36 inches; dark grayish brown (10YR 4/2) loamy sand; common coarse faint very dark grayish brown (10YR 3/2) mottles; massive; very friable; few fine flakes of mica; very strongly acid; gradual wavy boundary.

2Cg2—36 to 62 inches; light brownish gray (10YR 6/2) sand; single grained; loose; very strongly acid.

Wasda soils consist of highly decomposed organic matter, 8 to 16 inches thick, underlain by loamy mineral material. The organic and loamy horizons are 30 to 60 inches or more thick over stratified fluvial sediment. Reaction is extremely acid to strongly acid in the O, A, and B horizons and slightly acid to moderately alkaline in the C horizon.

The Oap or Oa horizon has hue of 5YR to 2.5Y, value of 2 or 3, and chroma of 1 or 2, or it is neutral and has value of 2 or 3.

The 2Ag horizon has hue of 7.5YR to 2.5Y, value of 2 to 4, and chroma of 1 to 3, or it is neutral and has value of 2 to 4. The texture is sandy loam, sandy clay loam, clay loam, fine sandy loam, mucky fine sandy loam, or mucky loam. In some pedons, the 2Ag horizon is sandy.

The 2Bg horizon has hue of 10YR or 2.5Y, value of 2 to 6, and chroma of 1 to 3, or it has hue of 7.5YR, value of 3 or 4, and chroma of 2. The texture is sandy loam, fine sandy loam, sandy clay loam, clay loam, or loam. Under natural forest conditions, the 2Bg horizon is often massive and would be considered part of the 2Cg horizon. If this soil is drained and cultivated, structure develops and this horizon becomes the 2Bg.

The 2Cg horizon has hue of 10YR or 2.5Y, value of 3 to 8, and chroma of 1 to 3, or it has hue of 7.5YR, value of 3 to 5, and chroma of 2 or 3. The texture generally is sandy but ranges to sandy clay loam. Some pedons have thin layers of clay loam or clay.

Wickham Series

The Wickham series consists of well drained soils that formed in loamy and sandy fluvial sediments. These soils are on terraces of the Cape Fear River. Slope ranges from 1 to 6 percent.

Typical pedon of Wickham fine sandy loam, 1 to 6 percent slopes; about 6.5 miles northwest of White Oak Community, 0.7 mile southwest of the intersection of secondary roads 1318 and 1320 on a farm road, 20 feet south of road, in a cultivated field (384,000N; 2,059,000E):

Ap—0 to 7 inches; dark brown (7.5YR 4/4) fine sandy

loam; weak medium granular structure; very friable; common fine roots; slightly acid; clear smooth boundary.

Bt1—7 to 22 inches; yellowish red (5YR 4/8) sandy clay loam; moderate medium subangular blocky structure; friable; common fine roots; few fine pores; few thin discontinuous clay films on faces of peds; few fine flakes of mica; slightly acid; clear wavy boundary.

Bt2—22 to 35 inches; yellowish red (5YR 5/8) sandy clay loam; weak medium subangular blocky structure; friable; common fine flakes of mica; very strongly acid; gradual wavy boundary.

BC—35 to 43 inches; yellowish red (5YR 5/8) sandy loam; weak coarse subangular blocky structure; very friable; common fine flakes of mica; very strongly acid; clear smooth boundary.

2C1—43 to 55 inches; reddish yellow (7.5YR 6/8) loamy sand; massive; few fine flakes of mica; very friable; strongly acid; clear smooth boundary.

2C2—55 to 65 inches; reddish yellow (7.5YR 7/8) sand; few medium pockets of yellowish red (5YR 5/8) loamy sand; single grained; loose; medium acid.

Wickham soils have loamy horizons 40 to 60 inches or more thick over stratified sandy river sediment. Reaction is very strongly acid to medium acid except where lime has been added to the soil. Mica flakes are few to common throughout most pedons.

The Ap or A horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 2 to 4.

Some soils have an E horizon that has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 2 to 4. The texture is loamy fine sand, loamy sand, fine sandy loam, or sandy loam.

The Bt horizon has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8. The texture is loam, sandy clay loam, clay loam, or sandy loam. Some pedons have thin layers of clay or sandy clay. The BC horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 4 to 8. The texture is sandy loam, sandy clay loam, clay loam, loam, or loamy sand.

The 2C horizon has hue of 2.5YR to 10YR, value of 4 to 6, and chroma of 3 to 8. The texture is loamy sand, sand, loamy fine sand, or sandy loam. Layers of gravel are in some pedons.

Wilbanks Series

The Wilbanks series consists of very poorly drained soils that formed in stratified clayey and loamy fluvial and marine sediments. These soils are on flood plains. Slope is less than 2 percent.

Typical pedon of Wilbanks loam, frequently flooded; 1.5 miles east of Clarkton, 0.3 mile west of the intersection of North Carolina Highway 211 and secondary road 1759, 200 feet north of highway, in wooded swamp (264,000N; 211,000E):

A1—0 to 9 inches; very dark gray (10YR 3/1) loam; moderate fine subangular blocky structure; friable; many fine and medium and few coarse roots; extremely acid; clear smooth boundary.

A2—9 to 28 inches; black (10YR 2/1) clay loam; moderate coarse subangular blocky structure; firm, sticky and slightly plastic; common fine and medium roots and few coarse roots; extremely acid; clear irregular boundary.

B/A—28 to 51 inches; dark gray (10YR 4/1) clay; about 10 percent, by volume, tongues of black (10YR 2/1) subsurface material; few fine distinct yellowish brown (10YR 5/4) mottles; strong coarse angular blocky structure; firm, sticky and plastic; common fine and medium roots; few coarse roots; strongly acid; clear smooth boundary.

Bg1—51 to 58 inches; grayish brown (10YR 5/2) clay loam; few fine distinct brownish yellow (10YR 6/6) mottles; moderate coarse angular blocky structure; firm, slightly sticky and slightly plastic; few fine and medium roots; neutral; clear smooth boundary.

BCg—58 to 65 inches; dark grayish brown (10YR 4/2) fine sandy loam; few fine distint brownish yellow (10YR 6/6) mottles; weak coarse subangular blocky structure; friable; few fine and medium roots; neutral; gradual smooth boundary.

2Cg—65 to 80 inches; dark grayish brown (10YR 4/2) loamy sand; few fine distinct strong brown (7.5YR 5/8) mottles; massive; very friable; neutral.

Wilbanks soils have loamy and clayey horizons from 24 to 60 inches or more thick over marly marine and fluvial sediments. Reaction is extremely acid to strongly acid in the 10- to 40-inch control section and very strongly acid to neutral in the lower horizons.

The A1 horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The lower part of the A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2, or it is neutral and has value of 2 or 3. In some pedons, few to common high chroma mottles are in the lower part of the A horizon.

The B/A horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. Pockets or tongues of umbric

material from the A horizon are less than 50 percent of this horizon. Some pedons do not have a B/A horizon. The Bg horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. The texture of the B/A and Bg horizons is clay loam, clay, or silty clay loam. The BCg horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. The texture is clay loam, sandy clay loam, sandy loam, or fine sandy loam. Some pedons do not have a BCg horizon. In some pedons, the Bg horizon has few or common high chroma mottles.

The 2Cg horizon has hue of 10YR, value of 4 to 7, and chroma of 1 or 2. The texture is sandy clay loam, sandy loam, fine sandy loam, loamy sand, loamy fine sand, sand, or fine sand.

Woodington Series

The Woodington series consists of poorly drained soils that formed in loamy and sandy sediments. These soils are on uplands. Slope is less than 2 percent.

Typical pedon of Woodington loamy sand; about 6 miles southwest of Elizabethtown, 0.2 mile northeast of the intersection of secondary road 1003 and North Carolina Highway 242, 0.6 mile northwest on Timber Road, 100 feet east of road, in an area of loblolly and longleaf pine (306,500N; 2,098,000E):

A—0 to 6 inches; very dark gray (10YR 3/1) loamy sand; weak medium granular structure; very friable; common fine roots; extremely acid; clear wavy boundary.

E—6 to 12 inches; light brownish gray (10YR 6/2) loamy sand; weak fine granular structure; very friable; few fine roots; very strongly acid; clear wavy boundary.

Btg1—12 to 30 inches; gray (10YR 6/1) sandy loam; few fine distinct yellowish brown (10YR 5/8) mottles; few fine faint lenses of white fine sand; weak medium subangular blocky structure; friable; few fine roots; very strongly acid; gradual wavy boundary.

Btg2—30 to 36 inches; light brownish gray (10YR 6/2) sandy loam; common medium distinct brown (7.5YR 5/4) and strong brown (7.5YR 5/8) mottles; few medium faint lenses of white fine sand; weak medium subangular blocky structure; friable; very strongly acid; gradual wavy boundary.

Btg3—36 to 50 inches; light brownish gray (10YR 6/2) sandy loam; common medium distinct brownish yellow (10YR 6/8) mottles; weak medium subangular blocky structure; friable; very strongly acid; gradual wavy boundary.

BCg—50 to 62 inches; light gray (10YR 7/2) loamy sand; weak fine subangular blocky structure; very friable; common small pockets of clean sand; few medium roots; very strongly acid.

Woodington soils have sandy and loamy horizons more than 60 inches thick over stratified Coastal Plain sediment. Reaction is extremely acid to medium acid except where lime has been added to the soil.

The Ap or A horizon has hue of 10YR, value of 3 or 4, and chroma of 1 or 2.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. The texture is loamy sand, loamy fine sand, sandy loam, or fine sandy loam.

The Btg horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. It has few to common high chroma mottles. The texture is sandy loam or fine sandy loam. The BCg horizon is similar in color to the Btg horizon. The texture is loamy sand, loamy fine sand, fine sandy loam, or sandy loam.

Some pedons have a Cg horizon that has colors in shades of gray, brown, or yellow, or it is mottled in these colors. This horizon generally has strata of white sand. The texture ranges from loamy fine sand to coarse sand.

Formation of the Soils

Soil results from the combined effects of parent material, climate, plant and animal life, relief, and time. All of these factors affect the formation of every soil. In many places, however, one or two factors are dominant and fix most of the properties of the soil.

Parent Material

Many of the differences among the soils of Bladen County reflect differences in the geologic material from which the soils formed. Nahunta and Aycock soils, for example, are high in silt content. These soils formed in sediment that is high in silt content. In contrast, Lakeland and Wakulla soils, which are very sandy, formed in coarse sandy sediment. Johnston soils on flood plains and Wickham, Altavista, and Dogue soils on terraces formed in mixed alluvium consisting of sand, silt, and clay. Their profiles have layers of contrasting texture.

Climate

Climate affects soil development primarily through its influence on precipitation and temperature. Water is necessary for biological activity. It also dissolves minerals and moves them through the soil profile. Temperature influences the kinds of organisms and their growth. It also largely determines the speed and extent of chemical and physical reactions in the soil.

Bladen County has a warm, humid climate, resulting in conditions that cause rapid decomposition of organic matter and that favor chemical reactions in the soils. The abundant rainfall leaches out soluble bases and carries finer mineral particles downward; therefore, nearly all of the mineral soils in the county are acid, highly weathered, and highly leached. Variations in climate within the county are slight and probably do not cause significant local variation in soils.

Plant and Animal Life

Bacteria, fungi, and other relatively simple organisms aid in weathering soil and in decomposing organic matter. Larger plants and animals produce organic matter and translocate elements and material within the soil.

The activities of fungi and micro-organisms take place only in the upper few inches of the soil in this area. Earthworms and other small invertebrates carry on a slow, but continuous cycle of mixing within this thin surface layer. Rodents have had little effect on the formation of soils in Bladen County.

Originally, pine forests covered most of the uplands in the county. Baldcypress, water tupelo, and other hardwoods were dominant on flood plains and along drainageways. These trees took up elements from the subsoil and deposited them on the surface. The decay of twigs, trunks, branches, and leaves added organic matter to the soil surface.

The length of time that organic matter remains in the soil greatly depends upon soil drainage. In the well drained Norfolk and Wagram soils, organic matter is rapidly broken down by micro-organisms, causing very little organic matter to accumulate on the surface. Organic matter breakdown is slower in wetter soils, such as Pantego and Byars soils, and the wet soils have a dark colored surface layer that is relatively high in organic matter content. Some large Carolina bays are almost continually wet. Under these wet conditions, organic matter accumulates year after year with little or no mineralization, forming such soils as Croatan soils, which have a black organic surface layer more than 4 feet thick in places.

Relief

Relief influences runoff, erosion, drainage, aeration, and exposure to sun and wind. Soils in Bladen County range from nearly level to moderately steep. Aycock, Norfolk, and Wagram soils and other nearly level to gently sloping soils have a thicker profile than that of soils on a more sloping landscape, such as Gritney soils and Dystrochrepts, steep. Relief largely governs natural drainage (fig. 6) and strongly influences the accumulation of organic matter in soils.

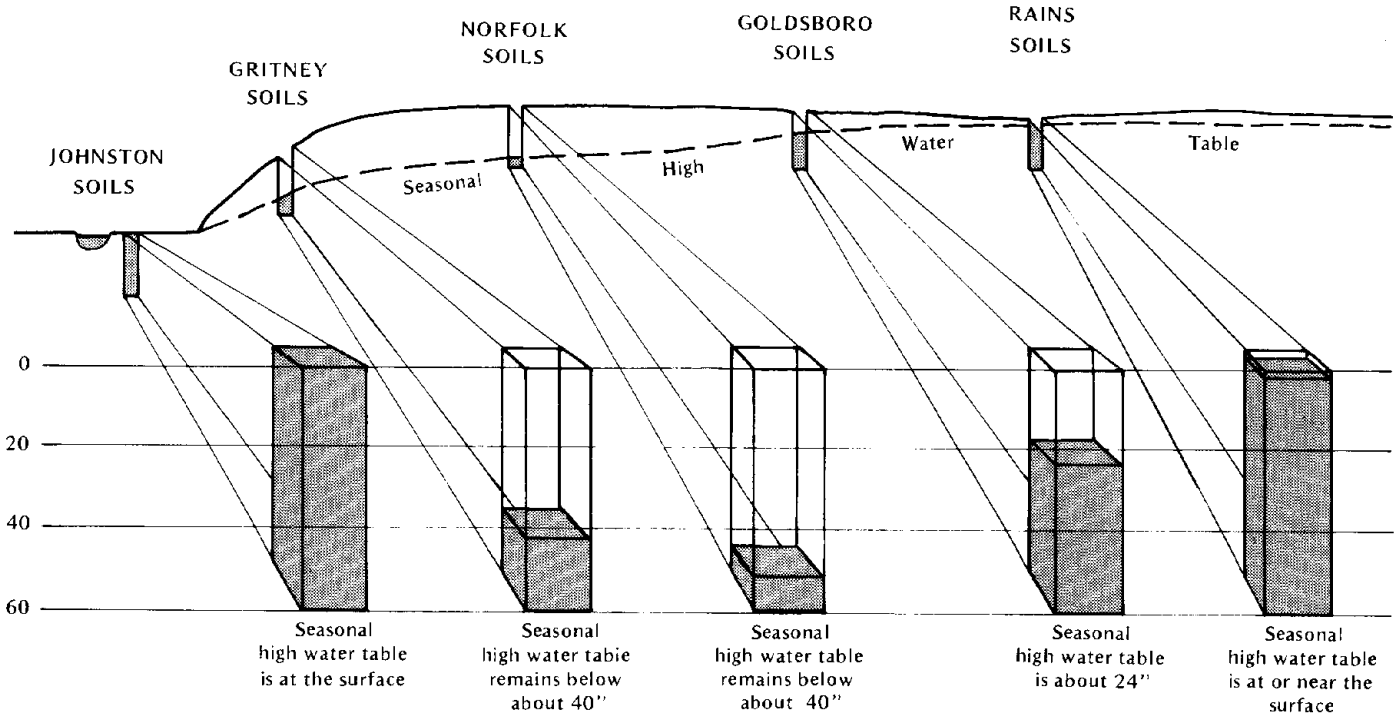


Figure 6.—A representative landscape shows the relative location of some important soils in Bladen County and the depth to the seasonal high water table.

Time

Some differences in soils reflect differences in age. A sequence of horizons takes a long time to develop in a natural soil. Horizons are more strongly defined in older soils than in younger soils, assuming both soils formed under the same conditions and in similar parent material.

Norfolk, Wagram, and Goldsboro soils are the older soils in Bladen County. They formed on the smooth, nearly level upland divides. These soils have well developed horizons. These soils formed in Coastal Plain sediment on landscapes that have remained essentially unchanged for millions of years.

In contrast, Johnston and Chewacla soils are younger. They formed in alluvial material that has not been in place long enough for well defined horizons to develop.

Geology and Soils

The surface geology of Bladen County consists mostly of Pleistocene to Recent age sediments *(15)*. Along the Cape Fear River and its tributaries, older sediments of the Cretaceous age Black Creek and Peedee Formations are exposed. A thin marly layer, the Duplin Formation, rests on the Cretaceous sediments in a few areas. The slightly younger Waccamaw Formation, a sandy, marly layer a few feet thick, rests on the Cretaceous sediments in many areas. In the southern part of the county, most of the stream flood plains cut into the Waccamaw Formation.

Bladen County can be divided into six major geomorphic surfaces. A map of the geomorphic surfaces accompanies the general soil map at the back of this publication.

The *Sunderland terrace* is believed to be a marine terrace. It lies in the middle Coastal Plain area. The elevation of this terrace is about 100 to 155 feet *(13)*. The Sunderland terrace has been highly fluviated and modified to some degree by Carolina bay formation.

The soils on the Sunderland terrace dominantly have a thick, well developed, loamy subsoil and low natural fertility. These soils are well drained to very poorly drained, but the well drained soils are most common.

The Wicomico terrace is a younger marine terrace. It is separated from the Sunderland terrace by the Surry

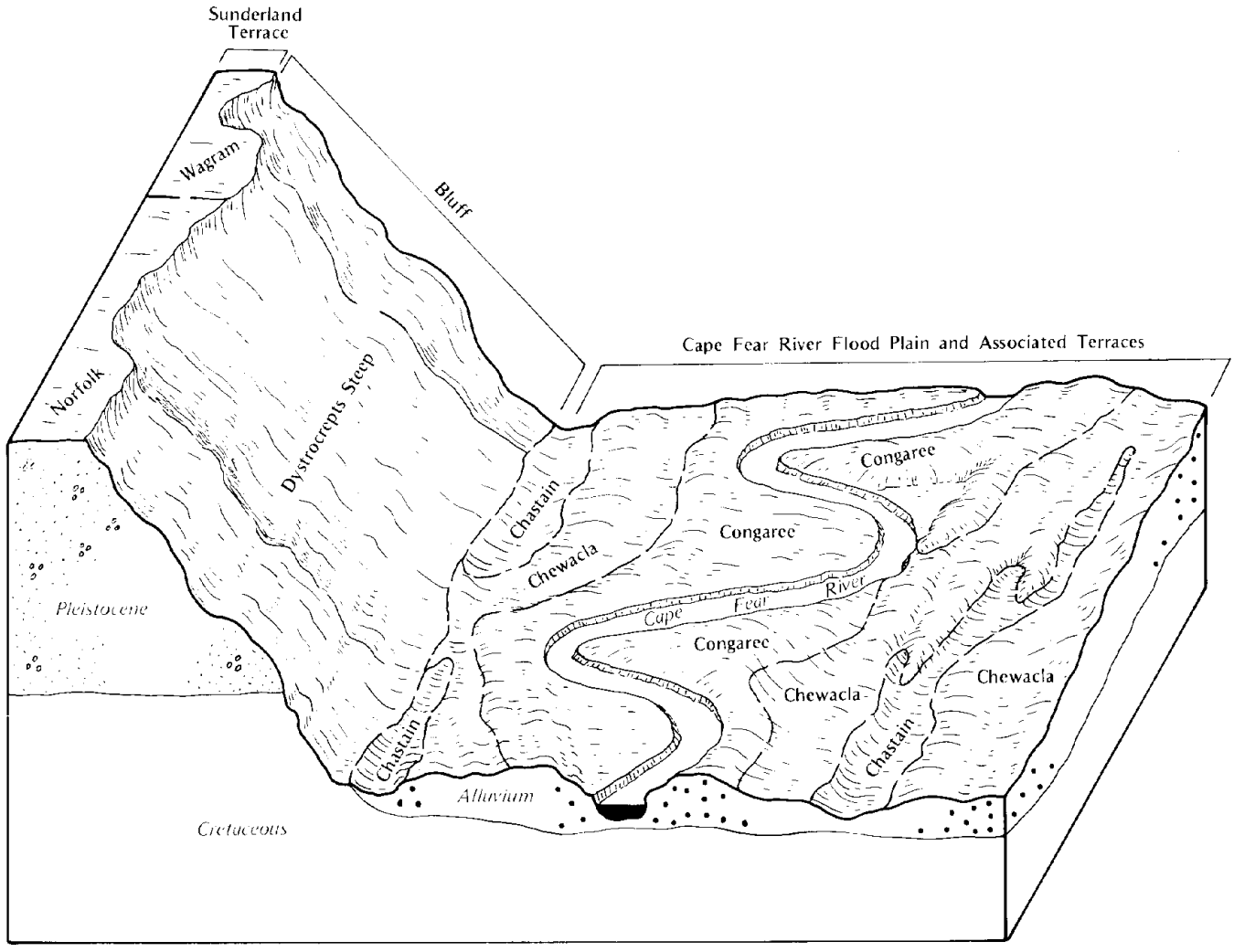


Figure 7.—Relationship of the Sunderland terrace, bluff, and Cape Fear River flood plain and associated terraces geomorphic surfaces.

