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 Onslow
County Board of
Commissioners

Soil Survey of Onslow County, North Carolina

How To Use This Soil Survey

General Soil Map

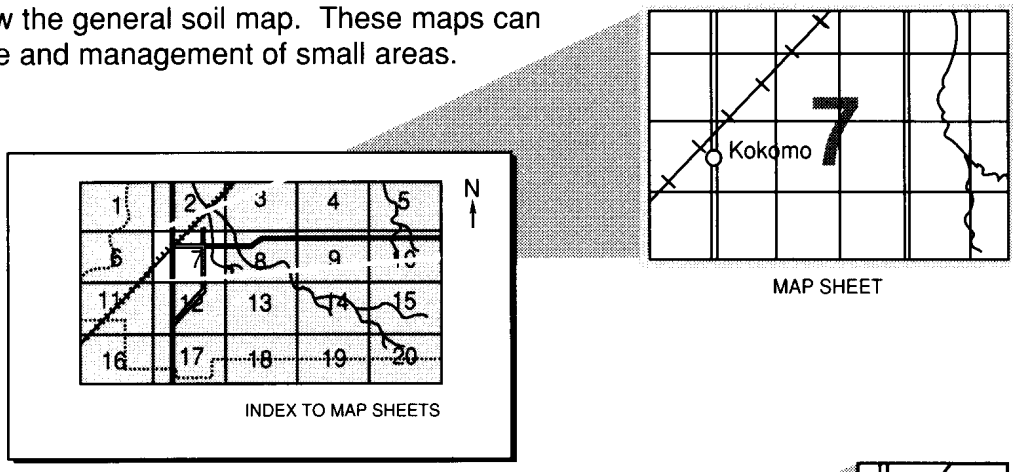
The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

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.

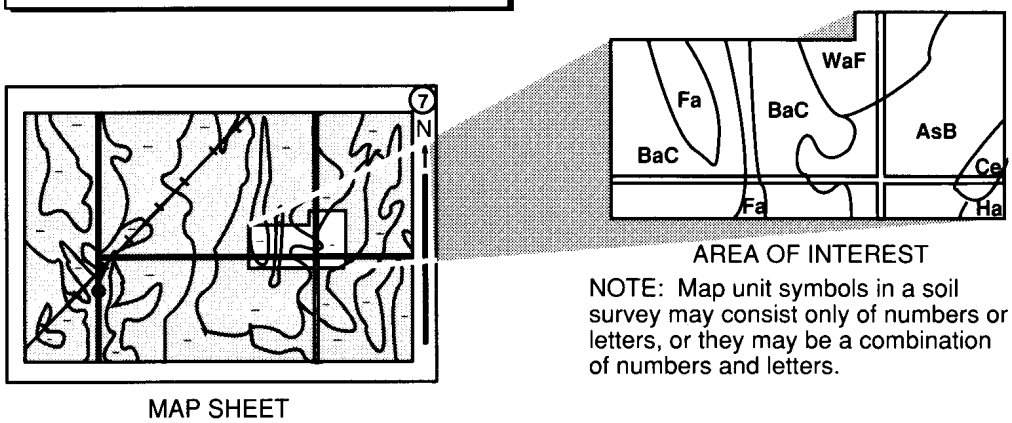
To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



INDEX TO MAP SHEETS

MAP 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.



MAP SHEET

AREA OF INTEREST

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

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

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

Major fieldwork for this soil survey was completed in 1982. Soil names and descriptions were approved in 1984. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1982. This survey was made cooperatively by the Soil Conservation Service, the North Carolina Department of Natural Resources and Community Development, the North Carolina Agricultural Research Service, the North Carolina Agricultural Extension Service, and the Onslow County Board of Commissioners. The survey is part of the technical assistance furnished to the Onslow 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 large scale.

This soil survey updates the survey of Onslow County published in 1923 *(19)*. It provides additional information and has larger maps, which show the soils in greater detail.

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

Cover: The extensive shoreline along the Atlantic Ocean is important in Onslow County because it provides numerous recreational opportunities. Newhan fine sand, 0 to 30 percent slopes, is on dunes and barrier ridges between the beach and the inland side of the Outer Banks.

Contents

Issued July 1992

Index to Map Units

Summary of Tables

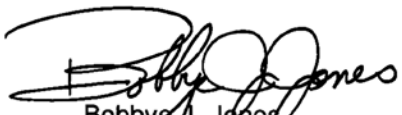
Foreword

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

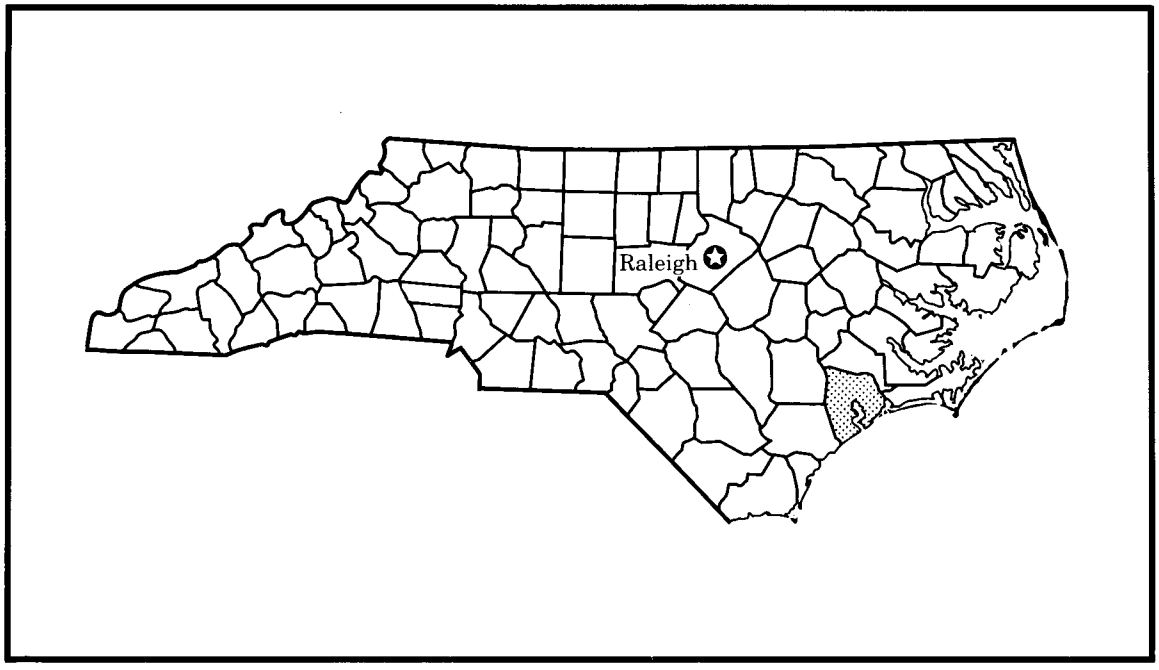
This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey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

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to septic 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 about specific uses is given for each soil. Help in using this publication and additional information is available at the local office of the Soil Conservation Service or the North Carolina Agricultural Extension Service.



Bobbye J. Jones
State Conservationist
Soil Conservation Service



Location of Onslow County in North Carolina.

Soil Survey of Onslow County, North Carolina

By W.L. Barnhill, Soil Conservation Service

Fieldwork by W.L. Barnhill, D.C. Clapp, J.C. Jenkins, and C. Boccetti, Soil Conservation Service, and V.E. Lewis, North Carolina Department of Natural Resources and Community Development

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 Onslow County Board of Commissioners

General Nature of the County

This section provides general information about Onslow County. It describes physiography and drainage, the Outer Banks, history and development, ground water, and climate.

Physiography and Drainage

Nearly all of Onslow County is on the Lower Coastal Plain. Much of the county is nearly level and is in wide, undissected interstream areas. Well drained and moderately well drained soils are on short side slopes near drainageways. The upper side slopes of the drainageways merge into the wide interstream areas *(10)*. Water movement is slow in these interstream areas because of minimal relief, and the soils are somewhat poorly drained, poorly drained, or very poorly drained. A thick mantle of organic matter has developed in the Hofmann Forest and Great Sandy Run Pocosin areas, and the underlying mineral material in these areas is nearly impermeable. The layer of organic matter is thinner or does not occur near the drainageways.

The Talbot and Wicomico Surfaces of Pleistocene age cover nearly all of Onslow County. The Wicomico Surface is 42 to 100 feet in elevation, and it covers the northeastern and northwestern parts of the county. The Talbot Surface is 24 to 42 feet in elevation. It covers about two-thirds of the county, in the central, southeastern, and southwestern parts. The Pamlico Surface is at sea level to 24 feet in elevation, and it covers a narrow strip near the coast. The northern tip of the county is covered by the Sunderland Surface, which is 100 feet or more in elevation.

The unconsolidated surface sediment is about 10 feet thick in the northern part of the county and 30 feet thick in the southern coastal part. The Yorktown Formation of Miocene age underlies the surficial sediment unless it has been removed by erosion. This formation either is very thin or does not occur north of Jacksonville, but it is about 60 feet thick near the coast. The Castle Hayne Limestone Formation of Eocene age underlies the Yorktown Formation. Where the Yorktown Formation has been removed by erosion, the surficial sediment overlies the Castle Hayne Formation. The Castle Hayne Formation is wedge shaped and is thicker near the coast. The Pee Dee Formation of Cretaceous age underlies the Castle Hayne Formation. It is within 30 feet of the surface northwest of Richlands but is at a greater depth in the southern coastal part of the county *(11)*.

The main water systems draining the county are the White Oak River, the New River, Southwest Creek, Back Creek, Sandy Run Swamp, Nine Mile Swamp, and Juniper Swamp. The flow of water is sluggish in these systems. The White Oak and New Rivers and the short creeks draining into the Intracoastal Waterway have wide estuarial flood plains. Because of high ocean

tides, these flood plains are flooded with brackish water 1 to 10 miles inland.

The Outer Banks

The Outer Banks, the barrier islands along the coastline of Onslow County, are a small but important part of the county. They are on the Pamlico Surface, mostly at sea level to about 15 feet in elevation. A few sand dunes are at elevations of as much as 40 feet. The characteristic undulating sand dunes and ridges are 200 to 500 feet wide in most places and are toward the center of the islands. Some of the ridges and dunes are stabilized by vegetation. The eastern side of the islands slopes gently from the barrier ridge to the ocean, and the western side slopes gently from the dunes toward the marshes or sounds. The Outer Banks protect the mainland from wave action and impede tidal action on the mainland shoreline.

The agents involved in formation of the Outer Banks include waves, winds, longshore currents, tides and tidal currents, and rivers and creeks that empty into the bays, sounds, and ocean. These agents continually reshape the barrier islands, causing the islands to migrate or "roll over" toward the west and closer to the mainland.

The vegetation of the Outer Banks consists of species that can tolerate the salt spray from the ocean and the salinity of the floodwater overflowing the low marshes. The marshes, the sand dunes and barrier ridge, and the beach each support a distinct plant community *(23)*. Figure 1 illustrates the dominant plants adapted to the soils in these different landscape positions.

History and Development

Onslow County was settled in the early 18th century by the English, Germans, French Hugenots, and Africans. Most settlers migrated from Craven and New Hanover Counties because those areas had become crowded. Governor George Burrington granted a request for the establishment of a new county in 1731, but the Assembly did not confirm it until 1734. The county was named for Arthur Onslow, who served as speaker of the British House of Commons for 33 years *(7)*.

Important crops in the early 1800's were corn, cotton, and peanuts. Swansboro was the largest shipping point in the world. Turpentine and lumber were shipped from there.

In response to needs brought on by World War II, about 86,173 acres, or 16 percent of the county, was established as Camp Lejeune in 1940 *(14)*. This area is managed under a natural resource plan that stresses a multiple use concept.

The population of the county increased from 17,939 in 1940 *(18)* to 112,165 in 1980 *(25)*. Many acres of woodland and farmland have been converted to urban uses to accommodate the expanded population.

In 1984, about 48,566 acres in Onslow County was cropland *(26)* and about 341,875 acres was commercial forest land. Hofmann Forest, which is owned by North Carolina State University, makes up about 54,000 acres, or 10 percent of the county. Most of Hofmann Forest is woodland, but some areas are cropland.

Ground Water

Ground water sources supply all of the water for domestic uses in Onslow County. The Surficial Sands aquifer is 10 to 30 feet deep. It yields large amounts of water because the water table is high in most of the county. The Tertiary Limestone Unit, made up mostly of the Castle Hayne Formation, lies between the Surficial Sands and the Pee Dee Formation. This unit is thinner toward the northern part of the county, but it is an important aquifer throughout the county. The Surficial Sands and Tertiary Limestone aquifers furnish most of the water for the county, but the Pee Dee Formation supplies a few wells in the northwestern part. It is the deepest and oldest of the formations, and it is a major source of ground water *(17)*.

Climate

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

Onslow County generally is hot and humid in summer, but the coast frequently is cooled by sea breezes. Winter is cool, and there is an occasional brief cold spell. Rains occur throughout the year and are fairly heavy. Snowfall is rare. Annual precipitation is adequate for all of the crops commonly grown in the county.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Maysville in the period 1951 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 32 degrees. The lowest temperature on record, which occurred at Maysville on February 1, 1965, is 2 degrees. In summer, the average temperature is 76 degrees and the average daily maximum temperature is 87 degrees. The highest recorded temperature, which occurred on June 28, 1954, is 103 degrees.

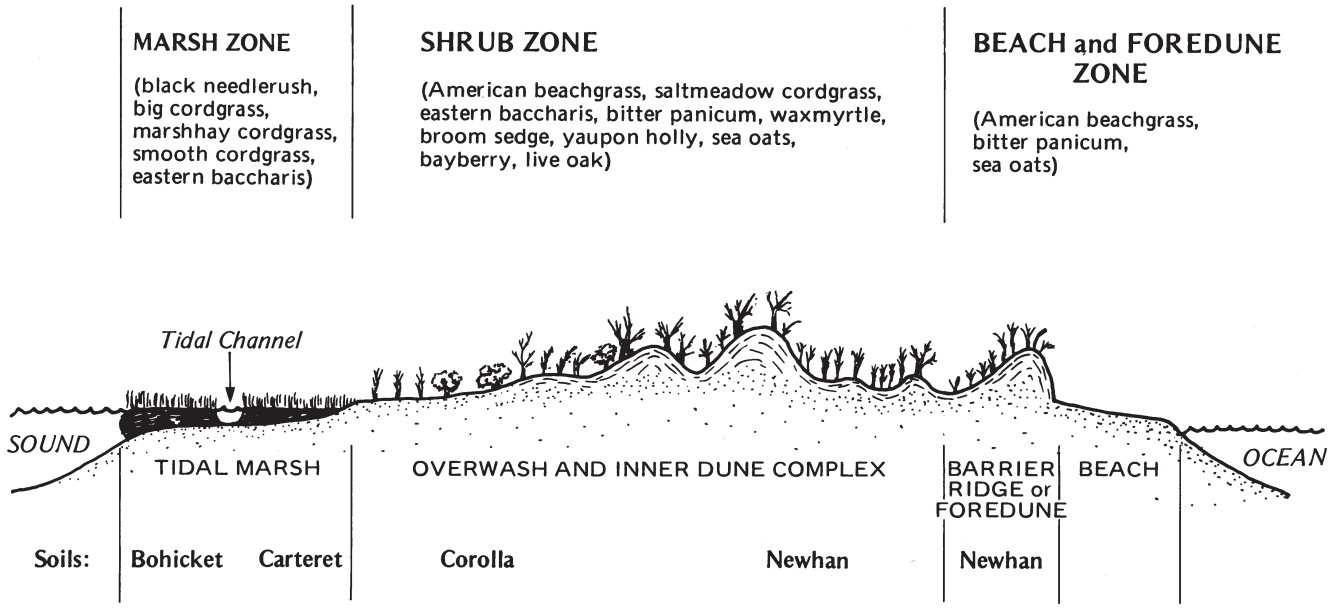


Figure 1.—Dominant vegetation, landscape, and soils of the Outer Banks in the Bohicket-Newhan general soil map unit.

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.

Of the total annual precipitation, nearly 34 inches, or about 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 27 inches. The heaviest 1-day rainfall during the period of record was 15.25 inches at Maysville on September 19, 1955. Thunderstorms occur on about 45 days each year.

The average seasonal snowfall is about 3 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 55 percent. Humidity is higher at night, and the average at dawn is about 85 percent. The sun shines 65 percent of the time possible in summer and 60 percent in winter. The prevailing wind is from the southwest. Average windspeed is highest, 10 miles per hour, in 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 in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

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

of accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another resulting in gradual changes in characteristics. 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 determine the boundaries.

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

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

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

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

Map Unit Composition

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

General Soil Map Units

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

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

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

1. Baymeade-Foreston-Stallings

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

These soils are dominantly in the center and on the western side of the county. Areas generally are large and are nearly level, but they are gently sloping a short distance from the major streams.

This map unit makes up about 28 percent of the county. It is about 35 percent Baymeade soils, 15 percent Foreston soils, 10 percent Stallings soils, and 40 percent soils of minor extent.

The Baymeade soils are nearly level and gently sloping and are well drained. They are on convex slopes near large drainageways and on low ridges. Typically, the surface layer and subsurface layer are fine sand and the subsoil is fine sandy loam.

The Foreston soils are nearly level and moderately well drained. They are on slightly convex divides. Typically, the surface layer is loamy fine sand and the subsoil is fine sandy loam.

The Stallings soils are nearly level and somewhat poorly drained. They are in interstream areas. Typically, the surface layer and subsurface layer are loamy fine sand and the subsoil is fine sandy loam.

Of minor extent in this unit are the Marvyn, Woodington, Torhunta, Murville, Leon, Norfolk, and Autryville soils. Marvyn soils are on short side slopes and are more sloping than the major soils. Woodington, Torhunta, Murville, and Leon soils are on flats and in depressions. Norfolk and Autryville soils are near the major streams.

The major soils are used mainly as woodland. Some areas are used as cropland or building sites, and other areas provide habitat for openland and woodland wildlife.