Scarp, an old shoreline with its toe at an elevation of 92 feet *(13)*. The Wicomico terrace has an elevation of 42 to 100 feet and lies in the lower Coastal Plain area. This surface has been fluviated to some degree but not as much as the Sunderland terrace. The Wicomico terrace has been only slightly affected by Carolina bay formation.

The soils on the Wicomico terrace dominantly have a thick, well developed, loamy subsoil and low natural fertility. These soils are well drained to very poorly drained, but the poorly drained soils are most common.

A *bluff* is primarily an erosional surface. It formed as the Cape Fear River entrenched and laterally deflected to the southwest, possibly because of the Corioles effect. By undercutting and mass slumping, a steep scarp or bluff has developed that exposes Recent to Cretaceous age sediment. This geomorphic surface extends diagonally northwest to southeast through the center of Bladen County and separates the Sunderland and Wicomico terraces from the Cape Fear River flood plain and associated terraces (fig. 7). Deeply entrenched tributaries of the Cape Fear River are also a part of this surface. The slope of this bluff ranges from about 8 to 100 percent or more, but it averages about 30 percent. In the northwestern part of the county, the bluff is 100 feet high in places but decreases to 40 feet to the southeast.

Because the geologic sediments are so variable and

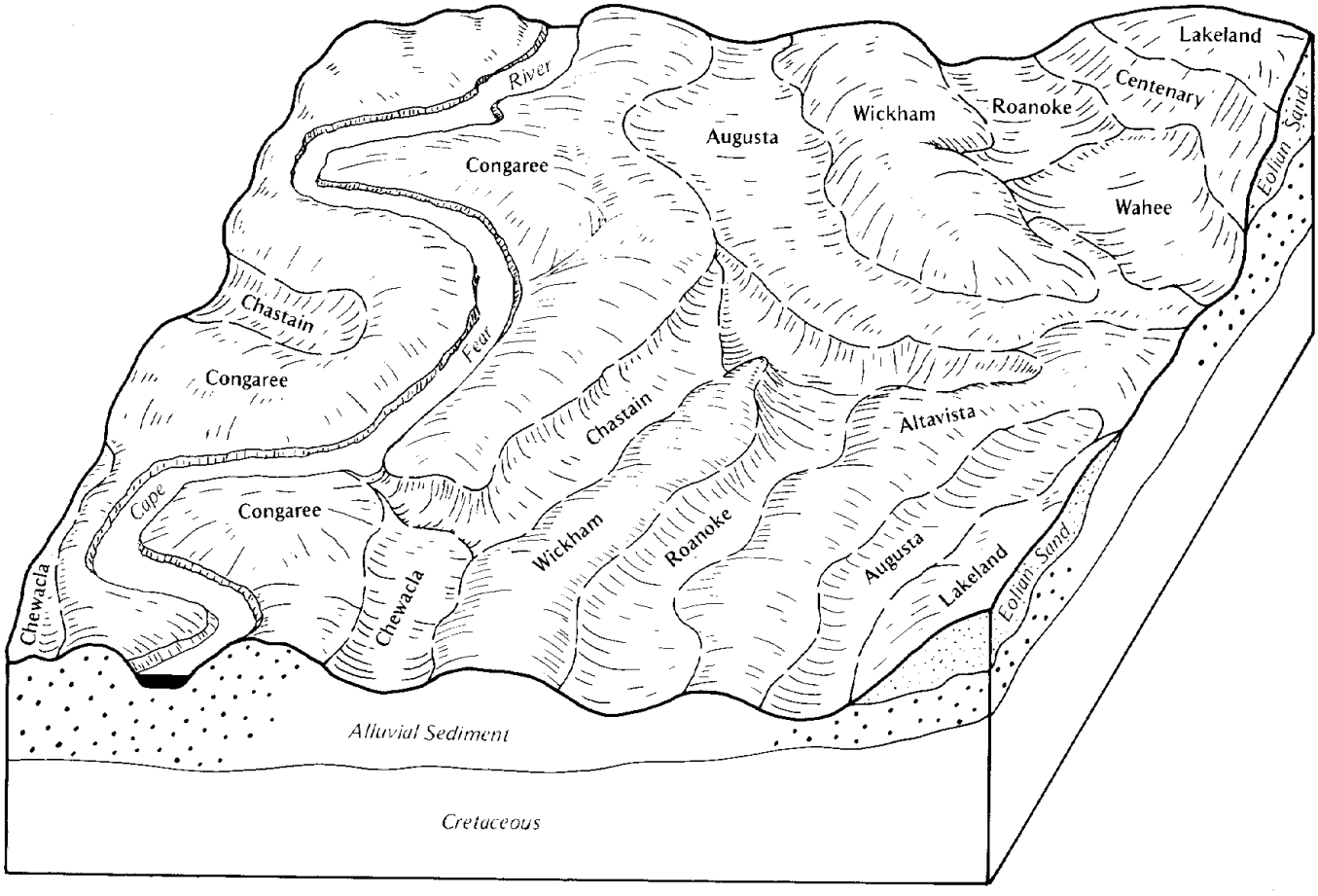


Figure 8.—On the Cape Fear River flood plain and associated terraces geomorphic surface, the Congaree, Chastain, and Chewacla soils are on the flood plain and the Augusta, Altavista, Roanoke, Wahee, and Wickham soils are on the terraces. The Lakeland and Centenary soils are part of the adjacent Eolian sands and Carolina bays geomorphic surface.

the time of exposure short, the soils on the bluff geomorphic surface dominantly have a thin, weakly developed subsoil or no subsoil development. In some less sloping areas, soils have developed a moderately thick subsoil. The soils are sandy, loamy, or clayey. They are dominantly well drained or excessively drained, but they can be moderately well drained.

The Cape Fear River flood plain and associated terraces (fig. 8) is a sequence of river terraces or benches that developed as the river entrenched and deflected. The soils on the flood plain part of this geomorphic surface dominantly have a loamy subsoil that has little or no horizon development. The soils on the terrace part dominantly have a moderately thick, well developed, loamy or clayey subsoil, or they are sandy throughout. These soils are excessively drained to very poorly drained. Because the soils on this geomorphic surface formed in sediments with mixed mineralogy derived from the Piedmont, they have slightly higher natural fertility than the soils on the other geomorphic surfaces in Bladen County.

The Eolian sands and Carolina bays geomorphic surface is between the Cape Fear River flood plain and associated terraces and the South-Black River flood plain and associated terraces geomorphic surfaces. When the Pleistocene seas receded, this area would have been part of the Sunderland and Wicomico terraces. For a period following the retreat of the sea, the Cape Fear River apparently developed and maintained a fairly stable channel in the area where the South and Black Rivers now flow. As sea level continued to drop, the river began to laterally deflect to

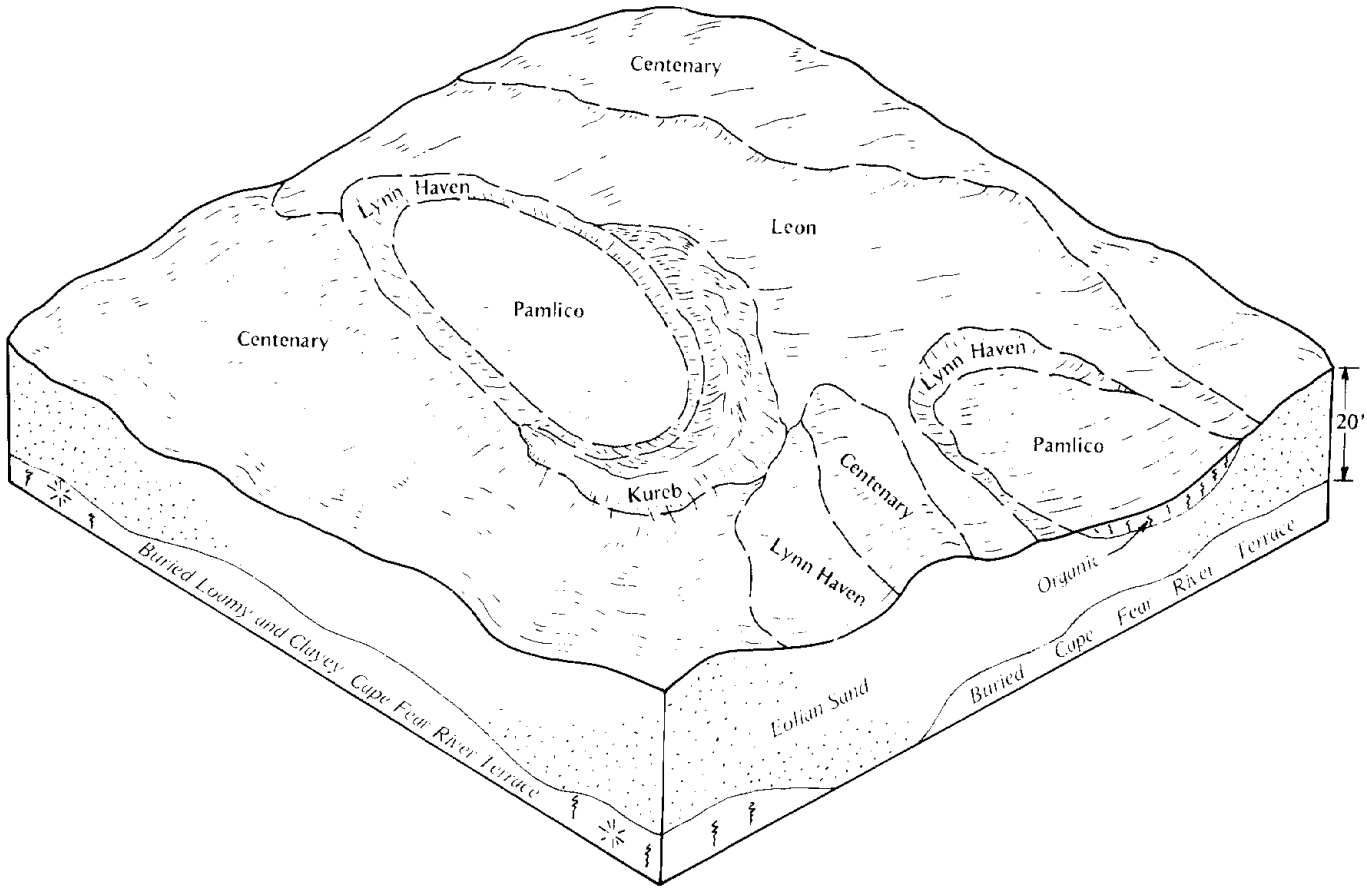


Figure 9.—Carolina bays are oval-shaped in the Eolian sands and Carolina bays geomorphic surface.

the southwest across the marine terraces. This process continues today to bring the Cape Fear River to its present location. If no other processes had occurred, this surface would be part of the terraces on the Cape Fear River flood plain and associated terraces geomorphic surface. However, the river deflected and cut into the underlying sediment and carried the sediment toward the sea. During periods of flooding, much silt and clay were carried off in suspension and settled out wherever the water velocity slowed. At the same time, large quantities of sand were deposited on the flood plain adjacent to the river. The prevailing southwesterly winds spread the sand over the river terraces and almost completely obscured them. The sands of this dunal system range from a few feet thick to more than 30 feet thick.

On this geomorphic surface, soils that have sandy horizons throughout are dominant. These soils are excessively drained to very poorly drained. They sometimes have one or more organically stained horizon in the subsoil. In the northeastern part of this geomorphic surface, the dune sands have a little more silt and clay than in the south and east. Some of the soils that developed in these sediments have a thin to moderately thick, loamy subsoil.

During periods of severe flooding, the river left its banks and reestablished flood channels through the sandy areas. In general soil map units 1, 3, and 10, which are northeast of the Cape Fear River, some of these isolated flood channels remain today, but they have been partly obscured by sand. The channels are characterized by soils that dominantly have a clay loam subsoil, higher natural fertility, and that are somewhat poorly drained to very poorly drained.

Carolina bay formation (fig. 9) has had a tremendous influence on this geomorphic surface. About 60 percent of the area is Carolina bays and their accompanying sand rims. Soils that have a thick organic surface

horizon, sandy soils that have an organically stained subsoil, and soils that have a thin, weakly developed, loamy subsoil are dominant in the Carolina bays. These soils are poorly drained or very poorly drained. The dominant soils on the Carolina bay rims are poorly drained to excessively drained sand.

The South-Black River flood plain and associated terraces geomorphic surface formed as the South and Black Rivers developed in the old Cape Fear River channel and cut deeper into the underlying sediment. The soils on the flood plain dominantly have a thin, weakly developed, sandy or loamy subsoil. Some have a thick organic surface horizon. These soils are very poorly drained. The soils on the terraces are dominantly loamy soils that have a thin to moderately thick subsoil and clayey soils that have a moderately thick to thick subsoil and slightly higher natural fertility.

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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.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

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

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

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

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.

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

Bluff. A high, steep bank.

Bottom land. The normal flood plain of a stream, subject to flooding.

Carolina bay. A shallow, oval-shaped depression that does not have a natural drainage outlet. Such bays are oriented in a northwest-southeast direction and range from 5 to 500 acres or more.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but that have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity, but is more precise in meaning.

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, i.e., clay coating, clay skin.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Compressible (in tables). The volume of soft soil

decreases excessively under load.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

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

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Carioles effect. Apparent force caused by the earth's rotation which serves to deflect a moving body on the surface of the earth to the right in the northern hemisphere and to the left in the southern hemisphere.

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.

Deferred grazing. Postponing grazing or resting grazingland for a prescribed period.

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.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material to eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

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

Excess fines (in tables). Excess silt and clay are in the soil. The soil is not a source of gravel or sand for construction purposes.

Fast intake (in tables). The movement of water into the soil is rapid.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity*.

Fine textured soil. Sandy clay, silty clay, and clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

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

Forb. Any herbaceous plant that is not a grass or a sedge.

Fragile (in tables). The soil is easily damaged by use or disturbance.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Graded stripcropping. Growing crops in strips that grade toward a protected waterway.

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

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

Gravelly soil material. Material that is 15 to 50 percent,

by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.5 centimeters) in diameter.

Green-manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and to which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an 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.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is, in part, a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as accumulation of clay, sesquioxides, humus, or a combination of these; prismatic or blocky structure; redder or browner colors than those in the A horizon; or a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Arabic numeral 2 precedes the letter C.

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

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil to which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material. This contrasts with percolation, which is movement of water to 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.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Basin.—Water is applied rapidly to nearly level

plains surrounded by levees or dikes.
Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.
Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.
Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil to such applicators as emitters, porous tubing, or perforated pipe.
Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.
Sprinkler.—Water is sprayed over the soil surface to pipes or nozzles from a pressure system.
Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.
Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. 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.

Moderately coarse textured soil. Sandy loam and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

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

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

Muck. Dark, 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.)

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.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water to the soil.

Percs slowly (in tables). The slow movement of water to the soil adversely affects the specified use.

Permeability. The quality of the soil that enables water to move to the profile. Permeability is measured as the number of inches per hour that water moves to the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches

Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Subsurface tunnels or pipelike cavities are formed by water moving to the soil.

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

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Pleistocene. A geologic age that ranges from about 1.5 million years ago to 5 million years ago.

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor filter (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poor outlets (in tables). In these areas, surface or subsurface drainage outlets are difficult or expensive to install.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

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

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

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

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

Rill. A steep sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

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.

Saprolite (soil science). Unconsolidated, residual material underlying the soil and grading to hard bedrock below.

Scarp. An escarpment, cliff, or steep slope of some extent along a plateau or terrace.

Seepage (in tables). The movement of water to the soil adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series , soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

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

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

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

Slippage (in tables). The soil mass is susceptible to movement downslope when loaded, excavated, or wet.

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

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

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

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind and water erosion.

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

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

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

Subsoiling. Breaking up a compact subsoil by pulling a special chisel to the soil.

Substratum. The part of the soil below the solum.

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

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

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.

Terrace. An embankment, or ridge, constructed on the contour or at a slight angle to the contour across sloping soils. The terrace intercepts surface runoff, so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam,*

silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). An otherwise suitable soil material that is too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

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.

Underlying material. Technically the C horizon; the part of the soil below the biologically altered A and B horizons.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Variegation. Refers to patterns of contrasting colors that are assumed to be inherited from the parent material rather than to be the result of poor drainage.

Weathering. All physical and chemical changes produced by atmospheric agents in rocks or other deposits at or near the earth's surface. These changes result in disintegration and decomposition of the material.