Droughtiness is a limitation in the Baymeade soils. Windblown sand can damage young plants if these soils are used for crops. Wetness is a limitation if row crops are grown on the Foreston and Stallings soils.

The major soils are limited as sites for urban uses. The instability of cutbanks is a problem affecting the installation of drainage systems. The sandy surface material, a seepage potential, and droughtiness in the Baymeade soils and wetness in the Foreston and Stallings soils limit building site development, sanitary facilities, and recreational development.

Droughtiness in the Baymeade soils and wetness in the Foreston and Stallings soils limit the use of these soils as woodland.

2. Norfolk-Goldsboro-Onslow

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

These soils are mainly in the northeastern part of the county. Areas are dominantly broad and are nearly level, but they are gently sloping near the main streams (fig. 2).

This map unit makes up about 23 percent of the county. It is about 24 percent Norfolk soils, 19 percent Goldsboro soils, 15 percent Onslow soils, and 42 percent soils of minor extent.

The nearly level and gently sloping, well drained Norfolk soils are adjacent to the drainageways in slightly convex areas. Typically, the surface layer is loamy fine sand and the subsoil is sandy clay loam.

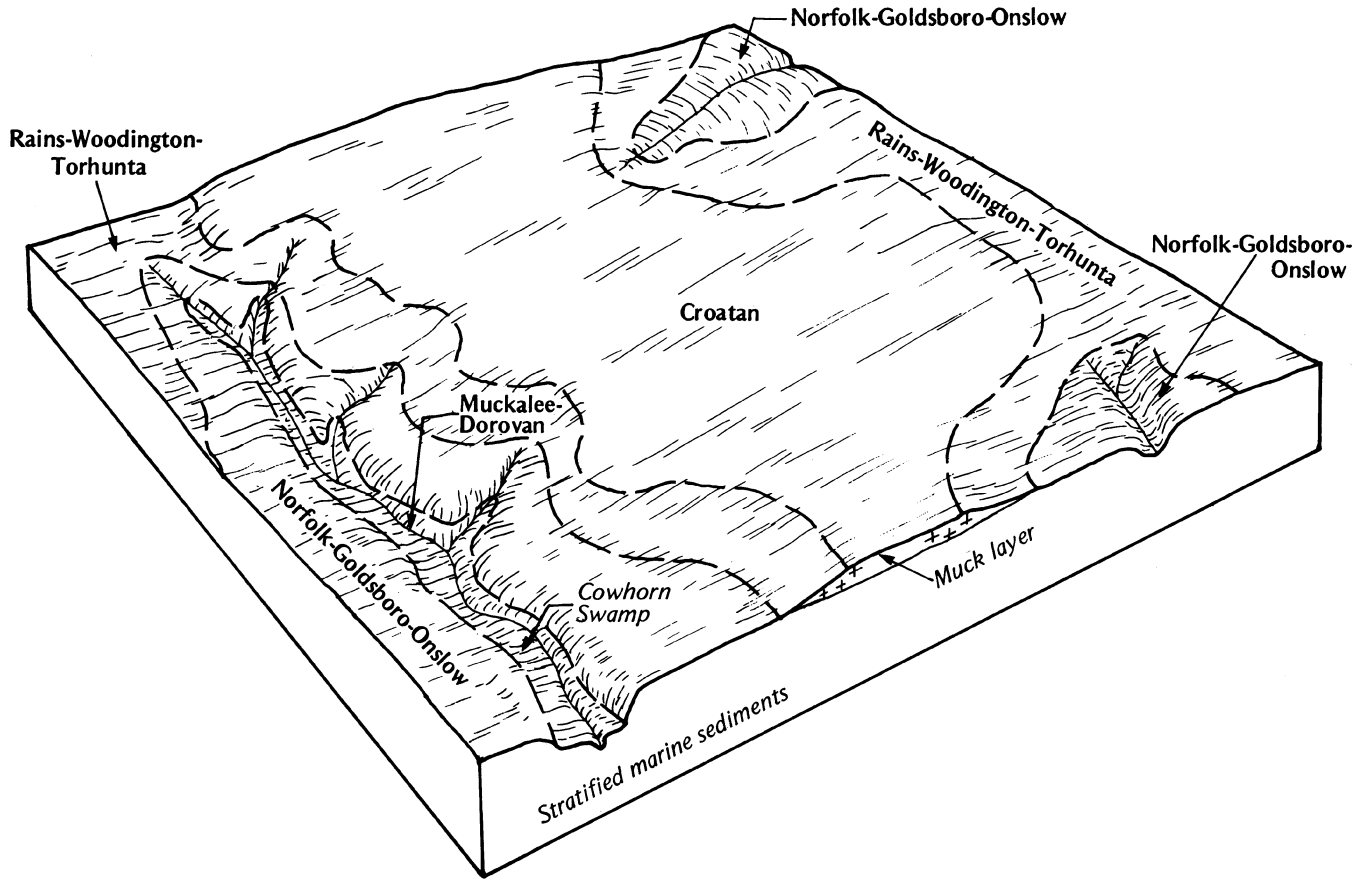


Figure 2.—Soils of the Norfolk-Goldsboro-Onslow general soil map unit are in areas near drainageways, those of the Muckalee-Dorovan map unit are in the drainageways, those of the Croatan map unit are in the middle interstream area, and those of the Rains-Woodington-Torhunta map unit are along the outer edge of the interstream area.

The nearly level, moderately well drained Goldsboro soils are on slightly convex divides. Typically, the surface layer is fine sandy loam and the subsoil is sandy clay loam.

The nearly level, moderately well drained and somewhat poorly drained Onslow soils are near shallow drainageways. Typically, the surface layer is loamy fine sand and a thin sublayer of weakly cemented, humus-coated sand. The subsoil is sandy clay loam.

Of minor extent in this map unit are Marvyn and Craven soils on side slopes; Autryville soils adjacent to side slopes; Lynchburg, Lenoir, Rains, and Grifton soils in interstream areas; and Muckalee soils in narrow drainageways.

The major soils are used mainly for row crops. Some areas are used as woodland, and a few areas are used as urban land. Areas of the major soils also provide habitat for openland or woodland wildlife. Wetness is a limitation, and Goldsboro and Onslow soils may require artificial drainage for row crops, timber production, building site development, and sanitary facilities. Wetness is the main limitation affecting recreational development on Goldsboro and Onslow soils.

3. Rains-Woodington-Torhunta

Nearly level, poorly drained and very poorly drained soils that have a loamy or clayey subsoil; on uplands

These soils are dominantly in large interstream areas in the northern part of the county (fig. 2). Several small areas are on the western side of the county.

This map unit makes up about 14 percent of the county. It is about 37 percent Rains soils, 30 percent Woodington soils, 28 percent Torhunta soils, and 5 percent soils of minor extent.

The poorly drained Rains soils are mostly in broad,

smooth interstream areas. Typically, the surface layer is fine sandy loam and the subsoil is sandy clay loam and sandy clay.

The poorly drained Woodington soils are mostly in broad, smooth interstream areas. Typically, the surface layer is loamy fine sand and the subsoil is fine sandy loam.

The very poorly drained Torhunta soils are in broad interstream areas. Typically, the surface layer and the subsoil are fine sandy loam.

Of minor extent in this map unit are Pantego, Murville, and Croatan soils, which are in scattered areas throughout the unit. Also of minor extent are Lynchburg and Stallings soils near shallow drainageways.

Most of the soils in this unit are used as woodland. A small acreage is used for row crops.

If adequately drained, the major soils can be used for crops. The soils are suited to openland, woodland, and wetland wildlife habitat. Wetness is the main limitation affecting building site development and most kinds of recreational development. On Woodington and Torhunta soils, the instability of cutbanks and trench walls also is a limitation affecting building site development and some sanitary facilities. The main recreational use is deer hunting.

4. Leon-Murville-Kureb

Nearly level and gently sloping, poorly drained, very poorly drained, and excessively drained soils that have a sandy subsoil and underlying material; on uplands

These soils are in the southern part of the county. Areas are longer than they are wide. The soils are nearly level in the smooth interstream areas and undulating near drainageways (fig. 3).

This map unit makes up about 11 percent of the county. It is about 53 percent Leon soils, 26 percent Murville soils, 15 percent Kureb soils, and 6 percent soils of minor extent.

The nearly level, poorly drained Leon soils are in broad interstream areas. Typically, the surface layer and subsoil are fine sand.

The nearly level, very poorly drained Murville soils are in depressions and in interstream areas. Typically, the surface layer and subsoil are fine sand.

The nearly level and gently sloping, excessively drained Kureb soils are near large drainageways and in undulating, convex areas. Typically, the surface layer and underlying material are fine sand.

Of minor extent in this map unit are Stallings, Woodington, Pactolus, Alpin, and Baymeade soils. These soils are in scattered areas throughout the unit.

Nearly all of this unit is used as woodland. The seasonal high water table is the main limitation affecting management of Leon and Murville soils for this use. Also, droughtiness during the growing season is a limitation in areas of Leon and Kureb soils. Some small areas of this unit are used as cropland. Wetness is a limitation affecting management of Leon and Murville soils for this use. Also, leaching of nutrients and droughtiness are limitations in areas of Leon and Kureb soils. Wetness, seepage, and the instability of cutbanks are the main limitations affecting building site development, sanitary facilities, and recreational development.

5. Muckalee-Dorovan

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

These soils are along the major streams (fig. 2). The drainageways are long and narrow.

This map unit makes up about 10 percent of the county. It is about 54 percent Muckalee soils, 6 percent Dorovan soils, and 40 percent soils of minor extent.

Typically, the poorly drained Muckalee soils have a surface layer of loam. The underlying layers are sandy loam and loam.

Typically, the very poorly drained Dorovan soils are muck throughout. They are ponded most of the year.

Of minor extent in this map unit are Pactolus soils in narrow areas along the sides of the main stream channels, Lafitte soils at elevations near sea level, and Murville soils at the upstream end of some drainageways.

The major soils are wooded, mainly with hardwoods. Wetness and flooding are the main limitations affecting woodland management. The major soils generally are not used for crops, building site development, sanitary facilities, or most kinds of recreational development. Frequent flooding and wetness are the main limitations. The soils provide habitat for wetland wildlife.

6. Croatan

Nearly level, very poorly drained, mucky soils that are underlain by loamy material; on uplands

These soils are in interstream areas and depressions in the northeastern and south-central parts of the county (fig. 2). Typically, the areas of these soils are circular. The thickness of the muck layers varies so that the contact with the underlying mineral layers across the landscape is slightly undulating. The areas in the northeastern part of the county are slightly higher in elevation than the surrounding mineral soils that do not have a mantle of muck. The south-central part of the

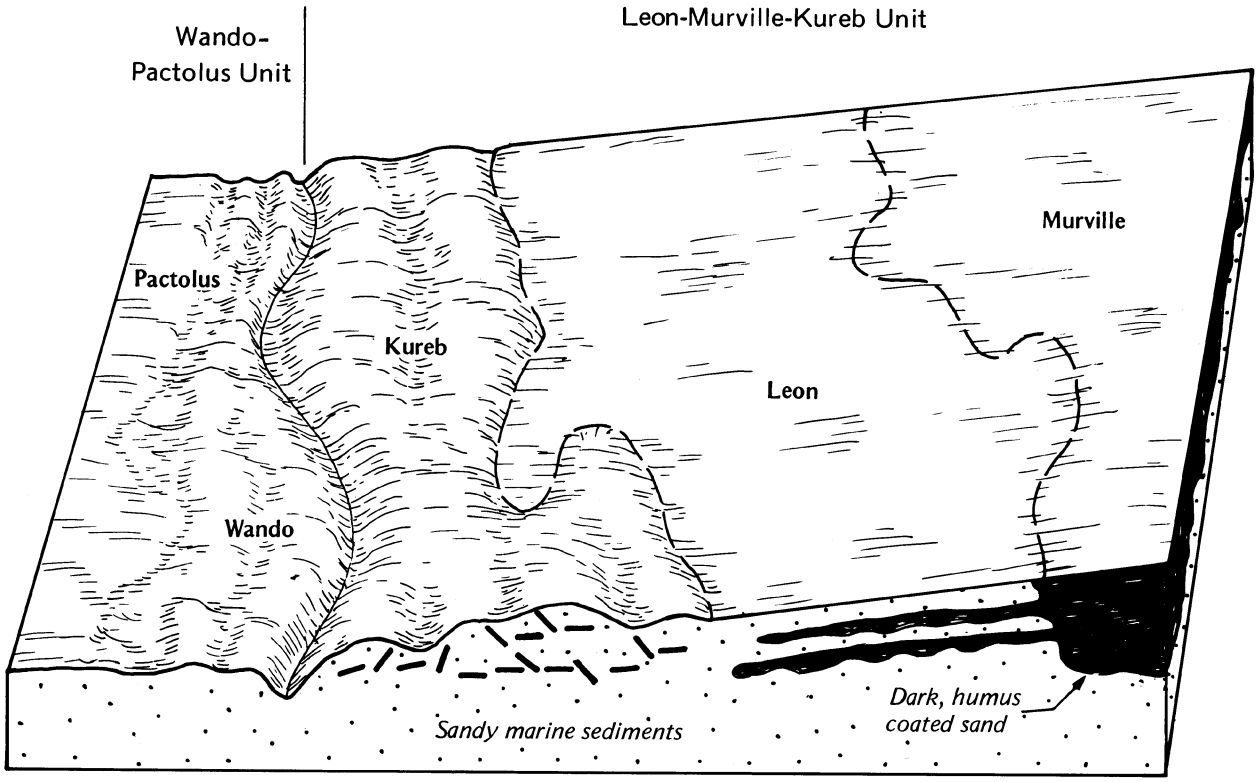


Figure 3.—The relationship of soils and landscape in the Leon-Murville-Kureb and Wando-Pactolus general soil map units. The Leon, Murville, and Kureb soils are at an elevation ranging from 25 to about 55 feet, and the Wando and Pactolus soils are mostly below an elevation of 25 feet.

county has large irregularly shaped depressions.

This map unit makes up about 8 percent of the county. It is about 75 percent Croatan soils and 25 percent soils of minor extent.

The nearly level, very poorly drained Croatan soils are in broad interstream areas and in oval depressions. The upper part of these soils is muck less than 51 inches thick. The underlying material is mucky sandy loam, sandy clay loam, and sandy loam.

The soils of minor extent in this unit are mineral soils. Leon and Murville soils are on long, narrow, slightly elevated edges of the depressions in the south-central part of the county. Pantego and Torhunta soils are near the outer edges of mapped areas in the northeastern part of the county where the Croatan soils are slightly higher than the surrounding mineral soils.

Nearly all of this unit is used for woodland or wildlife habitat. If drained, the major soils can be used for row crops. Wetness and the hazard of fire in the muck after drainage are the major limitations. The Croatan soils provide habitat for openland, woodland, and wetland wildlife. The major soils are generally not used for building site development, sanitary facilities, cropland, or recreational development because of wetness, flooding, and low strength.

7. Bohicket-Newhan

Nearly level to steep, very poorly drained soils that are underlain by clayey or sandy material and excessively drained soils that are sandy throughout; in tidal marshes and on barrier dunes

These soils border the mainland in the southeastern part of the county. The tidal marsh between the barrier islands and the mainland extends up the short creeks along the coast. The barrier islands are about 0.25 to 1.0 mile southeast of the mainland.

This map unit makes up about 3 percent of the county. It is about 55 percent Bohicket soils, 20 percent Newhan soils, and 25 percent soils of minor extent.

The Bohicket soils are nearly level and very poorly drained. They are in tidal marshes. Typically, the surface layer is silty clay loam and the underlying material is silty clay and loamy sand.

The Newhan soils are nearly level to steep and are excessively drained. They are on undulating dunes and

barrier ridges. Typically, they are sandy throughout.

Of minor extent in this map unit are Carteret, Duckston, Corolla, and Yaupon soils. Carteret and Duckston soils are next to the islands. Corolla soils are in low areas on the islands. Yaupon soils are along the Intracoastal Waterway.

The Bohicket soils are an important feeding area for fish, birds, and many mammals. Areas of the Newhan soils are used for summer cottages and for recreational activities, such as swimming and surf fishing.

The less sloping Newhan soils are used for building site development. The instability of cutbanks and soil blowing are limitations affecting this use. Seepage is a limitation on sites for sanitary facilities. Because of droughtiness and salt spray, establishment of a plant cover is difficult and crop or timber production is not feasible. Wetness, daily flooding, low strength, and shrinking and swelling limit the use of the Bohicket soils for crop or timber production, building site development, and sanitary facilities.

8. Wando-Pactolus

Nearly level and gently sloping, excessively drained, moderately well drained, and somewhat poorly drained soils that are sandy throughout; on uplands and stream terraces

These soils are on the mainland adjacent to the coast and are affected by the maritime environment (fig. 3).

This map unit makes up about 3 percent of the county. It is about 54 percent Wando soils, 39 percent Pactolus soils, and 7 percent soils of minor extent.

The nearly level to gently sloping, excessively drained Wando soils are in undulating areas on uplands. Typically, they are fine sand throughout.

The nearly level, moderately well drained and somewhat poorly drained Pactolus soils are on uplands and stream terraces. Typically, they are fine sand throughout.

Of minor extent in this unit are Leon and Murville soils in depressions and Alpin and Kureb soils in scattered areas throughout the unit.

The major soils are used mainly as woodland. The remaining areas are used for cropland, recreational development, or building site development. Droughtiness, the leaching of nutrients, the instability of ditchbanks, and a seasonal high water table in the Pactolus soils are limitations affecting crop and timber production. Large areas of this unit are managed by the U.S. Marine Corps at Camp Lejeune. These areas are used for heavy vehicle trails and for woodland. Some areas of the major soils are used for building site development, sanitary facilities, recreational development, or habitat for woodland wildlife. Droughtiness, the instability of cutbanks, and seepage are the main limitations. Wetness also is a major limitation in the Pactolus 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.

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

Some map units are made up of two or more major soils. These map units are called soil complexes. 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. Baymeade-Urban land complex, 0 to 6 percent slopes, is an example.