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. This contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Data recorded in the period 1957-79 at Elizabethtown Lock, North Carolina]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days*	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	55.8	32.1	44.0	79	11	81	3.47	1.93	4.82	8	.0
February---	58.3	33.6	46.0	81	12	67	3.33	1.72	4.73	7	.5
March------	66.9	41.4	54.2	87	24	208	4.11	2.59	5.47	8	.0
April------	76.4	49.4	62.9	92	30	387	2.96	1.28	4.39	5	.0
May--------	81.5	57.7	69.6	94	38	608	3.81	2.13	5.30	7	.0
June-------	85.8	64.2	75.0	96	49	750	4.64	2.57	6.47	7	.0
July-------	88.6	68.3	78.5	97	55	884	6.08	3.53	8.34	9	.0
August-----	88.3	67.9	78.1	97	55	871	5.67	2.87	8.10	8	.0
September--	83.8	62.5	73.2	94	45	696	4.13	1.93	6.02	6	.0
October----	75.0	50.7	52.9	89	28	400	2.87	.79	4.53	4	.0
November---	67.6	41.7	54.7	85	20	164	2.85	1.25	4.20	4	.0
December---	58.7	33.9	46.3	79	14	78	2.94	1.48	4.20	6	.1
Yearly:											
Average--	73.9	50.3	62.1	---	---	---	---	---	---	---	---
Extreme--	---	---	---	98	9	---	---	---	---	---	---
Total----	---	---	---	---	---	5,194	46.86	40.73	52.75	79	.6

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Data recorded in the period 1957-79 at Elizabethtown Lock, North Carolina]

Probability	Temperature		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	March 16	April 3	April 18
2 years in 10 later than--	March 10	March 28	April 13
5 years in 10 later than--	February 25	March 16	April 2
First freezing temperature in fall:			
1 year in 10 earlier than--	November 6	October 31	October 16
2 years in 10 earlier than--	November 11	November 5	October 21
5 years in 10 earlier than--	November 22	November 14	October 31

TABLE 3.--GROWING SEASON

[Data recorded in the period 1957-79 at Elizabethtown Lock, North Carolina]

Probability	Daily minimum temperature during growing season		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	247	217	188
8 years in 10	254	226	196
5 years in 10	269	243	213
2 years in 10	265	261	230
1 year in 10	295	272	241

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
AaA	Altavista fine sandy loam, 0 to 3 percent slopes	3,804	0.7
At	Augusta sandy loam	1,265	0.2
AuA	Autryville loamy sand, 0 to 3 percent slopes	10,109	1.8
AyB	Aycock very fine sandy loam, 1 to 4 percent slopes	2,034	0.4
BnB	Blanton sand, 2 to 7 percent slopes	2,895	0.5
BuA	Butters fine sand, 0 to 2 percent slopes	8,013	1.4
By	Byars loam	1,176	0.2
Ca	Cape Fear loam	4,397	0.8
Ce	Centenary sand	25,009	4.4
Ch	Chewacla and Chastain soils, frequently flooded	6,351	1.1
Cn	Congaree silt loam, frequently flooded	7,967	1.4
Co	Coxville loam	6,188	1.1
Cr	Croatan muck, rarely flooded	10,697	1.9
CT	Croatan muck, frequently flooded	8,047	1.4
DgA	Dogue sandy loam, 0 to 3 percent slopes	1,599	0.3
DO	Dorovan muck, frequently flooded	8,905	1.6
Dr	Dunbar fine sandy loam	2,485	0.4
DuA	Duplin sandy loam, 0 to 3 percent slopes	2,303	0.4
DyF	Dystrochrepts, steep	8,748	1.5
ExA	Exum very fine sandy loam, 0 to 3 percent slopes	10,053	1.8
Fo	Foreston loamy sand	11,410	2.0
GbA	Goldsboro sandy loam, 0 to 3 percent slopes	28,750	5.1
GdA	Goldsboro-Urban land complex, 0 to 3 percent slopes	695	0.1
Gh	Grantham very fine sandy loam	6,368	1.1
Gm	Grifton-Meggett complex, occasionally flooded	7,045	1.2
GrB	Gritney fine sandy loam, 2 to 7 percent slopes	5,777	1.0
GrD	Gritney fine sandy loam, 7 to 15 percent slopes	758	0.1
Jh	Johns fine sandy loam	2,711	0.5
JO	Johnston mucky loam, frequently flooded	17,468	3.1
KaA	Kalmia loamy fine sand, 0 to 3 percent slopes	498	0.1
KeA	Kenansville sand, 0 to 3 percent slopes	7,819	1.4
KuB	Kureb sand, 1 to 8 percent slopes	1,181	0.2
LaB	Lakeland sand, 1 to 7 percent slopes	22,354	3.9
LeA	Leon sand, 0 to 3 percent slopes	36,605	6.4
Ln	Lynchburg fine sandy loam	16,355	2.9
Ly	Lynn Haven and Torhunta soils	47,871	8.4
Na	Nahunta very fine sandy loam	7,238	1.3
NoA	Norfolk loamy fine sand, 0 to 2 percent slopes	23,290	4.1
NoB	Norfolk loamy fine sand, 2 to 6 percent slopes	8,948	1.6
NuB	Norfolk-Urban land complex, 0 to 6 percent slopes	561	0.1
Oc	Ocilla loamy fine sand	5,126	0.9
Pa	Pamlico muck, rarely flooded	34,034	6.0
PC	Pamlico muck, frequently flooded	896	0.2
Pe	Pantego loam	8,765	1.5
Pp	Paxville sandy loam	2,218	0.4
Pt	Portsmouth mucky sandy loam	3,651	0.6
Ra	Rains fine sandy loam	29,611	5.2
Rn	Rains-Urban land complex	425	0.1
Ro	Roanoke loam	10,451	1.8
St	Stallings loamy sand	4,433	0.8
To	Toisnot loam	1,826	0.3
Tr	Torhunta mucky sandy loam	19,574	3.4
Ud	Udorthents, loamy	1,188	0.2
WaB	Wagram fine sand, 0 to 6 percent slopes	12,231	2.2
WbB	Wagram-Urban land complex, 0 to 6 percent slopes	754	0.1
We	Wahee loam	4,446	0.8
WgB	Wakulla sand, 1 to 6 percent slopes	12,714	2.2
Wh	Wasda muck	4,995	0.9
WmB	Wickham fine sandy loam, 1 to 6 percent slopes	3,760	0.7
WN	Wilbanks loam, frequently flooded	1,620	0.3
Wo	Woodington loamy sand	14,044	2.5
	Water	5,696	1.0
	Total	568,205	100.0

TABLE 5.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Map symbol and soil name	Land capability	Tobacco	Peanuts	Corn	Soybeans	Improved bermudagrass	Wheat	Blueberries
		Lbs	Lbs	Bu	Bu	AUM*	Bu	Lbs
AaA---- Altavista	IIw	2,600	3,300	120	45	10.0	55	---
At---- Augusta	IIIw	2,200	2,800	100	40	---	---	---
AuA---- Autryville	IIs	2,200	3,000	75	25	9.0	---	---
AyB---- Aycock	IIe	2,700	---	120	40	10.0	60	---
BnB---- Blanton	IIIs	2,000	2,200	60	25	8.0	---	---
BuA---- Butters	IIs	2,400	3,400	100	35	9.0	50	---
By**---- Byars	IIIw	---	---	110	40	---	---	---
Ca**---- Cape Fear	IIIw	---	---	140	45	---	---	---
Ce---- Centenary	IIIs	2,000	---	65	20	7.5	---	---
Ch: Chewacla-------	IVw	---	---	80	30	---	---	---
Chastain-------	VIw	---	---	---	---	---	---	---
Cn---- Congaree	IIIw	---	---	140	40	10.0	---	---
Co**---- Coxville	IIIw	---	---	110	40	---	50	---
Cr**---- Croatan	IVw	---	---	125	40	---	---	---
CT---- Croatan	VIIw	---	---	---	---	---	---	---
DgA---- Dogue	IIw	---	3,700	125	45	---	60	---
DO---- Dorovan	VIIw	---	---	---	---	---	---	---
Dr---- Dunbar	IIw	2,000	2,220	80	35	---	35	---
DuA---- Duplin	IIw	2,800	3,300	110	50	---	60	---

See footnotes at end of table.

TABLE 5.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Land capability	Tobacco	Peanuts	Corn	Soybeans	Improved bermudagrass	Wheat	Blueberries
		Lbs	Lbs	Bu	Bu	AUM*	Bu	Lbs
ExA---------- Exum	IIw	3,000	3,400	125	50	---	---	---
Fo---------- Foreston	IIw	2,600	---	120	35	10.0	---	---
GbA---------- Goldsboro	IIw	3,000	3,600	125	45	10.0	60	---
Gh**---------- Grantham	IIIw	---	---	130	45	---	---	---
Gm---------- Grifton-Meggett	VIw	---	---	---	---	---	---	---
GrB---------- Gritney	IIIe	---	1,600	85	35	6.0	---	---
GrD---------- Gritney	VIe	---	---	---	---	5.0	---	---
Jh---------- Johns	IIw	2,700	---	120	45	9.0	50	---
JO---------- Johnston	VIIw	---	---	---	---	---	---	---
KaA---------- Kalmia	I	2,900	---	110	45	9.5	60	---
KeA---------- Kenansville	IIIs	2,000	2,400	70	---	7.5	---	---
KuB---------- Kureb	VIIs	---	---	---	---	---	---	---
LaB---------- Lakeland	IVs	1,700	2,000	55	20	7.0	---	---
LeA***---------- Leon	IVw	---	---	50	---	---	---	4,800
Ln---------- Lynchburg	IIw	2,800	---	115	45	---	---	---
Ly:								
Lynn Haven-----	IVw	---	---	70	---	---	---	---
Torhunta**-----	IIIw	---	---	120	40	---	---	---
Na---------- Nahunta	IIw	2,800	2,800	120	45	10.0	---	---
NoA---------- Norfolk	I	3,000	4,000	110	40	9.5	60	---
NoB---------- Norfolk	IIe	2,900	3,700	100	35	9.5	55	---

See footnotes at end of table.

TABLE 5.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Land capability	Tobacco	Peanuts	Corn	Soybeans	Improved bermudagrass	Wheat	Blueberries
		Lbs	Lbs	Bu	Bu	AUM*	Bu	Lbs
Oc---------- Ocilla	IIIw	2,600	2,200	75	35	8.5	---	---
Pa**---------- Pamlico	IVw	---	---	115	40	---	50	---
PC---------- Pamlico	VIIw	---	---	---	---	---	---	---
Pe**---------- Pantego	IIIw	---	---	135	50	---	50	---
Pp**---------- Paxville	IIIw	---	---	110	40	---	---	---
Pt**---------- Portsmouth	IIIw	---	---	130	45	---	60	---
Ra---------- Rains	IIIw	2,300	---	110	40	---	---	---
Ro**---------- Roanoke	IIIw	---	---	120	40	---	45	---
St---------- Stallings	IIw	2,500	---	100	35	---	---	---
To**---------- Toisnot	IVw	---	---	75	25	---	---	---
Tr**---------- Torhunta	IIIw	---	---	120	40	---	45	---
WaB---------- Wagram	IIs	2,400	2,900	75	25	7.5	40	---
We---------- Wahee	IIw	---	---	110	45	---	---	---
WgB---------- Wakulla	IIIs	1,700	---	45	20	---	---	---
Wh**---------- Wasda	IIIw	---	---	130	45	---	---	---
WmB---------- Wickham	IIe	2,600	3,300	115	---	9.0	---	---
WN---------- Wilbanks	VIw	---	---	---	---	---	---	---
Wo**---------- Woodington	IIIw	---	---	100	35	---	---	---

* 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.

** Yields shown for this map unit are for drained conditions. See the map unit description for the undrained land capability.

*** Yield of blueberries is 9,600 pounds per acre if this soil is irrigated.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Map symbol and soil name	Ordination symbol	Management concerns			Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Common trees	Site index	Productivity class*	
AaA---------- Altavista	9W	Slight	Moderate	Slight	Loblolly pine--------	91	9	Loblolly pine, hardwoods.**
					Longleaf pine--------	84	8	
					Shortleaf pine-------	77	9	
					Sweetgum------------	84	6	
					White oak-----------	---	---	
					Red maple-----------	---	---	
					Yellow poplar--------	---	---	
					Southern red oak-----	---	---	
					Northern red oak-----	---	---	
					Water oak-----------	---	---	
At---------- Augusta	9W	Slight	Moderate	Slight	Loblolly pine--------	90	9	Loblolly pine, hardwoods.**
					Sweetgum------------	90	7	
					American sycamore----	90	---	
					White oak-----------	80	4	
					Southern red oak-----	80	4	
					Water oak-----------	---	---	
					Shortleaf pine-------	---	---	
					Blackjack oak--------	---	---	
AuA---------- Autryville	7S	Slight	Moderate	Moderate	Loblolly pine--------	77	7	Loblolly pine, longleaf pine.
					Longleaf pine--------	---	---	
					Southern red oak-----	---	---	
					Shumard oak----------	---	---	
					Hickory-------------	---	---	
					Red maple-----------	---	---	
					White oak-----------	---	---	
					Post oak------------	---	---	
AyB---------- Aycock	9A	Slight	Slight	Slight	Loblolly pine--------	89	9	Loblolly pine.
					Longleaf pine--------	75	6	
					Southern red oak-----	80	4	
BnB---------- Blanton	8S	Slight	Moderate	Moderate	Loblolly pine--------	80	8	Loblolly pine, longleaf pine.
					Longleaf pine--------	70	6	
					Bluejack oak---------	---	---	
					Turkey oak-----------	---	---	
					Southern red oak-----	---	---	
					Live oak------------	---	---	
BuA---------- Butters	9A	Slight	Slight	Slight	Loblolly pine--------	86	9	Loblolly pine.
					Longleaf pine--------	76	6	
					Sweetgum------------	---	---	
					Southern red oak-----	---	---	
					White oak-----------	---	---	
By---------- Byars	10W	Slight	Severe	Severe	Water tupelo---------	90	10	Hardwoods.**
					Sweetgum------------	90	7	
					Blackgum------------	---	---	
					Cypress-------------	---	---	
					Water oak-----------	90	---	

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns			Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Common trees	Site index	Productivity class*	
Ca---------- Cape Fear	11W	Slight	Severe	Severe	Loblolly pine--------	100	11	Loblolly pine,*** hardwoods.**
					Sweetgum----------	---	---	
					Water oak----------	---	---	
					Water tupelo---------	---	---	
					Baldcypress----------	---	---	
Ce---------- Centenary	6S	Slight	Moderate	Moderate	Longleaf pine--------	72	6	Longleaf pine.
					Loblolly pine--------	85	8	
					Blackjack oak--------	---	---	
					Turkey oak----------	---	---	
Ch: Chewacla----------	10W	Slight	Moderate	Slight	Loblolly pine--------	96	10	Loblolly pine, hardwoods.**
					Yellow poplar--------	100	8	
					American sycamore----	---	---	
					Sweetgum----------	97	9	
					Water oak----------	86	6	
					Eastern cottonwood---	---	---	
					Green ash----------	---	---	
					Southern red oak-----	---	---	
					Blackgum----------	---	---	
Chastain----------	8W	Slight	Severe	Severe	Sweetgum----------	95	8	Hardwoods.**
					Baldcypress----------	---	---	
					Water tupelo---------	---	---	
					Water oak----------	---	---	
Cn---------- Congaree	10A	Slight	Slight	Slight	Sweetgum----------	100	10	Loblolly pine, hardwoods.**
					Yellow poplar--------	107	8	
					Cherrybark oak-------	107	4	
					Loblolly pine--------	90	9	
					Eastern cottonwood---	107	10	
					American sycamore----	89	---	
					Black walnut---------	100	---	
					Scarlet oak----------	100	4	
					Willow oak----------	95	6	
Co---------- Coxville	9W	Slight	Severe	Moderate	Loblolly pine--------	90	9	Loblolly pine.***
					Longleaf pine--------	---	---	
					Sweetgum----------	---	---	
					Blackgum----------	---	---	
					Water oak----------	---	---	
					Willow oak----------	---	---	
					Water tupelo---------	---	---	
					Elm----------	---	---	
					Hickory----------	---	---	
Cr, CT---------- Croatan	4W	Slight	Severe	Severe	Pond pine----------	55	4	Loblolly pine.***
					Water tupelo---------	60	6	
					Baldcypress----------	---	---	
					Loblolly pine--------	70	6	
					Sweetgum----------	---	---	
					Swamp tupelo---------	---	---	
					Atlantic white-cedar-	---	---	

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns			Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Common trees	Site index	Productivity class*	
DgA---------- Dogue	9W	Slight	Moderate	Slight	Loblolly pine--------	90	9	Loblolly pine.
					Southern red oak-----	80	4	
					Sweetgum------------	90	7	
					Yellow poplar--------	93	7	
					White oak-----------	80	4	
DO---------- Dorovan	7W	Slight	Severe	Severe	Blackgum------------	70	7	Baldcypress.
					Sweetbay------------	---	---	
					Baldcypress----------	---	---	
					Swamp tupelo---------	---	---	
					Green ash-----------	---	---	
Dr---------- Dunbar	9W	Slight	Moderate	Moderate	Loblolly pine--------	90	9	Loblolly pine,*** hardwoods.**
					Longleaf pine--------	70	6	
					Water oak-----------	---	---	
					Water tupelo---------	---	---	
					Yellow poplar--------	---	---	
					Sweetgum------------	90	7	
DuA---------- Duplin	9W	Slight	Moderate	Moderate	Loblolly pine--------	90	9	Loblolly pine, hardwoods.**
					Sweetgum------------	---	---	
					Blackgum------------	---	---	
					Southern red oak-----	---	---	
					White oak-----------	---	---	
					Yellow poplar--------	100	8	
ExA---------- Exum	9W	Slight	Moderate	Slight	Loblolly pine--------	90	9	Loblolly pine, hardwoods.**
					Longleaf pine--------	77	7	
					Sweetgum------------	90	7	
					Yellow poplar--------	100	8	
					Southern red oak-----	---	---	
					White oak-----------	---	---	
Fo---------- Foreston	9W	Slight	Moderate	Slight	Loblolly pine--------	90	9	Loblolly pine.
					Longleaf pine--------	75	6	
					Sweetgum------------	---	---	
					Water oak-----------	---	---	
					Turkey oak----------	---	---	
					Post oak------------	---	---	
GbA---------- Goldsboro	9W	Slight	Moderate	Slight	Loblolly pine--------	90	9	Loblolly pine, hardwoods.**
					Longleaf pine--------	77	7	
					Sweetgum------------	90	7	
					Southern red oak-----	---	---	
					White oak-----------	---	---	
					Water oak-----------	---	---	
					Red maple-----------	---	---	
Gh---------- Grantham	9W	Slight	Severe	Severe	Loblolly pine--------	86	9	Loblolly pine, hardwoods.**
					Sweetgum------------	---	---	
					Water oak-----------	---	---	
					Blackgum------------	---	---	
					Red maple-----------	---	---	
					Willow oak----------	---	---	
					Yellow poplar--------	---	---	
					Pond pine-----------	---	---	

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns			Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Common trees	Site index	Productivity class*	
Gm:								
Grifton	9W	Slight	Severe	Severe	Loblolly pine	89	9	Loblolly pine,*** hardwoods.**
					Sweetgum	---	---	
					Water oak	---	---	
					White oak	---	---	
Meggett	11W	Slight	Severe	Severe	Loblolly pine	100	11	Loblolly pine.***
					Pond pine	75	---	
					Green ash	---	---	
GrB, GrD Gritney	8A	Slight	Slight	Slight	Loblolly pine	80	8	Loblolly pine, hardwoods.**
					Longleaf pine	65	5	
					American beech	---	---	
					White oak	---	---	
Jh Johns	9W	Slight	Moderate	Slight	Loblolly pine	86	9	Loblolly pine, hardwoods.**
					Sweetgum	90	7	
					Water oak	---	---	
					Willow oak	---	---	
JO Johnston	9W	Slight	Severe	Severe	Loblolly pine	90	9	Loblolly pine, hardwoods.**
					Water tupelo	---	---	
					Swamp tupelo	---	---	
					Water oak	---	---	
					Pond pine	---	---	
					Baldcypress	---	---	
KaA Kalmia	9A	Slight	Slight	Slight	Loblolly pine	88	9	Loblolly pine, hardwoods.**
					Sweetgum	85	6	
					Yellow poplar	96	7	
					Southern red oak	---	---	
					White oak	---	---	
KeA Kenansville	8S	Slight	Moderate	Moderate	Loblolly pine	80	8	Loblolly pine.
					Longleaf pine	65	5	
					Turkey oak	---	---	
					Blackjack oak	---	---	
KuB Kureb	3S	Slight	Severe	Severe	Longleaf pine	52	3	Longleaf pine.
					Sand pine	---	---	
					Turkey oak	---	---	
					Blackjack oak	---	---	
LaB Lakeland	8S	Slight	Moderate	Moderate	Loblolly pine	80	8	Loblolly pine, longleaf pine.
					Longleaf pine	65	5	
					Turkey oak	---	---	
					Blackjack oak	---	---	
LeA Leon	5W	Slight	Moderate	Moderate	Longleaf pine	65	5	Longleaf pine, loblolly pine.***
					Turkey oak	---	---	
					Redbay	---	---	