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

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

Important or commonly occurring plants are listed by their recognized common plant names *(13, 16)* in each map unit. An alphabetical list of these plants and their scientific names is given in table 4.

Table 5 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.

AnB—Alpin fine sand, 1 to 6 percent slopes. This excessively drained soil is on undulating uplands near the coast and in a few areas on stream terraces along the New River. Individual areas generally are about as broad as they are long, and they range from 50 to 250 acres in size.

The typical sequence, depth, color, and texture of the layers of this soil are:

Surface layer:
0 to 4 inches; gray fine sand

Subsurface layer:
4 to 13 inches; very pale brown fine sand
13 to 48 inches; very pale brown fine sand mottled with brownish yellow

Subsoil:
48 to 80 inches; white fine sand that has thin layers of yellowish brown loamy fine sand

Infiltration is rapid, and surface runoff is slow. Permeability is very rapid, and available water capacity is very low. The soil ranges from very strongly acid to medium acid throughout unless the surface has been

limed. The seasonal high water table is below a depth of 6 feet.

Included with this soil in mapping are small areas of Kureb, Baymeade, Pactolus, Leon, and Muckalee soils. Kureb soils are in scattered areas. They are in landscape positions similar to those of the Alpin soil. The well drained Baymeade, somewhat poorly drained Pactolus, and poorly drained Leon soils are in narrow depressions. The poorly drained Muckalee soils are in narrow drainageways. The included soils make up 15 percent of this unit.

Most areas of this unit are used as woodland. The rest are used mainly for building site development.

In the wooded areas, the dominant trees are loblolly pine, longleaf pine, turkey oak, bluejack oak, blackjack oak, and sassafras. The understory includes pineland threeawn, panicgrass, oaks, and American beautyberry. Some large areas have been cleared, bedded, and planted to loblolly pine. The use of equipment is limited, and seedling mortality is a management concern because of droughtiness. Areas of this soil provide habitat for deer, turkey, rabbit, fox, quail, and other wildlife.

Droughtiness, the leaching of plant nutrients, and wind erosion are the main limitations affecting the use of this soil for crops. Additions of plant nutrients, minimum tillage, cover crops, and crop residue management conserve moisture and help to overcome the effects of excessive leaching. Windbreaks help to control wind erosion.

If this soil is used for building site development and sanitary facilities, the instability of ditchbanks and trench walls and seepage are the main limitations. This sandy soil provides a good support base for most structures. Wind erosion is a hazard on unprotected sandy surfaces. It can be controlled by revegetating disturbed areas around construction and road sites as soon as possible. Lawns and shrubs are difficult to establish and maintain because of the leaching of plant nutrients and droughtiness. Irrigation, additions of organic material, and frequent applications of fertilizer improve the growth of lawns and shrubs on this sandy soil. Sandiness and summer droughtiness are the main limitations affecting recreational development. Wind and water erosion and sedimentation can be minimized by maintaining or regenerating an adequate plant cover.

The capability subclass is IVs, and the woodland group is 6S.

AuB—Autryville loamy fine sand, 1 to 6 percent slopes. This well drained soil is on uplands. Most areas are near large drainageways on the northwestern side of the county. Individual areas are long and narrow, and they range from 20 to about 75 acres in size.

The typical sequence, depth, color, and texture of the layers of this soil are:

Surface layer:
0 to 8 inches; grayish brown loamy fine sand

Subsurface layer:
8 to 24 inches; very pale brown loamy fine sand

Subsoil:
24 to 27 inches; brownish yellow fine sandy loam
27 to 38 inches; strong brown fine sandy loam mottled with very pale brown
38 to 53 inches; light gray fine sand mottled with light yellowish brown
53 to 64 inches; strong brown fine sandy loam
64 to 77 inches; light gray sandy clay loam mottled with weak red and yellowish red
77 to 99 inches; light gray sandy loam mottled with brownish yellow and red

Infiltration is rapid, and surface runoff is slow. Permeability is moderately rapid in the upper part of the subsoil, rapid in the next part, and moderate in the lower part. Available water capacity is low. The soil ranges from very strongly acid to medium acid throughout unless the surface has been limed. The seasonal high water table is below a depth of 6 feet.

Included with this soil in mapping are small areas of a soil that has a thicker, sandier surface layer and small areas of Baymeade and Norfolk soils. These soils are in scattered areas. They are in landscape positions similar to those of the Autryville soil. Norfolk soils have a surface layer that is thinner than that of the Autryville soil. Also included are short, narrow strips of Muckalee soils in drainageways. The included soils make up 5 to 20 percent of this unit.

Most areas of this unit are used as cropland. The rest are used for building site development or woodland.

In cultivated areas the main crops are tobacco, corn, and soybeans. The leaching of plant nutrients, droughtiness, and wind erosion are the main limitations. Windblown sand can damage young plants. Additions of plant nutrients, minimum tillage, and cover crops help to control wind erosion, conserve moisture, and help to overcome the effects of excessive leaching.

In the wooded areas the dominant trees are loblolly pine, longleaf pine, post oak, turkey oak, white oak, southern red oak, flowering dogwood, sassafras, and hickory. The understory includes turkey oak, blackjack oak, sassafras, persimmon, flowering dogwood, huckleberry, pineland threeawn, panicgrass, and American beautyberry. Droughtiness is the main limitation.

This soil has no major limitations affecting building

site development. Seepage is the main limitation on sites for sanitary facilities. Lawns and shrubs may be difficult to establish and maintain because of the leaching of plant nutrients and droughtiness. The instability of ditchbanks and trench walls is a problem. The sandy material is the main limitation affecting recreational development.

The capability subclass is IIs, and the woodland group is 7S.

BaB—Baymeade fine sand, 0 to 6 percent slopes. This well drained soil is on uplands. It is on convex slopes near large drainageways and on low ridges. Individual areas are irregular in shape, and they range from 25 to about 300 acres in size.

The typical sequence, depth, color, and texture of the layers of this soil are:

Surface layer:
0 to 2 inches; gray fine sand

Subsurface layer:
2 to 9 inches; light gray fine sand
9 to 15 inches; light yellowish brown fine sand that has soft, dark yellowish brown nodules
15 to 30 inches; white fine sand that has very pale brown mottles and a few thin bands of brownish yellow fine sandy loam

Subsoil:
30 to 40 inches; brownish yellow fine sandy loam
40 to 56 inches; light yellowish brown fine sandy loam that has light gray mottles and thin layers of fine sand

Substratum:
56 to 80 inches; light gray fine sand that has brown mottles and thin layers of loamy fine sand

Infiltration is rapid, and surface runoff is slow. Permeability is moderately rapid, and available water capacity is low. The soil is strongly acid or medium acid throughout unless the surface has been limed. The seasonal high water table is 4 to 5 feet below the surface.

Included with this soil in mapping are small areas of Alpin, Kureb, Pactolus, and Leon soils; the moderately well drained Foreston soils; and the poorly drained Muckalee soils. Alpin, Kureb, Pactolus, and Leon soils are sandier than the Baymeade soil. Alpin and Kureb soils are on the small, slightly higher ridges. Foreston, Leon, and Pactolus soils are in narrow depressions. Muckalee soils are in narrow drainageways. The included soils make up about 15 percent of this unit.

Most areas of this unit are used as woodland. The rest is used for cropland or building site development.

In the wooded areas, the major canopy trees are longleaf pine, loblolly pine, southern red oak, white oak, and hickory. The understory includes turkey oak, blackjack oak, sassafras, persimmon, flowering dogwood, huckleberry, pineland threeawn, panicgrass, and American beautyberry. Some large areas have been cleared, bedded, and planted to loblolly pine. Droughtiness and seedling mortality are the main limitations. Areas of this soil provide habitat for deer, turkey, rabbit, fox, quail, red-cockaded woodpecker, and other wildlife.

Only a small acreage of this soil is cultivated. Droughtiness, the leaching of plant nutrients, and wind erosion are the main limitations affecting the use of this soil for crops. Additions of plant nutrients, minimum tillage, cover crops, and crop residue management conserve moisture and help to overcome the effects of leaching. Windbreaks help to control wind erosion.

If this soil is used for building site development or sanitary facilities, the instability of ditchbanks and trench walls and seepage are the main limitations. Sandiness and summer droughtiness are the main limitations affecting recreational development. This sandy soil provides a good support base for most structures. Unprotected sandy surfaces are subject to wind erosion. Lawns and shrubs are difficult to establish and maintain because of the leaching of plant nutrients and droughtiness. Irrigation, additions of organic material, and frequent applications of fertilizer can improve the growth of lawns.

The capability subclass is IIIs, and the woodland group is 6S.

BmB—Baymeade-Urban land complex, 0 to 6 percent slopes. About 50 percent of this unit is a well drained Baymeade soil; 30 percent is covered by buildings, streets, and parking lots; and the rest includes soil that has been disturbed during urban development.