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns			Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Common trees	Site index	Productivity class*	
Ln---------- Lynchburg	9W	Slight	Moderate	Slight	Loblolly pine--------	86	9	Loblolly pine,*** hardwoods.**
					Longleaf pine--------	74	6	
					Yellow poplar--------	92	6	
					Sweetgum------------	90	7	
					Southern red oak-----	---	---	
					White oak------------	---	---	
					Blackgum------------	---	---	
Ly:								
Lynn Haven--------	8W	Slight	Moderate	Moderate	Loblolly pine--------	80	8	Loblolly pine.***
					Longleaf pine--------	70	6	
					Pond pine------------	70	---	
Torhunta----------	9W	Slight	Severe	Severe	Loblolly pine--------	90	9	Loblolly pine,
					Sweetgum------------	90	7	hardwoods.**
					Water tupelo---------	---	---	
Na---------- Nahunta	9W	Slight	Moderate	Moderate	Loblolly pine--------	87	9	Loblolly pine,
					Sweetgum------------	90	7	hardwoods.**
					Yellow poplar--------	100	8	
					Southern red oak-----	---	---	
					White oak------------	---	---	
NoA, NoB---------- Norfolk	9A	Slight	Slight	Slight	Loblolly pine--------	86	9	Loblolly pine,
					Longleaf pine--------	68	5	hardwoods.**
					White oak------------	---	---	
					Southern red oak-----	---	---	
Oc---------- Ocilla	8W	Slight	Moderate	Moderate	Loblolly pine--------	85	8	Loblolly pine.
					Longleaf pine--------	77	7	
					Southern red oak-----	---	---	
Pa---------- Pamlico	5W	Slight	Severe	Severe	Pond pine------------	55	---	Loblolly pine.***
					Baldcypress----------	---	---	
					Water tupelo---------	---	---	
					Loblolly pine--------	---	---	
					Atlantic white-cedar-	---	---	
PC---------- Pamlico	5W	Slight	Severe	Severe	Pond pine------------	---	---	Loblolly pine.***
					Baldcypress----------	---	---	
					Water tupelo---------	---	---	
					Loblolly pine--------	---	---	
					Atlantic white-cedar-	---	---	
Pe---------- Pantego	10W	Slight	Severe	Severe	Loblolly pine--------	98	10	Loblolly pine,***
					Pond pine------------	73	---	hardwoods.**
					Baldcypress----------	---	---	
					Water tupelo---------	---	---	
					Water oak------------	---	---	
					Sweetgum------------	---	---	

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns			Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Common trees	Site index	Productivity class*	
Pp---------- Paxville	10W	Slight	Severe	Severe	Loblolly pine--------	96	10	Loblolly pine,*** hardwoods.**
					Pond pine----------	77	---	
					Water oak----------	90	6	
					Water tupelo---------	---	---	
					Baldcypress----------	---	---	
					Sweetgum----------	---	---	
Pt---------- Portsmouth	10W	Slight	Severe	Severe	Loblolly pine--------	96	10	Loblolly pine,*** hardwoods.**
					Sweetgum----------	---	---	
					Red maple----------	---	---	
					Water oak----------	---	---	
					Willow oak----------	---	---	
					Sweetbay----------	---	---	
					Redbay----------	---	---	
Ra---------- Rains	10W	Slight	Severe	Severe	Loblolly pine--------	94	10	Loblolly pine,*** hardwoods.**
					Water oak----------	---	---	
					Sweetgum----------	90	7	
					Red maple----------	---	---	
					Willow oak----------	---	---	
Ro---------- Roanoke	7W	Slight	Severe	Severe	Sweetgum----------	90	7	Loblolly pine,*** hardwoods.**
					Willow oak----------	76	4	
					White oak----------	75	4	
					Water oak----------	---	---	
St---------- Stallings	8W	Slight	Moderate	Slight	Loblolly pine--------	79	8	Loblolly pine, hardwoods.**
					Longleaf pine--------	---	---	
					Sweetgum----------	---	---	
					Yellow poplar--------	---	---	
					Water oak----------	---	---	
To---------- Toisnot	8W	Slight	Severe	Severe	Loblolly pine--------	80	8	Loblolly pine,*** hardwoods.**
					Sweetgum----------	80	6	
					Swamp tupelo---------	---	---	
					Water oak----------	---	---	
Tr---------- Torhunta	9W	Slight	Severe	Severe	Loblolly pine--------	90	9	Loblolly pine,*** hardwoods.**
					Sweetgum----------	90	7	
					Water tupelo---------	---	---	
WaB---------- Wagram	8S	Slight	Moderate	Moderate	Loblolly pine--------	82	8	Loblolly pine, longleaf pine.
					Longleaf pine--------	67	5	
					White oak----------	---	---	
					Southern red oak-----	---	---	
					Hickory----------	---	---	
We---------- Wahee	9W	Slight	Moderate	Moderate	Loblolly pine--------	86	9	Loblolly pine,*** hardwoods.**
					Sweetgum----------	90	7	
					Blackgum----------	---	---	
					Water oak----------	---	---	
					Swamp chestnut oak---	---	---	
					Willow oak----------	---	---	
					Southern red oak-----	---	---	

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns			Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Common trees	Site index	Productivity class*	
WgB---------- Wakulla	7S	Slight	Moderate	Moderate	Longleaf pine--------	78	7	Longleaf pine, loblolly pine.
					Loblolly pine--------	73	7	
					Turkey oak----------	---	---	
Wh---------- Wasda	9W	Slight	Severe	Severe	Loblolly pine--------	96	9	Loblolly pine,*** hardwoods.**
					Water tupelo---------	---	---	
					Sweetgum------------	---	---	
					Water oak-----------	95	6	
					Baldcypress----------	---	---	
					Pond pine-----------	80	---	
					Red maple-----------	---	---	
					Swamp tupelo---------	---	---	
WmB---------- Wickham	9A	Slight	Slight	Slight	Loblolly pine--------	90	9	Loblolly pine, hardwoods.**
					Yellow poplar--------	100	8	
					Southern red oak-----	---	---	
					White oak-----------	---	---	
					American beech-------	---	---	
WN---------- Wilbanks	7W	Slight	Severe	Severe	Water oak-----------	100	7	Loblolly pine,*** hardwoods.**
					Sweetgum------------	111	12	
					Baldcypress----------	---	---	
					Water tupelo---------	---	---	
Wo---------- Woodington	8W	Slight	Severe	Severe	Loblolly pine--------	83	8	Loblolly pine,*** hardwoods.**
					Sweetgum------------	---	---	
					White oak-----------	---	---	
					Southern red oak-----	---	---	
					Swamp tupelo---------	---	---	

* Productivity class is the yield in cubic meters per hectare per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

** To establish hardwoods on a forested site, rely on natural reproduction (seeds and sprouts) of acceptable species. Special site preparation techniques may be required. Planting of hardwoods on a specific site should be done upon recommendations of a forester.

*** Potential productivity is attainable in areas adequately drained or bedded, or both.

TABLE 7.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
AaA---------- Altavista	Severe: flooding.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
At---------- Augusta	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
AuA---------- Autryville	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Moderate: droughty.
AyB---------- Aycock	Moderate: percs slowly.	Slight----------	Moderate: slope.	Slight----------	Slight.
BnB---------- Blanton	Severe: too sandy.	Severe: too sandy.	Moderate: slope.	Severe: too sandy.	Severe: droughty.
BuA---------- Butters	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
By---------- Byars	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
Ca---------- Cape Fear	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Ce---------- Centenary	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
Ch: Chewacla----------	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
Chastain----------	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
Cn---------- Congaree	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
Co---------- Coxville	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Cr---------- Croatan	Severe: ponding, excess humus, flooding.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
CT---------- Croatan	Severe: flooding, wetness, excess humus.	Severe: wetness, excess humus.	Severe: excess humus, wetness, flooding.	Severe: wetness, excess humus.	Severe: flooding, wetness, excess humus.
DgA---------- Dogue	Severe: flooding.	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
DO---------- Dorovan	Severe: flooding, ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding, flooding.	Severe: ponding, excess humus.	Severe: ponding, flooding, excess humus.
Dr---------- Dunbar	Moderate: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
DuA---------- Duplin	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Slight----------	Slight.
DyF. Dystrochrepts					
ExA---------- Exum	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Slight----------	Slight.
Fo---------- Foreston	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Slight----------	Moderate: droughty.
GbA---------- Goldsboro	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Slight----------	Slight.
GdA: Goldsboro----------	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Slight----------	Slight.
Urban land.					
Gh---------- Grantham	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Gm: Grifton----------	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Meggett----------	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
GrB---------- Gritney	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight----------	Slight.
GrD---------- Gritney	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight----------	Moderate: slope.
Jh---------- Johns	Severe: flooding.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
JO---------- Johnston	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
KaA---------- Kalmia	Severe: flooding.	Slight----------	Slight----------	Slight----------	Moderate: droughty.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
KeA--- Kenansville	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty.
KuB--- Kureb	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
LaB--- Lakeland	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty, too sandy.
LeA--- Leon	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
Ln--- Lynchburg	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Ly: Lynn Haven---	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
Torhunta---	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Na--- Nahunta	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
NoA--- Norfolk	Slight---	Slight---	Slight---	Slight---	Slight.
NoB--- Norfolk	Slight---	Slight---	Moderate: slope.	Slight---	Slight.
NuB: Norfolk---	Slight---	Slight---	Moderate: slope.	Slight---	Slight.
Urban land.					
Oc--- Ocilla	Moderate: wetness, too sandy.	Moderate: wetness, too sandy.	Moderate: wetness, too sandy.	Moderate: wetness, too sandy.	Moderate: wetness, droughty.
Pa--- Pamlico	Severe: flooding, wetness, excess humus.	Severe: wetness, excess humus.	Severe: excess humus, wetness.	Severe: wetness, excess humus.	Severe: wetness, excess humus.
PC--- Pamlico	Severe: flooding, ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding, flooding.	Severe: ponding, excess humus.	Severe: ponding, flooding, excess humus.
Pe--- Pantego	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Pp--- Paxville	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Pt--- Portsmouth	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Ra--- Rains	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Rn: Rains---	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Urban land.					
Ro--- Roanoke	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
St--- Stallings	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
To--- Toisnot	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Tr--- Torhunta	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Ud. Udorthents					
WaB--- Wagram	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty.
WbB: Wagram---	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty.
Urban land.					
We--- Wahee	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
WgB--- Wakulla	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
Wh--- Wasda	Severe: flooding, wetness, excess humus.	Severe: wetness, excess humus.	Severe: excess humus, wetness.	Severe: wetness, excess humus.	Severe: wetness, excess humus.
WmB--- Wickham	Severe: flooding.	Slight---	Moderate: slope.	Slight---	Slight.
WN--- Wilbanks	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
Wo--- Woodington	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.

TABLE 8.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
AaA---- Altavista	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
At---- Augusta	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
AuA---- Autryville	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
AyB---- Aycock	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
BnB---- Blanton	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
BuA---- Butters	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
By*---- Byars	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Ca---- Cape Fear	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Ce---- Centenary	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Ch: Chewacla----	Very poor.	Poor	Poor	Good	Good	Fair	Fair	Poor	Good	Fair.
Chastain----	Very poor.	Poor	Poor	Fair	Poor	Good	Good	Poor	Fair	Good.
Cn---- Congaree	Poor	Fair	Fair	Good	Good	Fair	Poor	Fair	Good	Fair.
Co*---- Coxville	Poor	Fair	Fair	Fair	Fair	Good	Fair	Fair	Good	Fair.
Cr---- Croatan	Very poor.	Poor	Poor	Poor	Poor	Good	Fair	Poor	Fair	Fair.
CT---- Croatan	Very poor.	Poor	Poor	Poor	Poor	Good	Fair	Poor	Poor	Fair.
DgA---- Dogue	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
DO---- Dorovan	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
Dr---- Dunbar	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.

See footnote at end of table.

TABLE 8.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
DuA---------- Duplin	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
DyF. Dystrochrepts										
ExA---------- Exum	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Fo---------- Foreston	Fair	Fair	Good	Good	Good	Poor	Poor	Good	Good	Poor.
GbA---------- Goldsboro	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
GdA: Goldsboro---------	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Urban land.										
Gh---------- Grantham	Poor	Good	Good	Good	Good	Poor	Good	Good	Good	Fair.
Gm: Grifton----------	Poor	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
Meggett----------	Poor	Fair	Fair	Fair	Good	Good	Good	Fair	Good	Good.
GrB, GrD---------- Gritney	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Jh---------- Johns	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
JO---------- Johnston	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
KaA---------- Kalmia	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
KeA---------- Kenansville	Poor	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
KuB---------- Kureb	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
LaB---------- Lakeland	Very poor.	Fair	Fair	Poor	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
LeA---------- Leon	Poor	Fair	Good	Poor	Fair	Fair	Poor	Fair	Fair	Poor.
Ln---------- Lynchburg	Fair	Good	Good	Good	Good	Fair	Fair	Fair	Good	Fair.

See footnote at end of table.

TABLE 8.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Ly:										
Lynn Haven	Poor	Poor	Fair	Poor	Poor	Fair	Fair	Fair	Poor	Poor.
Torhunta	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Na*-- Nahunta	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
NoA, NoB-- Norfolk	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
NuB:										
Norfolk	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Urban land.										
Oc-- Ocilla	Fair	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
Pa, PC-- Pamlico	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Pe*-- Pantego	Very poor.	Poor	Poor	Poor	Poor	Good	Fair	Poor	Poor	Fair.
Pp*-- Paxville	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Pt-- Portsmouth	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Ra-- Rains	Poor	Fair	Fair	Good	Good	Good	Good	Fair	Good	Good.
Rn:										
Rains	Poor	Fair	Fair	Good	Good	Good	Good	Fair	Good	Good.
Urban land.										
Ro-- Roanoke	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
St*-- Stallings	Fair	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
To*-- Toisnot	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
Tr-- Torhunta	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Ud. Udorthents										
WaB-- Wagram	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 8.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
WbB: Wagram	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Urban land.										
We: Wahee	Good	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
WgB: Wakulla	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Wh: Wasda	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
WmB: Wickham	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
WN: Wilbanks	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Wo*: Woodington	Poor	Fair	Fair	Fair	Fair	Good	Poor	Fair	Fair	Fair.

* Ratings are for undrained areas.

TABLE 9.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
AaA---------- Altavista	Severe: wetness, cutbanks cave.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Moderate: wetness, flooding.	Moderate: wetness.
At---------- Augusta	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Moderate: low strength, wetness, flooding.	Moderate: wetness.
AuA---------- Autryville	Severe: cutbanks cave.	Slight---------	Moderate: wetness.	Slight---------	Slight---------	Moderate: droughty.
AyB---------- Aycock	Moderate: wetness.	Slight---------	Moderate: wetness.	Slight---------	Moderate: low strength.	Slight.
BnB---------- Blanton	Severe: cutbanks cave.	Slight---------	Moderate: wetness.	Moderate: slope.	Slight---------	Severe: droughty.
BuA---------- Butters	Severe: cutbanks cave.	Slight---------	Moderate: wetness.	Slight---------	Slight---------	Severe: droughty.
By---------- Byars	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding.	Severe: ponding.
Ca---------- Cape Fear	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness.	Severe: wetness.
Ce---------- Centenary	Severe: cutbanks cave.	Slight---------	Moderate: wetness.	Slight---------	Slight---------	Severe: droughty.
Ch: Chewacla-------	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
Chastain-------	Severe: wetness, cutbanks cave.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
Cn---------- Congaree	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
Co---------- Coxville	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness.	Severe: wetness.
Cr---------- Croatan	Severe: excess humus, ponding.	Severe: low strength, ponding, flooding.	Severe: flooding, ponding.	Severe: low strength, ponding, flooding.	Severe: ponding.	Severe: ponding, excess humus.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
CT---------- Croatan	Severe: excess humus, wetness.	Severe: flooding, wetness, low strength.	Severe: flooding, wetness.	Severe: flooding, wetness, low strength.	Severe: flooding, wetness.	Severe: flooding, wetness, excess humus.
DgA---------- Dogue	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: low strength.	Moderate: wetness.
DO---------- Dorovan	Severe: excess humus, ponding.	Severe: flooding, ponding, low strength.	Severe: flooding, ponding.	Severe: flooding, ponding, low strength.	Severe: ponding, flooding.	Severe: ponding, flooding, excess humus.
Dr---------- Dunbar	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength.	Moderate: wetness.
DuA---------- Duplin	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Severe: low strength.	Slight.
DyF. Dystrochrepts						
ExA---------- Exum	Moderate: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: low strength, wetness.	Slight.
Fo---------- Foreston	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: droughty.
GbA---------- Goldsboro	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Slight.
GdA: Goldsboro------	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Slight.
Urban land.						
Gh---------- Grantham	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness.	Severe: wetness.
Gm: Grifton--------	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.
Meggett--------	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: shrink-swell, wetness, flooding.	Severe: wetness.
GrB---------- Gritney	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Slight.
GrD---------- Gritney	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength.	Moderate: slope.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Jh---------- Johns	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Moderate: wetness, flooding.	Moderate: wetness.
JO---------- Johnston	Severe: cutbanks cave, excess humus, ponding.	Severe: flooding, ponding, low strength.	Severe: flooding, ponding.	Severe: flooding, ponding, low strength.	Severe: ponding, flooding.	Severe: ponding, flooding.
KaA---------- Kalmia	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Moderate: droughty.
KeA---------- Kenansville	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Moderate: droughty.
KuB---------- Kureb	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Slight---------	Severe: droughty.
LaB---------- Lakeland	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Slight---------	Moderate: droughty, too sandy.
LeA---------- Leon	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
Ln---------- Lynchburg	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Ly: Lynn Haven------	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
Torhunta--------	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.
Na---------- Nahunta	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength.	Moderate: wetness.
NoA---------- Norfolk	Moderate: wetness.	Slight---------	Moderate: wetness.	Slight---------	Slight---------	Slight.
NoB---------- Norfolk	Moderate: wetness.	Slight---------	Moderate: wetness.	Moderate: slope.	Slight---------	Slight.
NuB: Norfolk---------	Moderate: wetness.	Slight---------	Moderate: wetness.	Slight---------	Slight---------	Slight.
Urban land.						
Oc---------- Ocilla	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, droughty.
Pa---------- Pamlico	Severe: flooding, cutbanks cave, excess humus, wetness.	Severe: flooding, wetness, low strength.	Severe: flooding, wetness.	Severe: wetness, low strength.	Severe: wetness.	Severe: wetness, excess humus.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
PC---------- Pamlico	Severe: cutbanks cave, excess humus, ponding.	Severe: flooding, ponding, low strength.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, flooding, ponding.	Severe: ponding, flooding, excess humus.
Pe---------- Pantego	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Pp---------- Paxville	Severe: cutbanks cave, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding.
Pt---------- Portsmouth	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.
Ra---------- Rains	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Rn: Rains----------	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Urban land.						
Ro---------- Roanoke	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness.	Severe: wetness.
St---------- Stallings	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
To---------- Toisnot	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.
Tr---------- Torhunta	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.
Ud. Udorthents						
WaB---------- Wagram	Slight---------	Slight---------	Slight---------	Slight---------	Slight---------	Moderate: droughty.
WbB: Wagram---------	Slight---------	Slight---------	Slight---------	Slight---------	Slight---------	Moderate: droughty.
Urban land.						
We---------- Wahee	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness.	Severe: wetness.
WgB---------- Wakulla	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Severe: droughty.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Wh---------- Wasda	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, excess humus.
WmB---------- Wickham	Slight---------	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Slight.
WN---------- Wilbanks	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
Wo---------- Woodington	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.

TABLE 10.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AaA--Altavista	Severe: wetness.	Severe: wetness.	Severe: wetness, seepage.	Severe: wetness.	Fair: wetness.
At--Augusta	Severe: wetness.	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness.	Fair: wetness.
AuA--Autryville	Moderate: wetness.	Severe: seepage.	Severe: wetness, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
AyB--Aycock	Severe: percs slowly.	Moderate: seepage, slope, wetness.	Moderate: too clayey.	Slight	Fair: too clayey.
BnB--Blanton	Moderate: wetness.	Severe: seepage.	Severe: too sandy.	Severe: seepage.	Poor: too sandy.
BuA--Butters	Moderate: wetness.	Severe: seepage.	Severe: wetness, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
By--Byars	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
Ca--Cape Fear	Severe: wetness, percs slowly.	Severe: seepage, flooding, wetness.	Severe: wetness, too clayey.	Severe: seepage, wetness.	Poor: too clayey, hard to pack, wetness.
Ce--Centenary	Severe: wetness, poor filter.	Severe: seepage.	Severe: seepage, wetness, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
Ch:					
Chewacla	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: hard to pack, wetness.
Chastain	Severe: flooding, wetness, percs slowly.	Severe: flooding, seepage.	Severe: flooding, wetness, seepage.	Severe: flooding, wetness.	Poor: wetness, too clayey, hard to pack.
Cn--Congaree	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: wetness.
Co--Coxville	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: wetness.

TABLE 10.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Cr---------- Croatan	Severe: ponding, percs slowly.	Severe: excess humus, ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
CT---------- Croatan	Severe: flooding, wetness, percs slowly.	Severe: seepage, flooding, excess humus.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness, seepage.	Poor: wetness, excess humus.
DgA---------- Dogue	Severe: wetness, percs slowly.	Severe: seepage, flooding, wetness.	Severe: seepage, wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.
DO---------- Dorovan	Severe: flooding, ponding.	Severe: flooding, excess humus, ponding.	Severe: flooding, seepage, ponding.	Severe: flooding, ponding.	Poor: ponding, excess humus.
Dr---------- Dunbar	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
DuA---------- Duplin	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, hard to pack, wetness.
DyF. Dystrochrepts					
ExA---------- Exum	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
Fo---------- Foreston	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness.	Severe: seepage, wetness.	Poor: thin layer.
GbA---------- Goldsboro	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
GdA: Goldsboro----------	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
Urban land.					
Gh---------- Grantham	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: seepage, wetness.	Poor: wetness.
Gm: Grifton----------	Severe: flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.	Severe: flooding, seepage, wetness.	Poor: wetness.
Meggett----------	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.

TABLE 10.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
GrB---- Gritney	Severe: percs slowly.	Moderate: slope.	Moderate: too clayey.	Slight----	Fair: too clayey.
GrD---- Gritney	Severe: percs slowly.	Severe: slope.	Moderate: too clayey.	Moderate: slope.	Fair: too clayey.
Jh---- Johns	Severe: wetness.	Severe: seepage, flooding, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
JO---- Johnston	Severe: flooding, ponding, poor filter.	Severe: seepage, flooding, ponding.	Severe: flooding, seepage, ponding.	Severe: flooding, seepage, ponding.	Poor: ponding.
KaA---- Kalmia	Slight----	Severe: seepage, flooding.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
KeA---- Kenansville	Slight----	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
KuB---- Kureb	Severe: poor filter.	Severe: seepage.	Severe: too sandy.	Severe: seepage.	Poor: seepage, too sandy.
LaB---- Lakeland	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
LeA---- Leon	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
Ln---- Lynchburg	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Ly*: Lynn Haven----	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
Torhunta----	Severe: wetness.	Severe: wetness, seepage, flooding.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: wetness.
Na---- Nahunta	Severe: wetness.	Slight----	Severe: wetness.	Severe: wetness.	Poor: wetness.
NoA, NoB---- Norfolk	Moderate: wetness.	Moderate: seepage.	Severe: wetness.	Slight----	Good.
NuB: Norfolk----	Moderate: wetness.	Moderate: seepage.	Severe: wetness.	Slight----	Good.
Urban land.					

TABLE 10.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Oc--- Ocilla	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness.	Severe: seepage, wetness.	Fair: wetness.
Pa--- Pamlico	Severe: wetness, poor filter.	Severe: seepage, excess humus, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
PC--- Pamlico	Severe: flooding, ponding, poor filter.	Severe: seepage, flooding, excess humus.	Severe: flooding, seepage, ponding.	Severe: flooding, seepage, ponding.	Poor: seepage, excess humus, ponding.
Pe--- Pantego	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Pp--- Paxville	Severe: ponding.	Severe: seepage, ponding.	Severe: seepage, ponding.	Severe: ponding.	Poor: ponding.
Pt--- Portsmouth	Severe: wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
Ra--- Rains	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Rn: Rains---	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Urban land.					
Ro--- Roanoke	Severe: wetness, percs slowly.	Severe: seepage, flooding, wetness.	Severe: seepage, wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
St--- Stallings	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: thin layer.
To--- Toisnot	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Tr--- Torhunta	Severe: wetness.	Severe: wetness, seepage, flooding.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: wetness.
Ud. Udorthents					
WaB--- Wagram	Slight---	Moderate: seepage.	Slight---	Slight---	Good.

TABLE 10.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
WbB: Wagram	Slight	Moderate: seepage.	Slight	Slight	Good.
Urban land.					
We: Wahee	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
WgB: Wakulla	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: seepage, too sandy.
Wh: Wasda	Severe: wetness.	Severe: flooding, excess humus, wetness.	Severe: wetness, seepage.	Severe: wetness, seepage.	Poor: wetness, excess humus.
WmB: Wickham	Moderate: flooding.	Severe: flooding.	Severe: seepage.	Moderate: flooding.	Fair: thin layer.
WN: Wilbanks	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
Wo: Woodington	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: wetness.

TABLE 11.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Roadfill	Sand	Topsoil
AaA Altavista	Fair: wetness, thin layer.	Improbable: excess fines.	Good.
At Augusta	Fair: wetness.	Improbable: excess fines.	Fair: small stones.
AuA Autryville	Good	Improbable: thin layer.	Fair: too sandy.
AyB Aycock	Fair: low strength.	Improbable: excess fines.	Fair: too clayey.
BnB Blanton	Good	Probable	Poor: too sandy.
BuA Butters	Good	Improbable: thin layer.	Poor: too sandy.
By Byars	Poor: low strength, wetness.	Improbable: excess fines.	Poor: thin layer, wetness.
Ca Cape Fear	Poor: low strength, wetness.	Improbable: excess fines.	Poor: thin layer, wetness.
Ce Centenary	Good	Probable	Poor: too sandy.
Ch: Chewacla	Poor: low strength, wetness.	Improbable: excess fines.	Poor: wetness.
Chastain	Poor: wetness.	Improbable: excess fines.	Poor: too clayey, wetness.
Cn Congaree	Fair: low strength, wetness.	Improbable: excess fines.	Good.
Co Coxville	Poor: wetness, low strength.	Improbable: excess fines.	Poor: thin layer, wetness.
Cr Croatan	Poor: wetness, low strength.	Improbable: excess fines.	Poor: excess humus, wetness.
CT Croatan	Poor: wetness.	Improbable: excess fines.	Poor: excess humus, wetness.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Topsoil
DgA---- Dogue	Fair: wetness.	Improbable: excess fines.	Poor: thin layer.
DO---- Dorovan	Poor: wetness.	Probable----	Poor: excess humus, wetness.
Dr---- Dunbar	Poor: low strength.	Improbable: excess fines.	Poor: thin layer.
DuA---- Duplin	Poor: low strength.	Improbable: excess fines.	Poor: thin layer.
DyF. Dystrochrepts			
ExA---- Exum	Fair: wetness.	Improbable: excess fines.	Good.
Fo---- Foreston	Fair: wetness.	Probable----	Fair: too sandy.
GbA---- Goldsboro	Fair: wetness.	Improbable: excess fines.	Good.
GdA: Goldsboro----	Fair: wetness.	Improbable: excess fines.	Good.
Urban land.			
Gh---- Grantham	Poor: low strength, wetness.	Improbable: excess fines.	Poor: wetness.
Gm: Grifton----	Poor: wetness.	Improbable: excess fines.	Poor: wetness.
Meggett----	Poor: wetness, shrink-swell.	Improbable: excess fines.	Poor: too clayey, wetness.
GrB, GrD---- Gritney	Poor: shrink-swell, low strength.	Improbable: excess fines.	Poor: thin layer.
Jh---- Johns	Fair: wetness.	Probable----	Fair: thin layer.
JO---- Johnston	Poor: wetness.	Improbable: excess fines.	Poor: wetness.
KaA---- Kalmia	Good----	Probable----	Fair: too sandy, thin layer.
KeA---- Kenansville	Good----	Probable----	Poor: too sandy.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Topsoil
KuB---- Kureb	Good	Probable	Poor: too sandy.
LaB---- Lakeland	Good	Probable	Poor: too sandy.
LeA---- Leon	Poor: wetness.	Probable	Poor: too sandy, wetness.
Ln---- Lynchburg	Poor: wetness.	Improbable: excess fines.	Poor: wetness.
Ly: Lynn Haven----	Poor: wetness.	Probable	Poor: too sandy, wetness.
Torhunta----	Poor: wetness.	Probable	Poor: wetness.
Na---- Nahunta	Poor: low strength.	Improbable: excess fines.	Good.
NoA, NoB---- Norfolk	Good	Improbable: excess fines.	Fair: too sandy.
NuB: Norfolk----	Good	Improbable: excess fines.	Fair: too sandy.
Urban land.			
Oc---- Ocilla	Fair: wetness.	Improbable: excess fines.	Fair: too sandy.
Pa---- Pamlico	Poor: wetness.	Probable	Poor: excess humus, wetness.
PC---- Pamlico	Poor: low strength, wetness.	Probable	Poor: excess humus, wetness.
Pe---- Pantego	Poor: wetness.	Improbable: excess fines.	Poor: wetness.
Pp---- Paxville	Poor: wetness.	Probable	Poor: wetness.
Pt---- Portsmouth	Poor: wetness.	Probable	Poor: wetness.
Ra---- Rains	Poor: wetness.	Improbable: excess fines.	Poor: wetness.
Rn: Rains----	Poor: wetness.	Improbable: excess fines.	Poor: wetness.
Urban land.			

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Topsoil
Ro---------- Roanoke	Poor: wetness.	Improbable: excess fines.	Poor: thin layer, wetness.
St---------- Stallings	Fair: wetness.	Probable----------	Fair: too sandy.
To---------- Toisnot	Poor: wetness.	Improbable: excess fines.	Poor: wetness.
Tr---------- Torhunta	Poor: wetness.	Probable----------	Poor: wetness.
Ud. Udorthents			
WaB---------- Wagram	Good----------	Improbable: excess fines.	Poor: too sandy.
WbB: Wagram----------	Good----------	Improbable: excess fines.	Poor: too sandy.
Urban land.			
We---------- Wahee	Poor: wetness.	Improbable: excess fines.	Poor: too clayey, wetness.
WgB---------- Wakulla	Good----------	Probable----------	Poor: too sandy.
Wh---------- Wasda	Poor: wetness.	Improbable: excess fines.	Poor: excess humus, wetness.
WmB---------- Wickham	Fair: thin layer.	Improbable: excess fines.	Good.
WN---------- Wilbanks	Poor: low strength, wetness.	Improbable: excess fines.	Poor: thin layer, wetness.
Wo---------- Woodington	Poor: wetness.	Probable----------	Poor: wetness.

TABLE 12.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
AaA--Altavista	Moderate: seepage.	Moderate: wetness.	Favorable	Wetness	Wetness	Favorable.
At--Augusta	Moderate: seepage.	Severe: piping, wetness.	Favorable	Wetness	Wetness	Wetness.
AuA--Autryville	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake.	Too sandy	Droughty.
AyB--Aycock	Moderate: seepage.	Moderate: piping.	Deep to water	Erodes easily	Erodes easily	Erodes easily.
BnB--Blanton	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.	Droughty.
BuA--Butters	Severe: seepage.	Severe: seepage, piping.	Deep to water	Fast intake, droughty.	Too sandy	Droughty.
By--Byars	Slight	Severe: hard to pack, ponding.	Ponding, percs slowly.	Ponding, percs slowly.	Ponding, percs slowly.	Wetness, percs slowly.
Ca--Cape Fear	Slight	Severe: hard to pack, wetness.	Percs slowly	Wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
Ce--Centenary	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.	Droughty.
Ch: Chewacla	Moderate: seepage.	Severe: piping, hard to pack, wetness.	Flooding	Wetness, flooding.	Wetness	Wetness.
Chastain	Moderate: seepage.	Severe: hard to pack, wetness.	Percs slowly, flooding.	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
Cn--Congaree	Moderate: seepage.	Severe: piping.	Flooding	Wetness	Erodes easily, wetness.	Erodes easily.
Co--Coxville	Slight	Severe: wetness.	Favorable	Wetness	Wetness	Wetness.
Cr--Croatan	Moderate: seepage.	Severe: piping, ponding.	Ponding, percs slowly, subsides.	Ponding, percs slowly.	Ponding	Wetness, percs slowly.

TABLE 12.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
CT---------- Croatan	Slight---------	Severe: piping, wetness.	Percs slowly, flooding.	Wetness, percs slowly, flooding.	Wetness--------	Wetness, percs slowly.
DgA---------- Dogue	Moderate: seepage.	Severe: wetness.	Favorable------	Wetness, soil blowing.	Wetness, soil blowing.	Favorable.
DO---------- Dorovan	Moderate: seepage.	Severe: excess humus, ponding.	Ponding, flooding.	Ponding, flooding.	Ponding--------	Wetness.
Dr---------- Dunbar	Slight---------	Severe: wetness.	Favorable------	Wetness--------	Wetness--------	Wetness.
DuA---------- Duplin	Slight---------	Moderate: piping, hard to pack, wetness.	Favorable------	Wetness--------	Wetness--------	Favorable.
DyF. Dystrochrepts						
ExA---------- Exum	Slight---------	Moderate: piping, wetness.	Favorable------	Wetness, erodes easily.	Erodes easily, wetness.	Erodes easily.
Fo---------- Foreston	Severe: seepage.	Severe: seepage, piping.	Favorable------	Wetness, droughty, fast intake.	Wetness, soil blowing.	Droughty.
GbA---------- Goldsboro	Moderate: seepage.	Moderate: piping, wetness.	Favorable------	Wetness--------	Wetness--------	Favorable.
GdA: Goldsboro-------	Moderate: seepage.	Moderate: piping, wetness.	Favorable------	Wetness--------	Wetness--------	Favorable.
Urban land.						
Gh---------- Grantham	Slight---------	Severe: wetness.	Favorable------	Wetness, erodes easily.	Erodes easily, wetness.	Wetness, erodes easily.
Gm: Grifton---------	Moderate: seepage.	Severe: wetness.	Favorable------	Wetness--------	Wetness--------	Wetness.
Meggett---------	Moderate: seepage.	Severe: hard to pack, wetness.	Percs slowly, flooding.	Wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
GrB---------- Gritney	Slight---------	Moderate: hard to pack.	Deep to water	Percs slowly, slope, soil blowing.	Percs slowly, erodes easily, soil blowing.	Erodes easily, percs slowly.
GrD---------- Gritney	Slight---------	Moderate: hard to pack.	Deep to water	Percs slowly, slope, soil blowing.	Slope, percs slowly, erodes easily, soil blowing.	Slope, percs slowly, erodes easily.

TABLE 12.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
Jh---- Johns	Severe: seepage.	Severe: seepage, piping, wetness.	Cutbanks cave	Wetness----	Wetness, too sandy.	Favorable.
JO---- Johnston	Severe: seepage.	Severe: piping, ponding.	Ponding, flooding.	Ponding, flooding.	Ponding----	Wetness.
KaA---- Kalmia	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake.	Too sandy----	Droughty.
KeA---- Kenansville	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake.	Too sandy	Droughty.
KuB---- Kureb	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, slope.	Too sandy	Droughty.
LaB---- Lakeland	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.	Droughty.
LeA---- Leon	Severe: seepage.	Severe: seepage, piping, wetness.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty.
Ln---- Lynchburg	Moderate: seepage.	Severe: piping, wetness.	Favorable----	Wetness	Wetness	Wetness.
Ly: Lynn Haven----	Severe: seepage.	Severe: seepage, piping, wetness.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty.
Torhunta----	Severe: seepage.	Severe: piping, wetness.	Favorable----	Wetness: fast intake.	Wetness	Wetness.
Na---- Nahunta	Slight	Severe: wetness.	Favorable----	Wetness, erodes easily.	Erodes easily, wetness.	Wetness, erodes easily.
NoA---- Norfolk	Moderate: seepage.	Moderate: piping.	Deep to water	Fast intake----	Favorable----	Favorable.
NoB---- Norfolk	Moderate: seepage, slope.	Moderate: piping.	Deep to water	Slope----	Favorable----	Favorable.
NuB: Norfolk----	Moderate: seepage, slope.	Moderate: piping.	Deep to water	Slope----	Favorable----	Favorable.
Urban land.						

TABLE 12.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
Oc---------- Ocilla	Severe: seepage.	Severe: piping, wetness.	Favorable------	Wetness, droughty, fast intake.	Wetness--------	Droughty.
Pa---------- Pamlico	Severe: seepage.	Severe: seepage, piping, wetness.	Cutbanks cave	Wetness, rooting depth.	Wetness, too sandy.	Wetness, rooting depth.
PC---------- Pamlico	Severe: seepage.	Severe: seepage, piping, ponding.	Ponding, flooding, cutbanks cave.	Ponding, flooding.	Ponding, too sandy.	Wetness.
Pe---------- Pantego	Moderate: seepage.	Severe: wetness.	Favorable------	Wetness--------	Wetness--------	Wetness.
Pp---------- Paxville	Severe: seepage.	Severe: piping, ponding.	Ponding--------	Ponding--------	Ponding, soil blowing.	Wetness.
Pt---------- Portsmouth	Severe: seepage.	Severe: seepage, piping, wetness.	Cutbanks cave	Wetness--------	Wetness, too sandy.	Wetness.
Ra---------- Rains	Moderate: seepage.	Severe: piping, wetness.	Favorable------	Wetness--------	Wetness, soil blowing.	Wetness.
Rn: Rains----------	Moderate: seepage.	Severe: piping, wetness.	Favorable------	Wetness--------	Wetness, soil blowing.	Wetness.
Urban land.						
Ro---------- Roanoke	Moderate: seepage.	Severe: wetness.	Percs slowly	Wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
St---------- Stallings	Severe: seepage.	Severe: piping, wetness.	Cutbanks cave	Wetness, fast intake.	Wetness--------	Wetness.
To---------- Toisnot	Slight---------	Severe: piping, wetness.	Percs slowly---	Wetness, droughty.	Wetness--------	Wetness, droughty.
Tr---------- Torhunta	Severe: seepage.	Severe: piping, wetness.	Favorable------	Wetness, fast intake.	Wetness--------	Wetness.
Ud. Udorthents						
WaB---------- Wagram	Moderate: seepage.	Slight---------	Deep to water	Droughty, fast intake, slope.	Favorable------	Droughty.

TABLE 12.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
WbB: Wagram	Moderate: seepage.	Slight	Deep to water	Droughty, fast intake, slope.	Favorable	Droughty.
Urban land.						
We: Wahee	Slight	Severe: wetness, hard to pack.	Percs slowly	Wetness	Wetness, percs slowly.	Wetness, percs slowly.
WgB: Wakulla	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, slope.	Too sandy	Droughty.
Wh: Wasda	Moderate: seepage.	Severe: wetness.	Subsides	Wetness	Wetness	Wetness.
WmB: Wickham	Moderate: seepage.	Moderate: thin layer.	Deep to water	Slope	Favorable	Favorable.
WN: Wilbanks	Slight	Severe: hard to pack, wetness.	Percs slowly, flooding.	Wetness, percs slowly, flooding.	Wetness, percs slowly.	Wetness, percs slowly.
Wo: Woodington	Severe: seepage.	Severe: piping, wetness.	Cutbanks cave	Wetness, fast intake.	Wetness	Wetness.