The typical sequence, depth, color, and texture of the layers of the Baymeade soil are:

Surface layer:
0 to 2 inches; gray fine sand

Subsurface layer:
2 to 9 inches; light gray fine sand
9 to 15 inches; light yellowish brown fine sand that has soft, dark yellowish brown nodules
15 to 30 inches; white fine sand that has very pale brown mottles and a few thin bands of brownish yellow fine sandy loam

Subsoil:
30 to 40 inches; brownish yellow fine sandy loam
40 to 56 inches; light yellowish brown fine sandy

loam that has light gray mottles and thin layers of fine sand

Substratum:

56 to 80 inches; light gray fine sand that has brown mottles and thin layers of loamy fine sand

Infiltration is rapid in the Baymeade soil, and surface runoff is slow. Permeability is moderately rapid, and available water capacity is low. The soil is strongly acid or medium acid throughout unless the surface has been limed. The seasonal high water table is 4 to 5 feet below the surface.

The Urban land consists of areas where the original soil has been cut, filled, graded, or paved. Most soil properties have been so altered that a soil series is not recognized. This land is used for apartment complexes, parking lots, or other areas where buildings are closely spaced or the soil is covered with pavement. The slope generally has been modified. The extent of site modification varies greatly. Many areas are relatively undisturbed. In the process of smoothing, however, high areas have been leveled and low areas have been filled.

Included in this unit in mapping are small areas of Norfolk, Craven, Marvyn, and Onslow soils. The well drained Norfolk soils are near the main drainageways. The moderately well drained, clayey Craven soils and well drained Marvyn soils are on the steep side slopes of drainageways. Also included are scattered small areas of Onslow soils in landscape positions similar to those of the Baymeade soil. The included soils make up about 20 percent of this unit.

The open parts of this unit are used for parks, lawns, gardens, trees, and shrubs. The instability of ditchbanks and trench walls and seepage are the main limitations affecting urban uses. The sandy Baymeade soil provides a good support base for most structures. Wind erosion is a hazard on unprotected sandy surfaces. It can be controlled by revegetating disturbed areas around construction and road sites as soon as possible. Lawns and shrubs are difficult to establish and maintain because of the leaching of plant nutrients and droughtiness. Irrigation, additions of organic material, and frequent applications of fertilizer can improve the growth of lawns and shrubs on this sandy soil. Onsite investigation is generally needed before the development of specific areas.

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

Bo—Bohicket silty clay loam. This nearly level, very poorly drained soil is in tidal marshes less than 3 feet above sea level. Locally, areas of this soil are referred to as "mud flats." Individual areas are broad and are generally dissected by shallow, narrow tidal channels. They commonly range from 50 to 300 acres in size, but a few are more than 1,000 acres in size. The areas are not easily accessible, and observations were not so detailed as those in most other map units.

The typical sequence, depth, color, and texture of the layers of this soil are:

Surface layer:

0 to 8 inches; dark gray silty clay loam

Substratum:

8 to 38 inches; dark gray silty clay that has pockets of silt loam

38 to 60 inches; gray loamy sand

Internal drainage is very slow. The shrink-swell potential is high. The soil has a very low supporting strength. The soil ranges from slightly acid to moderately alkaline throughout. It is flooded daily, and the water table fluctuates with the rise and fall of the tide.

Included with this soil in mapping are narrow areas of a sandy soil adjacent to the tidal channels. Also included are scattered small areas of Lafitte soils, which are in landscape positions similar to those of the Bohicket soil. The included soils make up about 20 percent of this unit.

The Bohicket soil is in areas used by marine and wetland wildlife. It supports vegetation that is adapted to extreme wetness, flooding, and exposure to salt. The dominant vegetation is smooth cordgrass and black needlerush. Because of the high silt and organic matter content, the soil cannot support the weight of large animals. The edges of these tidal marshes, however, provide habitat for raccoon, deer, river otter, and marsh rabbits. The birds that inhabit these areas are clapper rail, sora rail, gallinule, cattle egret, American egret, blue heron, black duck, lesser scaup, hooded merganser, and eastern brown pelican. Crab, shrimp, and fish, such as flounder, minnows, mullet, and menhaden, inhabit these areas during high tides. Reptiles, such as American alligator and young sea turtles, also inhabit the areas.

This soil generally is not used for woodland, cropland, building site development, or sanitary facilities. The daily flooding, the high shrink-swell potential, and the very low strength are the main limitations. Recreation is limited to hunting and fishing.

The capability subclass is VIIIw. A woodland group has not been assigned.

Ca—Carteret fine sand. This is a nearly level, very poorly drained soil in tidal marshes at elevations of less than 3 feet. Large areas are between the Intracoastal

Waterway and Topsail Island. Individual areas vary in shape and are generally dissected by shallow, narrow tidal channels. They range from 20 to 100 acres in size. The areas are not easily accessible, and observations were not so detailed as those in most other map units.

Typically, this soil is covered with about 7 inches of slightly decomposed plant litter and live roots. The typical sequence, depth, color, and texture of the underlying layers is as follows:

0 to 7 inches; gray fine sand
7 to 45 inches; dark gray fine sand
45 to 50 inches; dark greenish gray sandy loam
50 to 65 inches; dark gray fine sand

Permeability is rapid or very rapid. The soil ranges from medium acid to moderately alkaline throughout. It is subject to flooding, and the water table fluctuates with the rise and fall of the tide.

Included with this soil in mapping are scattered small areas of the clayey Bohicket and mucky Lafitte soils. These soils are in landscape positions similar to those of the Carteret soil. They make up 25 percent of this unit.

The Carteret soil is used by marine and wetland wildlife. It supports vegetation that is adapted to extreme wetness, flooding, and exposure to salt. Typical vegetation is smooth cordgrass, black needlerush, groundsel, saltmarsh bulrush, tearthumb, seashore mallow, saltmeadow cordgrass, sea oxeye, marshelder, saltgrass, and eastern baccharis (fig. 4). The edges of these tidal areas provide important habitat for raccoon, deer, river otter, and marsh rabbits. The birds that inhabit these areas are clapper rail, sora rail, gallinule, cattle egret, American egret, blue heron, black duck, lesser scaup, hooded merganser, and eastern brown pelican. Crab, shrimp, and fish, such as flounder, minnows, mullet, and menhaden, inhabit these areas during high tides. Reptiles, such as American alligator and young sea turtles, also inhabit the areas.

Generally, this soil is not used for woodland, cropland, building site development, or sanitary facilities. Daily flooding, ponding, the instability of cutbanks and trench walls, salty water, and seepage are the main limitations. Recreation is limited to hunting and fishing.

The capability subclass is VIIIw. A woodland group has not been assigned.

Co—Corolla fine sand. This nearly level, moderately well drained and somewhat poorly drained soil is on the Outer Banks adjacent to undulating ridges. Individual areas are long and narrow and range from 5 to 20 acres in size.

The typical sequence, depth, color, and texture of the layers of this soil are:

Surface layer:
0 to 1 inch; pale brown fine sand

Substratum:
1 to 8 inches; very pale brown fine sand
48 to 21 inches; pale brown fine sand
21 to 44 inches; light brownish gray fine sand
44 to 72 inches; grayish brown sand

Infiltration is rapid, and surface runoff is slow. Permeability is very rapid, and available water capacity is low. The soil ranges from medium acid to mildly alkaline throughout. The seasonal high water table is 1.5 to 3.0 feet below the surface. This soil is subject to rare flooding.

Included with this soil in mapping are scattered small areas of Duckston soils. These soils are in landscape positions similar to those of the Corolla soil. Also included are small areas of Newhan soils on small ridges. The included soils make up 20 percent of this unit.

This soil generally supports live oak, evening primrose, marshhay cordgrass, saltmeadow cordgrass, yucca, wild common olive, bitter panicum, marshelder, searocket, waxmyrtle, saltwort, and yaupon. Commercial tree production is not feasible. Areas of this soil provide important habitat for deer, raccoon, loggerhead turtle, cottontail rabbit, eastern brown pelican, least tern, and bobwhite quail.

This soil is not used for cultivated crops because of its position on the landscape, the hazard of flooding, and salt spray from the ocean.

Wetness, flooding, the instability of ditchbanks and trench walls, summer droughtiness, and the sandy material are the main limitations if this soil is used for building site development or sanitary facilities. A poor filtering capacity and seepage are additional limitations on sites for sanitary facilities. Wetness and the sandy material are limitations affecting recreational development.

The capability subclass is VIIw. A woodland group has not been assigned.

CrB—Craven fine sandy loam, 1 to 4 percent slopes. This moderately well drained soil is on slightly convex divides near large drainageways in the uplands. Most of the acreage is west of Belgrade. Individual areas are oblong, irregular in width, and 25 to about 50 acres in size.

The typical sequence, depth, color, and texture of the layers of this soil are:

Figure 4.—Black needlerush and eastern baccharis in an area of Carteret fine sand. These are among the typical native plants in tidal marshes in Onslow County.

Surface layer:
0 to 8 inches; grayish brown fine sandy loam

Subsoil:
8 to 11 inches; brownish yellow clay loam
11 to 20 inches; brownish yellow clay mottled with strong brown
20 to 34 inches; light yellowish brown clay mottled with light brownish gray and red
34 to 48 inches; gray clay mottled with light yellowish brown, red, and strong brown
48 to 55 inches; gray clay loam mottled with yellowish brown and red

Substratum:
55 to 80 inches; gray sandy loam that has light gray and reddish brown mottles and lenses of loamy sand and sandy clay

Infiltration is moderately slow, and surface runoff is medium in cultivated areas. Permeability is slow, and available water capacity is moderate. The shrink-swell potential also is moderate. The soil is very strongly acid or strongly acid throughout unless the surface has been limed. The seasonal high water table is at a depth of 2 to 3 feet.