TABLE 13.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than. Absence of an entry indicates that data were not estimated. Some soils may have Unified classifications and USDA textures in addition to those shown. In general, the dominant classifications and textures are shown]

Map symbol and soil name	Depth	USDA texture	Classification		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	4	10	40	200		
	In								Pct	
AaA---------- Altavista	0-7	Fine sandy loam	ML, CL-ML, SM, SM-SC	A-4, A-2	95-100	90-100	65-99	35-60	<23	NP-7
	7-39	Clay loam, sandy clay loam, loam.	CL, CL-ML, SC, SM-SC	A-4, A-6, A-7	95-100	95-100	60-99	45-75	20-45	5-28
	39-70	Variable---------	---	---	---	---	---	---	---	---
At---------- Augusta	0-8	Sandy loam-------	SM, SM-SC, ML	A-2, A-4	90-100	75-100	50-98	30-60	<25	NP-7
	8-34	Sandy clay loam, clay loam, loam.	CL, CL-ML	A-4, A-6, A-7	90-100	75-100	75-100	51-80	20-45	5-25
	34-70	Loamy sand, sand.	SP-SM, SM	A-2, A-3	90-100	75-100	75-100	5-20	---	NP
AuA---------- Autryville	0-24	Loamy sand-------	SP-SM, SM	A-2, A-3	100	100	50-100	5-20	---	NP
	24-38	Sandy loam, sandy clay loam, fine sandy loam.	SM	A-2	100	100	50-100	15-30	<25	NP-3
	38-50	Sand, loamy sand, loamy fine sand.	SP-SM, SM	A-2, A-3	100	100	50-100	5-20	---	NP
	50-62	Sandy loam, sandy clay loam, fine sandy loam.	SM, SC, SM-SC	A-2, A-4	100	100	60-100	20-49	<30	NP-10
AyB---------- Aycock	0-10	Very fine sandy loam.	ML, CL-ML, CL	A-4	100	95-100	80-100	51-80	<25	NP-10
	10-75	Clay loam, silty clay loam, loam.	CL	A-4, A-6, A-7	100	95-100	90-100	60-90	22-49	8-30
BnB---------- Blanton	0-60	Sand----------	SP-SM, SM	A-3, A-2-4	100	90-100	65-100	5-20	---	NP
	60-83	Sandy clay loam, sandy loam, fine sandy loam.	SC, SM-SC, SM	A-4, A-2-4, A-2-6, A-6	100	95-100	69-96	25-50	12-45	3-22
BuA---------- Butters	0-18	Fine sand--------	SP-SM, SM	A-2, A-3	100	95-100	50-95	5-20	---	NP
	18-29	Sandy loam, fine sandy loam.	SM, SM-SC	A-2, A-4	100	95-100	60-98	15-40	<30	NP-7
	29-48	Loamy sand, loamy fine sand, sand.	SP, SP-SM, SM	A-2, A-3	100	95-100	50-75	3-20	---	NP
	48-70	Sandy loam, sandy clay loam, fine sandy loam.	SM, SM-SC, SC	A-2, A-4, A-6	100	95-100	60-85	25-49	15-35	NP-15
By---------- Byars	0-10	Loam----------	CL	A-6, A-7-6	98-100	98-100	90-100	70-95	32-50	11-23
	10-70	Clay, clay loam, sandy clay.	CL, CH	A-7-5, A-7-6, A-6	98-100	98-100	90-100	60-95	39-75	17-42
Ca---------- Cape Fear	0-12	Loam----------	ML, CL-ML, CL	A-4, A-6	100	95-100	85-100	60-90	20-40	3-15
	12-46	Clay loam, clay, silty clay.	ML, CL, MH, CH	A-7	100	95-100	90-100	60-85	41-65	15-35
	46-60	Sand, loamy sand.	SP-SM, SM	A-2, A-3	90-100	75-100	75-100	5-20	---	NP
Ce---------- Centenary	0-6	Sand----------	SP, SP-SM	A-3	100	100	60-90	4-10	---	NP
	6-58	Sand, fine sand, loamy sand.	SP-SM, SP, SM	A-3, A-2-4	100	100	60-90	4-20	---	NP
	58-80	Sand, fine sand, loamy sand.	SP, SP-SM, SM	A-3, A-2-4	100	100	60-90	3-20	---	NP

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	4	10	40	200		
	In								Pct	
Ch:										
Chewacla	0-13	Loam	ML, CL, CL-ML	A-4, A-6, A-7	98-100	95-100	70-100	55-90	25-49	4-20
	13-80	Silt loam, clay loam, silty clay loam.	ML, MH	A-4, A-6, A-7	75-100	65-100	60-100	51-98	32-61	4-28
Chastain	0-5	Silty clay loam	ML, CL, CL-ML	A-4, A-6, A-7	100	100	90-100	70-95	23-45	3-18
	5-80	Silty clay loam, silty clay, clay.	CL, CH, ML, MH	A-6, A-7	100	100	95-100	85-98	35-75	12-40
Cn	0-5	Silt loam	CL-ML, ML, CL	A-4	95-100	95-100	70-100	51-90	20-35	3-10
Congaree	5-42	Silty clay loam, fine sandy loam, loam.	SC, ML, CL, SM	A-4, A-6, A-7	95-100	95-100	70-100	40-90	25-50	3-22
	42-90	Variable	---	---	---	---	---	---	---	---
Co	0-11	Loam	SM, ML, CL-ML, CL	A-4, A-6, A-7	100	100	85-97	46-75	20-46	3-15
Coxville	11-70	Clay loam, sandy clay, clay.	CL, CH	A-6, A-7	100	100	85-98	50-85	30-55	12-35
Cr	0-32	Muck	PT	---	---	---	---	---	---	---
Croatan	32-45	Loam, clay loam, sandy clay loam.	CL, CL-ML, SC, SM-SC	A-4, A-6	100	100	75-100	36-95	18-36	4-15
	45-62	Variable	---	---	---	---	---	---	---	---
CT	0-27	Muck	PT	---	---	---	---	---	---	---
Croatan	27-40	Sandy loam, fine sandy loam, mucky sandy loam.	SM, SC, SM-SC	A-2, A-4	100	100	60-85	25-49	<30	NP-10
	40-48	Loam, clay loam, sandy clay loam.	CL, ML, SC, SM	A-4, A-6	100	100	75-100	36-95	<36	NP-15
	48-80	Variable	---	---	---	---	---	---	---	---
DgA	0-10	Sandy loam	SM, SC, SM-SC	A-2, A-4	95-100	75-100	50-100	20-50	<25	NP-10
Dogue	10-62	Clay loam, clay, sandy clay loam.	CL, CH, SC	A-6, A-7	95-100	75-100	65-100	40-90	35-60	16-40
DO	0-53	Muck	PT	---	---	---	---	---	---	---
Dorovan	53-62	Sand, loamy sand, loam.	SP-SM, SM-SC, SM	A-1, A-3, A-4, A-2-4	100	100	5-70	5-49	<20	NP-7
Dr	0-11	Fine sandy loam	SM-SC, SC, SM	A-2, A-4	100	100	50-95	20-50	20-35	3-15
Dunbar	11-65	Sandy clay, clay loam, clay.	CL, CH, ML, MH	A-6, A-7	100	100	85-95	50-70	30-55	12-25
DuA	0-7	Sandy loam	SM, SM-SC	A-2, A-4	100	100	67-98	20-49	<26	NP-7
Duplin	7-62	Sandy clay, clay loam, clay.	CL, CH, SC	A-6, A-7	100	98-100	80-100	45-75	24-54	13-35
DyF.										
Dystrochrepts										

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	4	10	40	200		
	In								Pct	
ExA---------- Exum	0-9	Very fine sandy loam.	ML, CL-ML, CL	A-4	100	95-100	80-100	51-80	<25	NP-10
	9-62	Loam, clay loam, silty clay loam.	CL	A-4, A-6, A-7	100	95-100	90-100	60-90	22-49	8-30
Fo---------- Foreston	0-9	Loamy sand-------	SM	A-2	100	100	60-100	15-30	---	NP
	9-50	Sandy loam, fine sandy loam.	SM	A-2	100	100	70-100	18-35	<25	NP-4
	50-62	Loamy fine sand, loamy sand, fine sand.	SP-SM, SM	A-2, A-3	100	100	50-98	6-25	---	NP
GbA---------- Goldsboro	0-10	Sandy loam-------	SM, SM-SC, SC	A-2, A-4, A-6	95-100	95-100	50-100	15-45	<25	NP-14
	10-40	Sandy clay loam, sandy loam.	SM-SC, SC, CL-ML, CL	A-2, A-4, A-6	98-100	95-100	60-100	25-55	16-37	4-18
	40-62	Sandy clay loam, clay loam, sandy clay.	SC, CL, CL-ML, CH	A-4, A-6, A-7-6	95-100	90-100	65-95	36-70	25-55	6-32
GdA:										
Goldsboro-------	0-10	Sandy loam-------	SM, SM-SC, SC	A-2, A-4, A-6	95-100	95-100	50-100	15-45	<25	NP-14
	10-40	Sandy clay loam, sandy loam.	SM-SC, SC, CL-ML, CL	A-2, A-4, A-6	98-100	95-100	60-100	25-55	16-37	4-18
	40-62	Sandy clay loam, clay loam, sandy clay.	SC, CL, CL-ML, CH	A-4, A-6, A-7-6	95-100	90-100	65-95	36-70	25-55	6-32
Urban land.										
Gh---------- Grantham	0-11	Very fine sandy loam.	ML, CL-ML	A-4	100	100	85-100	55-85	<30	NP-7
	11-60	Loam, clay loam, silty clay loam.	CL	A-4, A-6, A-7	100	100	90-100	60-95	22-49	8-30
Gm:										
Grifton---------	0-13	Fine sandy loam	SM, SM-SC	A-2, A-4	100	95-100	60-100	20-45	<30	NP-7
	13-65	Sandy loam, sandy clay loam, clay loam.	SC, CL	A-4, A-6	98-100	95-100	60-100	31-60	20-35	8-15
	65-80	Loamy sand, sandy loam, fine sandy loam.	SM, SM-SC	A-2, A-4	100	95-100	60-100	12-45	<30	NP-7
Meggett---------	0-12	Fine sandy loam	SM	A-2, A-4	100	90-100	85-100	13-41	---	NP
	12-43	Clay, sandy clay, clay loam.	CH, MH, CL	A-6, A-7	100	90-100	85-100	51-90	30-60	12-30
	43-80	Stratified sand to clay.	---	---	---	---	---	---	---	---
GrB, GrD--------- Gritney	0-10	Fine sandy loam	SM, SM-SC	A-2-4, A-4	100	95-100	75-99	18-42	<30	NP-6
	10-15	Sandy clay loam, sandy clay, clay loam.	SC, CL	A-6, A-7	100	95-100	80-100	36-60	35-48	15-25
	15-50	Sandy clay, clay, clay loam.	CH, CL, SC	A-7	100	95-100	80-100	45-70	40-62	22-40
	50-60	Variable---------	---	---	---	---	---	---	---	---

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	4	10	40	200		
	In								Pct	
Jh---------- Johns	0-11	Fine sandy loam	SM, SC, SM-SC	A-2, A-4	100	95-100	70-98	20-49	<30	NP-10
	11-37	Sandy clay loam, sandy loam, clay loam.	SC, SM-SC, CL, CL-ML	A-2, A-4, A-6, A-7	100	95-100	60-98	30-65	20-45	5-25
	37-72	Sand, loamy sand, coarse sand.	SM, SP-SM, SP	A-2, A-3	95-100	95-100	51-90	4-25	---	NP
JO---------- Johnston	0-38	Mucky loam-------	OL, ML, CL-ML	A-4, A-5, A-7-5	100	100	90-100	51-75	20-45	2-14
	38-62	Stratified fine sandy loam to fine sand.	SM, SM-SC, SP-SM	A-2, A-4	100	100	50-100	5-49	<35	NP-10
KaA---------- Kalmia	0-11	Loamy fine sand	SM, SM-SC	A-2	100	95-100	50-75	15-35	---	NP
	11-34	Sandy clay loam, loam, sandy loam.	SC, SM-SC	A-2, A-4, A-6	100	95-100	70-100	30-49	20-35	4-15
	34-80	Loamy sand, sand, gravelly sand.	SM, SP-SM, SP	A-2, A-3	90-100	80-100	50-70	4-35	---	NP
KeA---------- Kenansville	0-23	Sand----------	SM, SP-SM	A-1, A-2	100	95-100	45-95	10-25	---	NP
	23-36	Sandy loam, fine sandy loam.	SM, SC, SM-SC	A-2, A-4	100	95-100	50-99	20-40	<30	NP-10
	36-72	Sand, loamy sand	SP-SM, SM	A-1, A-2, A-3	100	95-100	40-99	5-30	---	NP
KuB---------- Kureb	0-85	Sand----------	SP, SP-SM	A-3	100	100	60-100	0-7	---	NP
LaB---------- Lakeland	0-75	Sand----------	SP-SM	A-3, A-2-4	90-100	90-100	60-100	5-12	---	NP
	75-88	Sand, fine sand	SP, SP-SM	A-3, A-2-4	90-100	90-100	50-100	1-12	---	NP
LeA---------- Leon	0-21	Sand----------	SP, SP-SM	A-3, A-2-4	100	100	60-100	2-12	---	NP
	21-80	Sand, fine sand, loamy sand.	SM, SP-SM, SP	A-3, A-2-4	100	100	60-100	3-30	---	NP
Ln---------- Lynchburg	0-8	Fine sandy loam	SM, ML, SM-SC, CL-ML	A-2, A-4	92-100	90-100	75-100	25-55	<30	NP-7
	8-65	Sandy clay loam, sandy loam, clay loam.	SM-SC, SC, CL, CL-ML	A-2, A-4, A-6	92-100	90-100	70-100	25-67	15-40	4-18
Ly:										
Lynn Haven------	0-12	Sand----------	SP, SP-SM, SM	A-3, A-2-4	100	100	80-100	2-14	---	NP
	12-80	Sand, fine sand, loamy sand.	SM, SP-SM	A-3, A-2-4	100	100	70-100	5-20	---	NP
Torhunta--------	0-16	Mucky sandy loam	SM	A-2-4, A-4	100	95-100	70-85	20-49	<25	NP-4
	16-33	Sandy loam, fine sandy loam.	SM, SM-SC	A-2, A-4	100	95-100	70-92	20-40	<25	NP-7
	33-74	Loamy sand, sand, sandy loam.	SM, SP-SM, SM-SC	A-2, A-3	100	95-100	65-92	5-35	<25	NP-4
Na---------- Nahunta	0-6	Very fine sandy loam.	ML, CL-ML, CL	A-4	100	95-100	80-100	51-85	<25	NP-10
	6-65	Loam, clay loam, silty clay loam.	CL	A-4, A-6, A-7	100	95-100	90-100	60-95	22-49	8-30

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	4	10	40	200		
	In								Pct	
NoA, NoB--------- Norfolk	0-15 15-65	Loamy fine sand Fine sandy loam, sandy clay loam, clay loam.	SM SC, SM-SC, CL, CL-ML	A-2 A-2, A-4, A-6	95-100 95-100	92-100 91-100	50-95 70-96	13-30 30-63	<20 20-38	NP 4-15
NuB: Norfolk--------- Urban land.	0-15 15-65	Loamy fine sand Fine sandy loam, sandy clay loam, clay loam.	SM SC, SM-SC, CL, CL-ML	A-2 A-2, A-4, A-6	95-100 95-100	92-100 91-100	50-95 70-96	13-30 30-63	<20 20-38	NP 4-15
Oc--------------- Ocilla	0-26 26-52 52-62	Loamy fine sand Sandy loam, sandy clay loam. Sandy clay loam, sandy clay, sandy loam.	SM, SP-SM SM, CL, SC, ML SC, CL	A-2, A-3 A-2, A-4, A-6 A-4, A-5, A-6, A-7	100 100 100	95-100 95-100 95-100	75-100 80-100 80-100	8-35 20-55 36-60	--- 20-40 20-45	NP NP-18 7-20
Pa--------------- Pamlico	0-32 32-62	Muck------------- Loamy sand, sand, loamy fine sand.	PT SM, SP-SM	--- A-2, A-3	--- 100	--- 100	--- 70-95	--- 5-20	--- ---	--- NP
PC--------------- Pamlico	0-27 27-62	Muck------------- Loamy sand, sand, loamy fine sand.	PT SM, SP-SM	--- A-2, A-3	--- 100	--- 100	--- 70-95	--- 5-20	--- ---	--- NP
Pe--------------- Pantego	0-19 19-60 60-68	Loam------------- Sandy clay loam, sandy loam, clay loam. Clay loam, sandy clay, sandy clay loam.	SM, SM-SC, CL, ML SC, CL, SM-SC, CL-ML CL, SC	A-2, A-4, A-5 A-4, A-6, A-2 A-6, A-7	100 100 100	95-100 95-100 95-100	60-100 80-100 90-100	25-75 30-80 36-80	<35 20-40 25-49	NP-10 4-16 11-24
Pp--------------- Paxville	0-14 14-42 42-47 47-70	Sandy loam------- Sandy clay loam, sandy loam, loam. Sandy loam, loamy sand, fine sandy loam. Loamy sand, sand, fine sand.	SM, ML CL-ML, CL, SM-SC, SC SM, SP-SM SM, SP-SM	A-2, A-4 A-2, A-4, A-6 A-2, A-3 A-2, A-3, A-1	100 100 100 95-100	100 98-100 98-100 90-100	80-98 60-98 60-98 45-65	30-60 30-60 5-35 5-25	<35 21-40 <30 ---	NP-7 5-15 NP-4 NP
Pt--------------- Portsmouth	0-17 17-27 27-32 32-72	Mucky sandy loam Loam, sandy clay loam, clay loam. Loamy sand, sandy loam. Stratified coarse sand to loamy sand.	SM, SM-SC SC, CL-ML, CL SM SP-SM, SP, SM	A-2, A-4 A-4, A-6 A-2 A-1, A-2, A-3	98-100 98-100 98-100 98-100	98-100 98-100 98-100 98-100	65-95 75-95 50-70 45-65	30-65 36-70 13-35 3-25	<30 18-40 <18 ---	NP-7 7-18 NP-4 NP
Ra--------------- Rains	0-13 13-72	Fine sandy loam Sandy clay loam clay loam.	SM, ML SC, SM-SC, CL, CL-ML	A-2, A-4 A-2, A-4, A-6	100 100	95-100 95-100	50-85 55-98	25-56 30-70	<35 18-40	NP-10 4-20

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	4	10	40	200		
	In								Pct	
Rn:										
Rains	0-13	Fine sandy loam	SM, ML	A-2, A-4	100	95-100	50-85	25-56	<35	NP-10
	13-72	Sandy clay loam, clay loam.	SC, SM-SC, CL, CL-ML	A-2, A-4, A-6	100	95-100	55-98	30-70	18-40	4-20
Urban land.										
Ro	0-10	Loam	SM-SC, CL-ML, CL, SC	A-4, A-6	95-100	85-100	60-100	35-90	20-35	5-16
Roanoke	10-52	Clay, silty clay, clay loam.	CH, CL	A-7	90-100	85-100	85-100	65-95	45-70	22-40
	52-70	Variable	---	---	---	---	---	---	---	---
St	0-8	Loamy sand	SM	A-2	100	95-100	51-100	15-35	---	NP
Stallings	8-35	Sandy loam, fine sandy loam, loamy sand.	SM	A-2, A-4	100	95-100	51-100	15-50	<25	NP-3
	35-62	Sandy loam, loamy sand, loamy fine sand.	SM, SP-SM, SM-SC	A-2, A-4	100	95-100	51-100	10-50	<25	NP-4
To	0-8	Loam	CL-ML, CL, ML	A-4, A-6	100	100	85-95	60-75	20-30	5-15
Toisnot	8-21	Sandy loam, fine sandy loam, silt loam.	SM, SM-SC, SC, ML	A-2, A-4	100	100	60-90	30-65	<25	NP-10
	21-31	Loamy sand, sandy loam.	SM, SM-SC	A-2, A-4	100	100	50-75	20-49	<25	NP-7
	31-40	Sandy clay loam, sandy clay, loam	CL, SC, CL-ML	A-4, A-6	100	100	80-95	36-65	20-40	4-20
	40-62	Variable	---	---	---	---	---	---	---	---
Tr	0-8	Mucky sandy loam	SM	A-2-4, A-4	100	95-100	70-85	20-49	<25	NP-4
Torhunta	8-33	Sandy loam, fine sandy loam.	SM, SM-SC	A-2, A-4	100	95-100	70-92	20-40	<25	NP-7
	33-74	Loamy sand, sand, sandy loam.	SM, SP-SM, SM-SC	A-2, A-3	100	95-100	65-92	5-35	<25	NP-4
Ud.										
Udorthents										
WaB	0-28	Fine sand	SP-SM, SM	A-1, A-2, A-3	95-100	90-100	45-80	5-15	---	NP
Wagram	28-62	Sandy clay loam, sandy loam.	SC	A-2, A-4, A-6, A-7	100	98-100	60-95	31-49	21-41	8-25
WbB:										
Wagram	0-28	Fine sand	SP-SM, SM	A-1, A-2, A-3	95-100	90-100	45-80	5-15	---	NP
	28-62	Sandy clay loam, sandy loam.	SC	A-2, A-4, A-6, A-7	100	98-100	60-95	31-49	21-41	8-25
Urban land.										
We	0-7	Loam	ML, CL-ML, CL	A-4	100	100	90-98	51-75	20-35	2-10
Wahee	7-45	Clay, clay loam, silty clay.	CL, CH	A-6, A-7	100	100	85-100	51-90	38-77	16-54
	45-60	Variable	---	---	---	---	---	---	---	---

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	4	10	40	200		
	In								Pct	
WgB---------- Wakulla	0-30	Sand----------	SP, SP-SM	A-3, A-2-4	100	100	60-90	4-12	---	NP
	30-50	Loamy sand, loamy fine sand.	SM, SP-SM	A-2, A-2-4	100	100	55-85	10-25	---	NP
	50-80	Sand, fine sand	SM, SP-SM	A-1, A-2, A-3	100	100	40-70	2-15	---	NP
Wh---------- Wasda	0-14	Muck----------	PT	---	---	---	---	---	---	NP
	14-32	Clay loam, sandy clay loam, sandy loam.	ML, CL, CL-ML	A-2, A-4, A-6	98-100	95-100	75-99	50-80	20-40	6-18
	32-62	Variable---------	---	---	---	---	---	---	---	---
WmB---------- Wickham	0-7	Fine sandy loam	SM, SM-SC, ML, CL-ML	A-4	95-100	90-100	70-100	45-80	<25	NP-7
	7-43	Sandy clay loam, clay loam, loam.	CL-ML, CL, SC, SM-SC	A-2, A-4, A-6, A-7-6	95-100	90-100	75-100	30-70	20-41	5-15
	43-65	Variable---------	---	---	---	---	---	---	---	---
WN---------- Wilbanks	0-9	Loam----------	ML, CL-ML, CL	A-4	100	100	70-100	51-98	20-46	6-20
	9-58	Silty clay, clay, clay loam.	CH, MH	A-7	100	100	90-100	75-95	45-65	18-35
	58-80	Variable---------	---	---	---	---	---	---	---	---
Wo---------- Woodington	0-12	Loamy sand-------	SM	A-2	100	95-100	50-100	15-49	---	NP
	12-50	Sandy loam, fine sandy loam.	SM	A-2, A-4	100	95-100	50-100	20-50	<25	NP-3
	50-62	Sandy loam, loamy sand, loamy fine sand.	SM, SP-SM	A-2, A-4	100	95-100	50-100	10-50	<25	NP-3

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
AaA	0-7	10-24	1.30-1.50	2.0-6.0	0.12-0.20	4.5-6.0	Low	0.24	5	.5-3
Altavista	7-39	18-35	1.30-1.50	0.6-2.0	0.12-0.20	4.5-6.0	Low	0.24		
	39-70	---	---	---	---	---	---	---		
At	0-8	5-20	1.40-1.70	2.0-6.0	0.10-0.15	4.5-6.0	Low	0.20	4	.5-2
Augusta	8-34	20-35	1.35-1.60	0.6-2.0	0.12-0.18	4.5-6.0	Low	0.24		
	34-70	2-10	1.50-1.70	6.0-2.0	0.03-0.10	4.5-6.0	Low	0.10		
AuA	0-24	2-10	1.60-1.70	>6.0	0.04-0.09	4.5-6.5	Low	0.10	5	.5-1
Autryville	24-38	10-25	1.40-1.60	2.0-6.0	0.08-0.13	4.5-5.5	Low	0.10		
	38-50	2-8	1.60-1.70	>6.0	0.03-0.08	4.5-5.5	Low	0.10		
	50-62	10-35	1.40-1.60	0.6-2.0	0.10-0.15	4.5-5.5	Low	0.17		
AyB	0-10	4-15	1.30-1.60	2.0-6.0	0.15-0.20	4.5-6.0	Low	0.37	5	1-4
Aycock	10-75	18-35	1.30-1.60	0.2-2.0	0.15-0.20	4.5-5.5	Low	0.43		
BnB	0-60	1-7	1.30-1.60	6.0-20	0.03-0.07	4.5-6.0	Low	0.10	5	.5-1
Blanton	60-83	12-30	1.60-1.70	0.6-2.0	0.10-0.15	4.5-5.5	Low	0.20		
BuA	0-18	2-8	1.50-1.70	6.0-20	0.03-0.06	4.5-5.5	Low	0.10	5	.5-2
Butters	18-29	10-20	1.40-1.60	2.0-6.0	0.10-0.14	4.5-5.5	Low	0.15		
	29-48	1-10	1.50-1.70	6.0-20	0.03-0.08	4.5-6.5	Low	0.10		
	48-70	10-25	1.30-1.50	0.6-2.0	0.10-0.15	4.5-5.5	Low	0.17		
By	0-10	15-35	1.20-1.50	0.6-2.0	0.15-0.20	3.6-5.5	Low	0.28	5	2-9
Byars	10-70	35-45	1.30-1.60	0.06-0.2	0.14-0.18	3.6-5.5	Moderate	0.32		
Ca	0-12	5-15	1.30-1.50	0.6-6.0	0.15-0.22	4.5-6.5	Low	0.15	5	5-15
Cape Fear	12-46	35-60	1.25-1.40	0.06-0.2	0.12-0.22	4.5-6.0	Moderate	0.32		
	46-60	2-10	1.50-1.70	6.0-20	0.03-0.10	4.5-6.0	Low	0.10		
Ce	0-6	1-8	1.40-1.60	6.0-20	0.03-0.08	4.5-6.5	Low	0.10	5	<1
Centenary	6-58	1-8	1.40-1.60	6.0-20	0.03-0.05	4.5-6.0	Low	0.10		
	58-80	1-10	1.50-1.70	2.0-6.0	0.03-0.10	4.5-6.0	Low	0.10		
Ch:										
Chewacla	0-13	10-27	1.30-1.60	0.6-2.0	0.15-0.24	4.5-6.5	Low	0.28	5	1-4
	13-80	18-35	1.30-1.50	0.6-2.0	0.15-0.24	4.5-6.5	Low	0.32		
Chastain	0-5	15-35	1.20-1.40	0.2-0.6	0.12-0.18	4.5-6.0	Moderate	0.32	5	2-6
	5-80	35-60	1.30-1.50	0.06-0.2	0.12-0.16	4.5-6.0	Moderate	0.37		
Cn	0-5	10-25	1.20-1.40	0.6-2.0	0.12-0.20	4.5-7.3	Low	0.37	5	<4
Congaree	5-42	18-35	1.20-1.50	0.6-2.0	0.12-0.20	4.5-7.3	Low	0.37		
	42-90	---	---	---	---	---	---	---		
Co	0-11	5-27	1.45-1.65	0.6-2.0	0.12-0.17	3.6-5.5	Low	0.24	5	2-4
Coxville	11-70	35-60	1.25-1.45	0.2-0.6	0.14-0.18	3.6-5.5	Moderate	0.32		
Cr	0-32	---	0.40-0.65	0.06-6.0	0.35-0.45	<4.5	Low	---	---	25-60
Croatan	32-45	10-35	1.40-1.60	0.2-2.0	0.12-0.20	3.6-6.5	Low	0.24		
	45-62	---	---	---	---	---	---	---		

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
CT	0-27	---	0.40-0.65	0.06-6.0	0.35-0.45	<4.5	Low	---	---	25-60
Croatan	27-40	8-20	1.40-1.60	0.2-6.0	0.10-0.15	3.6-6.5	Low	0.17		
	40-48	10-35	1.40-1.60	0.2-6.0	0.12-0.20	3.6-6.5	Low	0.24		
	48-80	---	---	---	---	---	---	---		
DgA	0-10	5-10	1.35-1.50	2.0-6.0	0.08-0.15	3.6-5.5	Low	0.28	4	.5-1
Dogue	10-62	35-50	1.45-1.60	0.2-0.6	0.12-0.19	3.6-5.5	Moderate	0.28		
DO	0-53	---	0.35-0.55	0.6-2.0	0.25-0.50	3.6-4.4	---	---	---	20-60
Dorovan	53-62	5-20	1.40-1.65	6.0-20	0.05-0.08	4.5-5.5	Low	---		
Dr	0-11	5-27	1.45-1.65	2.0-6.0	0.10-0.15	4.5-5.5	Low	0.32	5	2-4
Dunbar	11-65	35-60	1.25-1.45	0.2-0.6	0.13-0.18	4.5-5.5	Moderate	---		
DuA	0-7	4-18	1.45-1.65	2.0-6.0	0.10-0.15	5.1-7.3	Low	0.24	5	.5-2
Duplin	7-62	35-60	1.25-1.40	0.2-0.6	0.13-0.18	4.5-5.5	Moderate	---		
DyF. Dystrochrepts										
ExA	0-9	6-18	1.30-1.50	2.0-6.0	0.15-0.20	4.5-6.0	Low	0.37	5	.5-2
Exum	9-62	18-35	1.30-1.40	0.2-0.6	0.15-0.20	4.5-5.5	Low	0.37		
Fo	0-9	2-12	1.20-1.40	6.0-20	0.05-0.10	4.5-6.5	Low	0.15	5	.5-2
Foreston	9-50	10-18	1.20-1.40	2.0-6.0	0.09-0.13	4.5-6.0	Low	0.10		
	50-62	4-12	1.30-1.60	6.0-20	0.03-0.10	4.5-6.0	Low	0.10		
GbA	0-10	5-15	1.40-1.60	2.0-6.0	0.08-0.12	4.5-6.0	Low	0.20	5	.5-2
Goldsboro	10-40	18-30	1.30-1.50	0.6-2.0	0.11-0.15	4.5-5.5	Low	0.24		
	40-62	20-34	1.30-1.40	0.2-2.0	0.11-0.15	4.5-5.5	Low	0.24		
GdA:										
Goldsboro	0-10	5-15	1.40-1.60	2.0-6.0	0.08-0.12	4.5-6.0	Low	0.20	5	.5-2
	10-40	18-30	1.30-1.50	0.6-2.0	0.11-0.15	4.5-5.5	Low	0.24		
	40-62	20-34	1.30-1.40	0.2-2.0	0.11-0.15	4.5-5.5	Low	0.24		
Urban land.										
Gh	0-11	6-18	1.30-1.50	2.0-6.0	0.13-0.20	3.6-5.5	Low	0.37	5	2-4
Grantham	11-60	18-35	1.30-1.40	0.2-0.6	0.15-0.20	3.6-5.5	Low	0.43		
Gm:										
Grifton	0-13	7-18	1.45-1.65	2.0-6.0	0.10-0.14	4.5-6.5	Low	0.20	5	2-4
	13-65	18-35	1.35-1.45	0.6-2.0	0.12-0.17	4.5-6.5	Low	0.24		
	65-80	2-18	1.45-1.70	2.0-20	0.07-0.14	5.6-8.4	Low	0.20		
Meggett	0-12	5-20	1.10-1.30	2.0-6.0	0.10-0.15	4.5-6.5	Low	0.24	5	2-8
	12-43	40-60	1.50-1.75	0.06-0.2	0.13-0.18	6.1-8.4	High	0.32		
	43-80	---	---	---	---	---	---	---		
GrB, GrD	0-10	5-30	1.50-1.60	6.0-20	0.10-0.15	4.5-5.5	Low	0.20	3	1-4
Gritney	10-15	30-45	1.55-1.65	0.6-2.0	0.10-0.15	4.5-5.5	Moderate	0.32		
	15-50	35-60	1.55-1.70	0.06-0.2	0.10-0.15	4.5-5.5	High	0.32		
	50-60	---	---	---	---	---	---	---		
Jh	0-11	5-15	1.45-1.65	2.0-6.0	0.10-0.15	4.5-5.5	Low	0.20	5	.5-2
Johns	11-37	18-35	1.40-1.60	0.6-2.0	0.12-0.15	4.5-5.5	Low	0.24		
	37-72	2-10	1.60-1.75	6.0-20	0.03-0.06	4.5-5.5	Low	0.10		

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
JO	0-38	7-18	1.25-1.45	2.0-6.0	0.20-0.26	4.5-5.5	Low	0.17	5	8-18
Johnston	38-62	5-20	1.45-1.65	6.0-20	0.06-0.12	4.5-5.5	Low	0.17		
KaA	0-11	4-12	1.60-1.75	2.0-6.0	0.06-0.10	4.5-6.0	Low	0.15	5	.5-2
Kalmia	11-34	18-35	1.40-1.60	0.6-2.0	0.12-0.16	4.5-5.5	Low	0.24		
	34-80	2-10	1.60-1.75	6.0-20	0.03-0.06	4.5-5.5	Low	0.10		
KeA	0-23	3-10	1.50-1.70	6.0-20	0.03-0.07	4.5-6.0	Low	0.15	5	.5-2
Kenansville	23-36	5-18	1.30-1.50	2.0-6.0	0.10-0.14	4.5-6.0	Low	0.15		
	36-72	1-10	1.50-1.70	6.0-20	<0.05	4.5-6.0	Low	0.10		
KuB	0-85	0-3	1.60-1.80	6.0-20	<0.05	4.5-7.3	Low	0.10	5	<2
Kureb										
LaB	0-75	2-8	1.35-1.65	6.0-20	0.05-0.09	4.5-6.0	Low	0.10	5	<1
Lakeland	75-88	1-6	1.50-1.60	6.0-20	0.02-0.08	4.5-6.0	Low	0.10		
LeA	0-21	0-6	1.40-1.65	6.0-20	0.02-0.05	3.6-5.5	Low	0.10	5	.5-4
Leon	21-80	2-8	1.50-1.70	0.6-6.0	0.05-0.10	3.6-5.5	Low	0.15		
Ln	0-8	5-20	1.30-1.60	2.0-6.0	0.09-0.13	3.6-5.5	Low	0.20	5	.5-5
Lynchburg	8-65	18-35	1.30-1.50	0.6-2.0	0.12-0.16	3.6-5.5	Low	0.20		
Ly:										
Lynn Haven	0-12	1-4	1.35-1.60	6.0-20	0.05-0.10	3.6-5.5	Low	0.10	5	1-4
	12-80	2-8	1.40-1.55	0.6-6.0	0.10-0.20	3.6-5.5	Low	0.15		
Torhunta	0-16	5-18	1.20-1.40	0.6-2.0	0.20-0.30	3.6-5.5	Low	0.10	5	10-15
	16-33	5-18	1.35-1.60	2.0-6.0	0.10-0.15	3.6-5.5	Low	0.15		
	33-74	2-18	1.45-1.65	6.0-20	<0.05	3.6-6.5	Low	0.10		
Na	0-6	6-18	1.30-1.50	2.0-6.0	0.15-0.20	4.5-6.0	Low	0.43	5	2-4
Nahunta	6-65	18-35	1.30-1.40	0.2-0.6	0.15-0.20	3.6-5.5	Low	0.43		
NoA, NoB	0-15	2-8	1.55-1.75	6.0-20	0.06-0.11	4.5-6.0	Low	0.17	5	.5-2
Norfolk	15-65	18-35	1.30-1.45	0.6-2.0	0.10-0.20	4.5-5.5	Low	0.24		
NuB:										
Norfolk	0-15	2-8	1.55-1.75	6.0-20	0.06-0.11	4.5-6.0	Low	0.17	5	.5-2
	15-65	18-35	1.30-1.45	0.6-2.0	0.10-0.20	4.5-5.5	Low	0.24		
Urban land.										
Oc	0-26	4-10	1.45-1.65	2.0-20	0.05-0.08	4.5-5.5	Low	0.10	5	1-2
Ocilla	26-52	15-35	1.55-1.70	0.6-2.0	0.09-0.12	4.5-5.5	Low	0.24		
	52-62	15-40	1.55-1.70	0.6-2.0	0.09-0.12	4.5-5.5	Low	0.24		
Pa	0-32	---	0.40-0.65	0.6-6.0	0.24-0.26	3.6-4.4	Low	----	---	20-80
Pamlico	32-62	5-10	1.60-1.75	6.0-20	0.03-0.06	3.6-5.5	Low	0.10		
PC	0-27	---	0.40-0.65	0.6-6.0	0.24-0.40	3.6-5.5	Low	----	---	20-60
Pamlico	27-62	5-10	1.60-1.75	6.0-20	0.10-0.20	3.6-5.5	Low	0.10		
Pe	0-19	5-15	1.40-1.60	2.0-6.0	0.10-0.20	3.6-5.5	Low	0.15	5	4-10
Pantego	19-60	18-35	1.30-1.40	0.6-2.0	0.12-0.20	3.6-5.5	Low	0.28		
	60-68	18-40	1.25-1.40	0.6-2.0	0.15-0.20	3.6-5.5	Low	0.28		
Pp	0-14	8-25	1.30-1.40	2.0-6.0	0.12-0.16	3.6-6.5	Low	0.20	5	2-10
Paxville	14-42	8-35	1.20-1.50	0.6-2.0	0.12-0.18	3.6-5.5	Low	0.15		
	42-47	8-18	1.30-1.50	6.0-20	0.05-0.10	3.6-5.5	Low	0.10		
	47-70	2-12	1.30-1.60	6.0-20	0.05-0.08	3.6-5.5	Low	0.10		