Included with this soil in mapping are small areas of

Goldsboro, Lenoir, and Norfolk soils. Goldsboro soils are moderately well drained and are in scattered areas. They are in landscape positions similar to those of the Craven soil. Lenoir soils are somewhat poorly drained and are on the outer edge of interstream areas. Norfolk soils are well drained and are near drainageways. The included soils make up about 15 percent of this unit.

About half of the acreage of this unit is used as cropland. The rest is used as woodland.

In cultivated areas the major crops are corn, soybeans, and tobacco. Surface runoff, slow permeability, and a seasonal high water table are the main limitations affecting the use of this soil for crops. Surface grading and contour cultivation help to control erosion. Additions of plant nutrients, crop residue management, field borders, and cover crops are suitable measures on this soil.

In the wooded areas, the dominant trees are loblolly pine, sweetgum, southern red oak, white oak, and yellow poplar. Other native trees are American holly, flowering dogwood, red maple, hickory, coast azalea, sourwood, waxmyrtle, blueberry, greenbrier, and persimmon. Some areas have been bedded and planted to loblolly pine. Fertilizer is applied in some areas. The use of equipment is limited during seasonal wet periods, mainly in winter. Logging during these periods results in the formation of deep ruts, poor surface drainage, and lower productivity. Areas of this soil provide habitat for deer, turkey, raccoon, fox, rabbit, bobcat, opossum, and birds.

Wetness, slow permeability, and the moderate shrink-swell potential are limitations if this soil is used for building site development or sanitary facilities. Because the subsoil shrinks and swells as a result of changes in moisture, foundations should be designed so that they can resist cracking. If unprotected by a plant cover, the soil is very susceptible to accelerated erosion. Wetness and slow permeability are the main limitations affecting recreational development.

The capability subclass is IIIe, and the woodland group is 8W.

CrC—Craven fine sandy loam, 4 to 8 percent slopes. This moderately well drained soil is on uplands. It is near large drainageways and on short side slopes. Individual areas are long and narrow. They range from 5 to about 50 acres in size.

The typical sequence, depth, color, and texture of the layers of this soil are:

Surface layer:

0 to 8 inches; grayish brown fine sandy loam

Subsoil:

8 to 11 inches; brownish yellow clay loam

11 to 20 inches; brownish yellow clay mottled with strong brown

20 to 34 inches; light yellowish brown clay mottled with light brownish gray and red

34 to 48 inches; gray clay mottled with light yellowish brown, red, and strong brown

48 to 55 inches; gray clay loam mottled with yellowish brown and red

Substratum:

55 to 80 inches; gray sandy loam that has light gray and reddish brown mottles and lenses of loamy sand and sandy clay

Infiltration is moderately slow, and surface runoff is rapid. Permeability is slow, and available water capacity is moderate. The shrink-swell potential also is moderate. The soil is very strongly acid or strongly acid throughout unless the surface has been limed. The seasonal high water table is at a depth of 2 to 3 feet.

Included with this soil in mapping are scattered small areas of Marvyn and Goldsboro soils. These soils are in landscape positions similar to those of the Craven soil. Also included are some areas that have slopes of more than 8 percent, a few areas of eroded Craven soils that have a surface layer of clay loam, and some small areas of Muckalee soils in narrow drainageways. The included soils make up about 20 percent of this unit.

Most of the acreage of this unit is used as woodland. The rest is used as cropland or pasture.

In the wooded areas, the dominant trees are loblolly pine, southern red oak, white oak, and yellow poplar. Other native trees are American holly, sweetgum, red maple, flowering dogwood, hickory, black cherry, and persimmon. Some small areas have been bedded and planted to loblolly pine. Fertilizer is applied in some areas. The use of equipment is limited during seasonal wet periods, mainly in winter. Logging during these periods results in the formation of deep ruts, poor surface drainage, and lower productivity. Areas of this soil provide habitat for deer, turkey, raccoon, fox, rabbit, bobcat, opossum, and birds.

If this soil is used for cultivated crops, the short slopes and rapid runoff are limitations. Contour cultivation and crops that provide close ground cover are needed to control erosion.

Wetness, slow permeability, and the moderate shrink-swell potential are the main limitations if this soil is used for building site development or sanitary facilities. Because the subsoil shrinks and swells as a result of changes in moisture, foundations should be designed so that they can resist cracking. If unprotected by a plant cover, the soil is very susceptible to accelerated erosion. The slope is the main limitation affecting recreational development.

The capability subclass is IVe, and the woodland group is 8W.

Ct—Croatan muck. This nearly level, very poorly drained soil is on uplands. It is in broad interstream areas and in oval depressions. The largest areas are in the Hofmann Forest and Great Sandy Run Pocosin. Individual areas generally are broad and long. They generally range from 250 to about 1,000 acres in size, but a few are as large as 10,000 acres.

The typical sequence, depth, color, and texture of the layers of this soil are:

Surface layer:
0 to 34 inches; black muck

Substratum:
34 to 40 inches; dark reddish brown mucky sandy loam
40 to 50 inches; dark gray sandy clay loam that has thin layers of sandy loam
50 to 70 inches; grayish brown sandy clay loam that has thin layers of sandy loam
70 to 80 inches; light brownish gray sandy loam that has thin layers of sandy clay loam

Infiltration is moderate, and surface runoff is very slow. Permeability is moderate, and available water capacity is high. A high volume change occurs in the organic layer when the soil dries. The organic layer is extremely acid unless the surface has been limed. The underlying mineral layers range from extremely acid to slightly acid. The seasonal high water table is at or near the surface during winter. This soil is subject to rare flooding.

Included with this soil in mapping are scattered small areas of Pantego, Torhunta, and Murville soils. These soils are in landscape positions similar to those of the Croatan soil. They make up about 20 percent of this unit.

Nearly all of the acreage of this unit is used as native forest. A few areas are used as cropland.

The major canopy trees are pond pine, baldcypress, Atlantic white cedar, loblollybay gordonia, swamp tupelo, and red maple. The understory includes titi, loblollybay gordonia, gallberry, huckleberry, greenbrier, switchcane, pitcherplant, sundew, giant cane, blueberry, redbay, sweetbay, and swamp cyrilla. Because of wetness and low strength in the organic layer, the use of equipment is limited and seedling mortality is a management concern. A few areas have ditches around rectangular tracts and are bedded and planted to loblolly pine. Fertilizer is applied in places. Areas of this soil provide habitat for deer, raccoon, fox, rabbit, bobcat, opossum, birds, and other wildlife.

If drained, this soil can be used for corn and soybeans. The seasonal high water table, which restricts aeration of plant roots, is a limitation. A well planned and constructed drainage system can lower the water table. The drainage system commonly requires open ditches and grading or "crowning" of the fields. Excessive drainage can cause subsidence and increases the hazard of fire in the organic material.

This soil generally is not used for building site development, sanitary facilities, or recreational development. Wetness, flooding, and low strength in the organic layer are the main limitations.

The capability subclass is VIIw in undrained areas and IVw in drained areas. The woodland group is 4W.

Da—Dorovan muck. This nearly level, very poorly drained soil is on flood plains. Individual areas are long and vary in width. The largest area, which is northwest of Jacksonville, is about 1,500 acres. The areas are not easily accessible, and observations were not so detailed as those in most other map units.

The typical sequence, depth, color, and texture of the layers of this soil are:

Surface layer:
0 to 4 inches; very dark grayish brown muck
4 to 80 inches; dark reddish brown muck

Substratum:
80 to 99 inches; very dark gray sandy loam that has dark gray mottles and thin layers of loamy sand

Infiltration is moderate, and surface runoff is very slow. Permeability is moderate, and available water capacity is high. The soil is very strongly acid or strongly acid in the organic layers. The soil has a high organic matter content. A high volume change occurs in the organic layers when the soil dries. The seasonal high water table is at or near the surface. The soil is frequently flooded for very long periods.

Included with this soil in mapping are narrow areas of Muckalee soils near streambanks. These soils make up about 10 percent of this unit.

Nearly all of the acreage of this unit is used as woodland. The major canopy trees are baldcypress, red maple, sweetgum, swamp tupelo, black willow, sweetbay, and Atlantic white cedar. The understory includes gallberry, greenbrier, titi, waxmyrtle, and sphagnum moss. Because of wetness and flooding, the use of equipment is limited and seedling mortality is a management concern. Areas of this soil provide habitat for deer, raccoon, fox, rabbit, bobcat, opossum, mink, otter, black bear, birds, and other wildlife.

This soil generally is not used for cropland, building site development, sanitary facilities, or recreation

because of wetness, low strength in the organic layers, and flooding.

The capability subclass is VIIw, and the woodland group is 7W.