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
Pt	0-17	10-25	1.10-1.30	2.0-6.0	0.15-0.20	3.6-5.5	Low	0.24	5	8-15
Portsmouth	17-27	20-35	1.45-1.55	0.6-2.0	0.14-0.20	3.6-5.5	Low	0.28		
	27-32	8-18	1.40-1.60	2.0-6.0	0.06-0.10	3.6-5.5	Low	0.17		
	32-72	2-10	1.40-1.65	6.0-20	0.02-0.05	3.6-6.0	Low	0.17		
Ra	0-13	5-20	1.30-1.60	2.0-6.0	0.10-0.14	3.6-6.5	Low	0.20	5	1-6
Rains	13-72	18-35	1.30-1.50	0.6-2.0	0.11-0.15	3.6-5.5	Low	0.24		
Rn:										
Rains	0-13	5-20	1.30-1.60	2.0-6.0	0.10-0.14	3.6-6.5	Low	0.20	5	1-6
	13-72	18-35	1.30-1.50	0.6-2.0	0.11-0.15	3.6-5.5	Low	0.24		
Urban land.										
Ro	0-10	10-27	1.20-1.50	0.6-2.0	0.14-0.20	3.6-5.5	Low	0.37	4	.5-2
Roanoke	10-52	35-60	1.35-1.65	0.06-0.2	0.10-0.19	3.6-5.5	Moderate	0.24		
	52-70	---	---	---	---	---	---	---		
St	0-8	2-10	1.50-1.60	6.0-20	0.06-0.11	3.6-5.5	Low	0.10	5	1-4
Stallings	8-35	5-18	1.40-1.60	2.0-6.0	0.10-0.15	3.6-5.5	Low	0.17		
	35-62	2-18	1.50-1.60	2.0-20	0.06-0.15	3.6-5.5	Low	0.17		
To	0-8	5-25	1.30-1.50	2.0-6.0	0.15-0.20	4.5-5.5	Low	0.28	5	.5-2
Toisnot	8-21	5-15	1.50-1.70	0.2-0.6	0.10-0.15	4.5-5.5	Low	0.32		
	21-31	5-15	1.50-1.70	0.06-0.2	0.-0.06	4.5-5.5	Low	0.43		
	31-40	15-30	1.25-1.35	0.06-0.2	0.10-0.18	4.5-5.5	Low	0.37		
	40-62	---	---	---	---	---	---	---		
Tr	0-8	5-18	1.20-1.40	0.6-2.0	0.20-0.30	3.6-5.5	Low	0.10	5	10-15
Torhunta	8-33	5-18	1.35-1.60	2.0-6.0	0.10-0.15	3.6-5.5	Low	0.15		
	33-74	2-18	1.45-1.65	6.0-20	<0.05	3.6-6.5	Low	0.10		
Ud. Udorthents										
WaB	0-28	1-7	1.60-1.75	6.0-20	0.03-0.07	4.5-6.0	Low	0.10	5	.5-2
Wagram	28-62	10-35	1.35-1.60	0.6-2.0	0.12-0.16	4.5-6.0	Low	0.20		
WbB:										
Wagram	0-28	1-7	1.60-1.75	6.0-20	0.03-0.07	4.5-6.0	Low	0.10	5	.5-2
	28-62	10-35	1.35-1.60	0.6-2.0	0.12-0.16	4.5-6.0	Low	0.20		
Urban land.										
We	0-7	10-27	1.20-1.50	0.2-2.0	0.15-0.20	4.5-6.0	Low	0.28	5	.5-5
Wahee	7-45	35-60	1.40-1.60	0.06-0.2	0.12-0.20	3.6-5.5	Moderate	0.28		
	45-60	---	---	---	---	---	---	---		
WgB	0-30	2-8	1.45-1.60	6.0-20	<0.05	4.5-6.0	Low	0.10	5	.5-1
Wakulla	30-50	5-12	1.45-1.60	6.0-20	0.05-0.10	4.5-6.0	Low	0.10		
	50-80	0-8	1.45-1.60	6.0-20	<0.05	4.5-6.0	Low	0.10		
Wh	0-14	---	0.40-0.65	0.2-0.6	0.20-0.25	3.6-5.5	---	---	---	20-50
Wasda	14-32	18-35	1.35-1.60	0.6-2.0	0.12-0.18	4.5-5.5	Low	0.20		
	32-62	2-8	1.60-1.70	6.0-20	0.02-0.06	5.6-8.4	Low	0.15		
WmB	0-7	8-15	1.45-1.65	2.0-6.0	0.11-0.16	4.5-6.0	Low	0.24	5	.5-2
Wickham	7-43	18-25	1.30-1.40	0.6-2.0	0.12-0.17	4.5-6.0	Low	0.24		
	43-65	---	---	---	---	---	---	---		

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
WN----------	0-9	5-25	1.35-1.55	0.6-2.0	0.11-0.20	3.6-5.5	Low----------	0.20	5	2-5
Wilbanks	9-58	35-55	1.40-1.50	0.06-0.6	0.15-0.22	3.6-5.5	Moderate-----	0.24		
	58-80	---	---	---	---	---	----------	----		
Wo----------	0-12	2-10	1.50-1.70	6.0-20	0.06-0.11	3.6-5.5	Low----------	0.10	5	2-4
Woodington	12-50	5-18	1.45-1.65	2.0-6.0	0.10-0.15	3.6-5.5	Low----------	0.20		
	50-62	3-18	1.45-1.65	2.0-20	0.06-0.15	3.6-5.5	Low----------	0.10		

TABLE 15.--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 more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated]

Map symbol and soil name	Hydrologic group	Flooding			High water table			Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Uncoated steel	Concrete
					Ft				
AaA---- Altavista	C	Rare----	---	---	1.5-2.5	Apparent	Dec-Mar	Moderate	Moderate.
At---- Augusta	C	Rare----	---	---	1.0-2.0	Apparent	Jan-May	High----	Moderate.
AuA---- Autryville	A	None----	---	---	4.0-6.0	Apparent	Jan-Apr	Low----	High.
AyB---- Aycock	B	None----	---	---	4.0-6.0	Apparent	Jan-Apr	Moderate	High.
BnB---- Blanton	A	None----	---	---	5.0-6.0	Perched	Dec-Mar	High----	High.
BuA---- Butters	B	None----	---	---	4.0-5.0	Apparent	Jan-Mar	Low----	Moderate.
By---- Byars	D	None----	---	---	+1-1.0	Apparent	Nov-Apr	High----	High.
Ca---- Cape Fear	D	Rare----	---	---	0-1.5	Apparent	Dec-Apr	High----	High.
Ce---- Centenary	A	None----	---	---	3.5-5.0	Apparent	Dec-Mar	Moderate	High.
Ch:									
Chewacla----	C	Frequent----	Brief----	Nov-Apr	0.5-1.5	Apparent	Nov-Apr	High----	Moderate.
Chastain----	D	Frequent----	Very long	Nov-Apr	0-1.0	Apparent	Nov-May	High----	High.
Cn---- Congaree	B	Frequent----	Brief----	Nov-Apr	2.5-4.0	Apparent	Nov-Apr	Moderate	Moderate.
Co---- Coxville	D	None----	---	---	0-1.5	Apparent	Nov-Apr	High----	High.
Cr---- Croatan	D	Rare----	---	---	+1-1.0	Apparent	Nov-Jul	High----	High.
CT---- Croatan	D	Frequent----	Brief to long	Jan-Dec	0-1.0	Apparent	Dec-May	High----	High.
DgA---- Dogue	C	Rare----	---	---	1.5-3.0	Apparent	Jan-Mar	High----	High.
DO---- Dorovan	D	Frequent----	Very long	Jan-Dec	+1-0.5	Apparent	Jan-Dec	High----	High.
Dr---- Dunbar	D	None----	---	---	1.0-2.5	Apparent	Nov-May	High----	High.
DuA---- Duplin	C	None----	---	---	2.0-3.0	Apparent	Dec-Apr	High----	High.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table			Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Uncoated steel	Concrete
					Ft				
DyF. Dystrochrepts									
ExA---------- Exum	C	None--------	---	---	2.0-3.0	Apparent	Dec-Apr	Moderate	High.
Fo---------- Foreston	C	None--------	---	---	2.0-3.5	Apparent	Dec-Apr	Moderate	High.
GbA---------- Goldsboro	B	None--------	---	---	2.0-3.0	Apparent	Dec-Apr	Moderate	High.
GdA: Goldsboro--------	B	None--------	---	---	2.0-3.0	Apparent	Dec-Apr	Moderate	High.
Urban land.									
Gh---------- Grantham	D	None--------	---	---	0-1.0	Apparent	Dec-May	High-----	High.
Gm: Grifton----------	D	Rare--------	Brief to long	Nov-Apr	0.5-1.0	Apparent	Dec-May	High-----	Low.
Meggett----------	D	Occasional	Brief to long	Nov-Apr	0-1.0	Apparent	Nov-Apr	High-----	Moderate.
GrB, GrD---------- Gritney	C	None--------	---	---	>6.0	---	---	High-----	Moderate.
Jh---------- Johns	C	Rare--------	---	---	1.5-3.0	Apparent	Dec-Apr	Moderate	High.
JO---------- Johnston	D	Frequent----	Brief to long.	Nov-Jul	+1-1.5	Apparent	Nov-Jun	High-----	High.
KaA---------- Kalmia	B	Rare--------	---	---	>6.0	---	---	Moderate	Moderate.
KeA---------- Kenansville	A	None--------	---	---	>6.0	---	---	Low------	High.
KuB---------- Kureb	A	None--------	---	---	>6.0	---	---	Low------	Low.
LaB---------- Lakeland	A	None--------	---	---	>6.0	---	---	Low------	Moderate.
LeA---------- Leon	B/D	None--------	---	---	0-1.0	Apparent	Nov-Apr	High-----	High.
Ln---------- Lynchburg	C	None--------	---	---	0.5-1.5	Apparent	Nov-Apr	High-----	High.
Ly: Lynn Haven-------	B/D	None--------	---	---	0-1.0	Apparent	Nov-Apr	High-----	High.
Torhunta---------	C	Rare--------	---	---	0.5-1.5	Apparent	Dec-May	High-----	High.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table			Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Uncoated steel	Concrete
					Ft				
Na---------- Nahunta	C	None--------	---	---	1.0-2.5	Apparent	Dec-May	High-----	High.
NoA, NoB---------- Norfolk	B	None--------	---	---	4.0-6.0	Apparent	Jan-Mar	Moderate	High.
NuB: Norfolk----------	B	None--------	---	---	4.0-6.0	Apparent	Jan-Mar	Moderate	High.
Urban land.									
Oc---------- Ocilla	C	None--------	---	---	1.0-2.5	Apparent	Dec-Apr	High-----	Moderate.
Pa---------- Pamlico	D	Rare--------	---	---	0-1.0	Apparent	Dec-May	High-----	High.
PC---------- Pamlico	D	Frequent----	Brief to long.	Jan-Dec	+1-0	Apparent	Jan-Dec	High-----	High.
Pe---------- Pantego	B/D	None--------	---	---	0-1.5	Apparent	Dec-May	High-----	High.
Pp---------- Paxville	B/D	Rare--------	---	---	+1-1.0	Apparent	Nov-Apr	High-----	High.
Pt---------- Portsmouth	B/D	Rare--------	---	---	0-1.0	Apparent	Dec-Apr	High-----	High.
Ra---------- Rains	B/D	None--------	---	---	0-1.0	Apparent	Nov-Apr	High-----	High.
Rn: Rains----------	B/D	None--------	---	---	0-1.0	Apparent	Nov-Apr	High-----	High.
Urban land.									
Ro---------- Roanoke	D	Rare--------	---	---	0-1.0	Apparent	Nov-May	High-----	High.
St---------- Stallings	C	None--------	---	---	1.0-2.5	Apparent	Dec-Apr	High-----	High.
To---------- Toisnot	B/D	Rare--------	---	---	0-1.0	Apparent	Dec-Apr	High-----	High.
Tr---------- Torhunta	C	Rare--------	---	---	0.5-1.5	Apparent	Dec-May	High-----	High.
Ud. Udorthents									
WaB---------- Wagram	A	None--------	---	---	>6.0	---	---	Low------	High.
WbB: Wagram----------	A	None--------	---	---	>6.0	---	---	Low------	High.
Urban land.									

TABLE 15.--SOIL AND WATER FEATURES--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table			Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Uncoated steel	Concrete
					Ft				
We---------- Wahee	D	Rare--------	---	---	0.5-1.5	Apparent	Dec-Mar	High-----	High.
WgB---------- Wakulla	A	None--------	---	---	>6.0	---	---	Low------	High.
Wh---------- Wasda	B/D	Rare--------	---	---	0-1.0	Apparent	Nov-Apr	High-----	High.
WmB---------- Wickham	B	Rare--------	---	---	>6.0	---	---	Moderate	High.
WN---------- Wilbanks	D	Frequent----	Brief to long	Nov-Apr	0-1.0	Apparent	Nov-May	High-----	High.
Wo---------- Woodington	B/D	None--------	---	---	0.5-1.0	Apparent	Nov-Apr	High-----	High.

TABLE 16.--ENGINEERING INDEX TEST DATA

[Dashes indicate data were not available. NP means nonplastic. Soils sampled are the typical pedon for the soil series. See the section "Soil Series and Their Morphology" for location of pedon sample]

Soil name, report number, horizon, and depth in inches	Classification		Grain-size distribution							Liquid limit	Plasticity index	Moisture density	
	AASHTO	Unified	Percentage passing sieve--				Percentage passing sieve--					Maximum dry density	Optimum moisture
			No. 4	No. 10	No. 40	No. 200	.02 mm	.005 mm	.002 mm				
										Pct		Lb/ft^3	Pct
Butters fine sand: S81NC-309-1(1-4)													
Ap - - - - 0-11	A-3(0)	---	100	100	95	8	7	4	2	---	NP	105.6	11.6
Bt - - - - 18-29	A-2-4(0)	---	100	100	96	18	17	15	12	---	NP-7	116.3	12.3
E' - - - - 35-48	A-3(0)	---	100	100	97	6	5	3	3	---	NP	103.7	11.9
Btg - - - - 48-52	A-3-4	---	100	100	96	22	20	16	14	---	NP	118.1	11.7
Centenary sand: S79NC-309-1(1-4)													
Ap - - - - 0-6	A-3(0)	---	100	100	61	7	5	3	2	---	NP	103.6	13.0
E - - - - 6-58	A-3(0)	---	100	100	61	7	6	5	3	---	NP	106.0	11.5
Bh - - - - 58-80	A-3(0)	---	100	100	71	4	3	1	1	---	NP	101.0	11.0
Foreston loamy sand: S79NC-309-2(1-3)													
Ap - - - - 0-9	A-2-4(0)	---	100	100	75	15	12	5	3	---	NP	114.0	9.1
Bt - - - - 9-50	A-2-4(0)	---	100	100	72	20	18	12	10	---	NP-4	122.3	8.9
BCg - - - - 50-62	A-2-4(0)	---	100	99	55	11	10	8	7	---	NP	114.0	11.6
Gritney fine sandy loam: S78NC-309-1(1-3)													
A - - - - 0-6	A-4(1)	---	100	100	95	40	29	11	7	---	NP-6	114.3	11.4
Bt2 - - - - 15-22	A-7-6(11)	---	100	100	96	62	53	38	32	40.9	24.0	110.8	15.3
C - - - - 50-60	A-7-5(18)	---	100	100	98	74	67	54	47	58.3	27.3	96.8	23.6
Leon sand: S80NC-309-2(1-4)													
A - - - - 0-3	A-3(0)	---	100	100	68	2	2	1	1	---	NP	96.9	11.3
E - - - - 3-21	A-3(0)	---	100	100	63	2	1	0	0	---	NP	98.2	15.8
Bh1 - - - - 21-30	A-2-4(0)	---	100	100	71	26	21	9	4	---	NP	122.2	9.4
Bh2 - - - - 30-80	A-3(0)	---	100	100	66	6	4	2	2	---	NP	102.0	14.7
Pantego loam: S80NC-309-1(1-2)													
A - - - - 0-4	A-4(9)	---	100	100	99	73	38	18	11	---	NP	77.1	33.0
Btg - - - - 14-60	A-4(6)	---	100	100	97	63	38	25	20	23.4	8.4	116.8	13.4
Wakulla sand: S81NC-309-2(1-3)													
A - - - - 6-30	A-2-4(0)	---	100	100	65	11	5	3	2	---	NP	102.4	12.8
Bt - - - - 30-50	A-2-4(0)	---	100	100	73	16	13	11	10	---	NP	116.3	12.5
C - - - - 50-80	A-1	---	100	100	44	3	2	1	1	---	NP	100.3	13 0

TABLE 17.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Altavista	Fine-loamy, mixed, thermic Aquic Hapludults
Augusta	Fine-loamy, mixed, thermic Aeric Ochraquults
Autryville	Loamy, siliceous, thermic Arenic Paleudults
Aycock	Fine-silty, siliceous, thermic Typic Paleudults
Blanton	Loamy, siliceous, thermic Grossarenic Paleudults
Butters	Coarse-loamy, siliceous, thermic Typic Paleudults
Byars	Clayey, kaolinitic, thermic Umbric Paleaquults
Cape Fear	Clayey, mixed, thermic Typic Umbraquults
Centenary	Sandy, siliceous, thermic Grossarenic Entic Haplohumods
Chastain	Fine, mixed, acid, thermic Typic Fluvaquents
Chewacla	Fine-loamy, mixed, thermic Fluvaquentic Dystrochrepts
Congaree	Fine-loamy, mixed, nonacid, thermic Typic Udifluvents
Coxville	Clayey, kaolinitic, thermic Typic Paleaquults
Croatan	Loamy, siliceous, dysic, thermic Terric Medisaprists
Dogue	Clayey, mixed, thermic Aquic Hapludults
Dorovan	Dysic, thermic Typic Medisaprists
Dunbar	Clayey, kaolinitic, thermic Aeric Paleaquults
Duplin	Clayey, kaolinitic, thermic Aquic Paleudults
Exum	Fine-silty, siliceous, thermic Aquic Paleudults
Foreston	Coarse-loamy, siliceous, thermic Aquic Paleudults
Goldsboro	Fine-loamy, siliceous, thermic Aquic Paleudults
Grantham	Fine-silty, siliceous, thermic Typic Paleaquults
Grifton	Fine-loamy, siliceous, thermic Typic Ochraqualfs
Gritney	Clayey, mixed, thermic Typic Hapludults
Johns	Fine-loamy over sandy or sandy-skeletal, siliceous, thermic Aquic Hapludults
Johnston	Coarse-loamy, siliceous, acid, thermic Cumulic Humaquepts
Kalmia	Fine-loamy over sandy or sandy-skeletal, siliceous, thermic Typic Hapludults
Kenansville	Loamy, siliceous, thermic Arenic Hapludults
Kureb	Thermic, uncoated Spodic Quartzipsamments
Lakeland	Thermic, coated Typic Quartzipsamments
Leon	Sandy, siliceous, thermic Aeric Haplaquods
Lynchburg	Fine-loamy, siliceous, thermic Aeric Paleaquults
Lynn Haven	Sandy, siliceous, thermic Typic Haplaquods
Meggett	Fine, mixed, thermic Typic Albaqualfs
Nahunta	Fine-silty, siliceous, thermic Aeric Paleaquults
Norfolk	Fine-loamy, siliceous, thermic Typic Paleudults
Ocilla	Loamy, siliceous, thermic Aquic Arenic Paleudults
Pamlico	Sandy or sandy-skeletal, siliceous, dysic, thermic Terric Medisaprists
Pantego	Fine-loamy, siliceous, thermic Umbric Paleaquults
Paxville	Fine-loamy, siliceous, thermic Typic Umbraquults
Portsmouth	Fine-loamy over sandy or sandy-skeletal, mixed, thermic Typic Umbraquults
Rains	Fine-loamy, siliceous, thermic Typic Paleaquults
Roanoke	Clayey, mixed, thermic Typic Ochraquults
Stallings	Coarse-loamy, siliceous, thermic Aeric Paleaquults
Toisnot	Coarse-loamy, siliceous, thermic Typic Fragiaquults
Torhunta	Coarse-loamy, siliceous, acid, thermic Typic Humaquepts
Wagram	Loamy, siliceous, thermic Arenic Paleudults
Wahee	Clayey, mixed, thermic Aeric Ochraquults
Wakulla	Sandy, siliceous, thermic Psammentic Hapludults
*Wasda	Fine-loamy, mixed, acid, thermic Histic Humaquepts
Wickham	Fine-loamy, mixed, thermic Typic Hapludults
Wilbanks	Fine, mixed, acid, thermic Cumulic Humaquepts
Woodington	Coarse-loamy, siliceous, thermic Typic Paleaquults

* 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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