Dc—Duckston fine sand. This nearly level, poorly drained soil is on the inland side of the Outer Banks and on the edges of the mainland. Elevation is less than 5 feet. Individual areas are generally long and narrow, and they range from 5 to 150 acres in size.

The typical sequence, depth, color, and texture of the layers of this soil are:

Surface layer:
0 to 7 inches; dark grayish brown fine sand

Substratum:
7 to 19 inches; light brownish gray fine sand
19 to 60 inches; gray fine sand

Infiltration is very rapid, and surface runoff is slow. Permeability is very rapid. The soil ranges from medium acid to moderately alkaline throughout. The water table fluctuates with the tide. It is generally at or near the surface. This soil is frequently flooded following intense rains and storm tides.

Included with this soil in mapping are small areas of Corolla soils on the higher parts of the landscape. These soils make up about 10 percent of this unit.

Nearly all areas of the Duckston soil support native maritime vegetation, which varies, depending on the amount of exposure to salt. The dominant vegetation consists of waxmyrtle, black willow, huckleberry, saltmeadow cordgrass, marshelder, groundsel, beachgrass, dotted smartweed, Virginia chainfern, largeleaf pennywort, cattail, seablite, and sphagnum moss. Commercial tree production is not feasible. Wetness and flooding are the main limitations. Areas of this soil provide habitat for white-tailed deer, raccoon, cottontail rabbit, loggerhead turtle, cattle egret, American egret, great blue heron, and crabs.

This soil generally is not used for cropland, building site development, sanitary facilities, or recreational development. Wetness and flooding are the main limitations.

The capability subclass is VIIw. A woodland group has not been assigned.

FoA—Foreston loamy fine sand, 0 to 2 percent slopes. This moderately well drained soil is on uplands. It is on slightly convex divides. Individual areas are irregular in shape and range from 10 to 350 acres in size.

The typical sequence, depth, color, and texture of the layers of this soil are:

Surface layer:
0 to 6 inches; dark gray loamy fine sand

Subsurface layer:
6 to 12 inches; light yellowish brown fine sandy loam mottled with strong brown

Subsoil:
12 to 21 inches; brownish yellow fine sandy loam
21 to 36 inches; brownish yellow fine sandy loam mottled with light gray and yellowish red
36 to 58 inches; light gray fine sandy loam mottled with brownish yellow and red
58 to 70 inches; light gray fine sandy loam that has brownish yellow mottles and thin layers of sandy clay loam

Substratum:
70 to 80 inches; light gray loamy fine sand that has thin layers of fine sand

Infiltration is moderate, and surface runoff is slow. Permeability is moderately rapid, and available water capacity is moderate. The soil is very strongly acid or strongly acid throughout unless the surface has been limed. The seasonal high water table is 2.5 to 3.5 feet below the surface.

Included with this soil in mapping are scattered small areas of Goldsboro, Onslow, Pactolus, and Stallings soils. These soils are in landscape positions similar to those of the Foreston soil. Also included are small areas of the well drained Baymeade soils along the outer edge of the unit, near the drainageways. The included soils make up about 20 percent of this unit.

About half of the acreage of this unit is used as cropland. The rest is used as woodland.

In cultivated areas the main crops are corn, soybeans, and tobacco. Wetness is the main limitation. A drainage system reduces the wetness and improves aeration in the lower part of the root zone. A suitable drainage system includes tile and open ditches. Grading the fields can improve surface drainage. Additions of plant nutrients, crop residue management, and cover crops increase crop production.

In the wooded areas, the major canopy trees are loblolly pine, sweetgum, blackgum, southern red oak, white oak, yellow poplar, red maple, hickory, willow oak, and water oak. The understory includes American holly, gallberry, coast azalea, sourwood, flowering dogwood, huckleberry, persimmon, black cherry, waxmyrtle, blueberry, and greenbrier. Some large areas of this soil have been bedded and planted to loblolly pine. Fertilizer is applied in some areas. Logging during wet periods results in the formation of ruts and damage to plant roots. Areas of this soil provide habitat for deer,

raccoon, fox, rabbit, bobcat, opossum, birds, and other wildlife.

Wetness is the main limitation affecting building site development, sanitary facilities, and recreational development. The instability of ditchbanks and trench walls and seepage are additional problems. The wetness can be reduced by installing a drainage system that includes tile and open ditches. Land grading can improve surface drainage.

The capability subclass is IIw, and the woodland group is 9W.

GoA—Goldsboro fine sandy loam, 0 to 2 percent slopes. This moderately well drained soil is on uplands. It is on slightly convex divides. Individual areas are long and vary in width. They range from 15 to about 100 acres in size.

The typical sequence, depth, color, and texture of the layers of this soil are:

Surface layer:
0 to 7 inches; dark grayish brown fine sandy loam

Subsurface layer:
7 to 11 inches; pale brown fine sandy loam
11 to 13 inches; light yellowish brown fine sandy loam

Subsoil:
13 to 24 inches; yellowish brown sandy clay loam
24 to 40 inches; light yellowish brown sandy clay loam mottled with light gray and strong brown
40 to 60 inches; light gray sandy clay loam mottled with red and strong brown
60 to 68 inches; light gray sandy clay loam that has brownish yellow and strong brown mottles and thin layers of sandy loam

Substratum:
68 to 80 inches; gray sandy loam that has thin layers of loamy sand

Infiltration is moderate, and surface runoff is slow. Permeability and available water capacity are moderate. The soil is very strongly acid or strongly acid throughout unless the surface has been limed. The seasonal high water table is 2 to 3 feet below the surface.

Included with this soil in mapping are scattered small areas of Onslow, Foreston, and Craven soils. These soils are in landscape positions similar to those of the Goldsboro soil. Also included are some areas of the well drained Norfolk soils and the somewhat poorly drained Lynchburg soils. Norfolk soils are near side slopes, and Lynchburg soils are near the interstream areas in slight depressions. The included soils make up about 10 percent of this unit.

Most of the acreage of this unit is used as cropland (fig. 5). The rest is used for woodland or building site development.

In cultivated areas the major crops are corn, soybeans, and tobacco. Wetness is the main limitation. A drainage system reduces the wetness and improves aeration in the lower part of the root zone. A suitable drainage system includes tile and open ditches. Grading the fields can improve surface drainage. Additions of plant nutrients, crop residue management, and cover crops increase crop production.

In the wooded areas, the dominant trees are loblolly pine, yellow poplar, sweetgum, and American sycamore. Other native trees are American holly, flowering dogwood, hickory, black cherry, persimmon, southern red oak, and white oak. The understory includes American holly, gallberry, coast azalea, sourwood, flowering dogwood, huckleberry, persimmon, waxmyrtle, blueberry, and greenbrier. Some large areas of this soil have been bedded and planted to loblolly pine. Fertilizer is applied in places. Logging during wet periods results in the formation of ruts and damage to plant roots. Areas of this soil provide habitat for deer, raccoon, fox, rabbit, bobcat, opossum, and birds.

Seasonal wetness is the main limitation affecting building site development, sanitary facilities, and recreational development. The wetness can be reduced by installing a drainage system that includes tile and open ditches. Land grading can improve surface drainage.

The capability subclass is IIw, and the woodland group is 9W.

GpB—Goldsboro-Urban land complex, 0 to 5 percent slopes. This unit is on uplands. About 50 percent of the unit is a moderately well drained Goldsboro soil, about 30 percent is Urban land, and the rest is soil that has been disturbed during urban development.

The typical sequence, depth, color, and texture of the layers of the Goldsboro soil are:

Surface layer:
0 to 7 inches; dark grayish brown fine sandy loam

Subsurface layer:
7 to 11 inches; pale brown fine sandy loam
11 to 13 inches; light yellowish brown fine sandy loam

Subsoil:
13 to 24 inches; yellowish brown sandy clay loam
24 to 40 inches; light yellowish brown sandy clay loam mottled with light gray and strong brown

Figure 5.—Goldsboro fine sandy loam, 0 to 2 percent slopes, is well suited to truck crops, such as these sweet potatoes.

40 to 60 inches; light gray sandy clay loam mottled with red and strong brown
60 to 68 inches; light gray sandy clay loam that has brownish yellow and strong brown mottles and thin layers of sandy loam

Substratum:

68 to 80 inches; gray sandy loam that has thin layers of loamy sand

Infiltration is moderate in the Goldsboro soil, and surface runoff is slow. Permeability and available water capacity are moderate. The soil is very strongly acid or strongly acid throughout unless the surface has been limed. The seasonal high water table is 2 to 3 feet below the surface during periods of high rainfall and in most winter months.

The Urban land consists of areas where the original soil has been cut, filled, graded, or paved. Most soil properties have been so altered that a soil series is not recognized. This land is used for apartment complexes, parking lots, or for other areas where buildings are closely spaced or the soil is covered with pavement. The slope generally has been modified. The extent of site modification varies greatly. Many areas are relatively undisturbed. In the process of smoothing, however, high areas have been leveled and low areas have been filled.

Included in this unit in mapping are small areas of fill material, areas where the surface layer has been removed by cutting and grading, and scattered areas of Onslow, Foreston, Lynchburg, and Stallings soils, which are in landscape positions similar to those of the Goldsboro soil. Also included are Rains and Muckalee soils in small depressions and intermittent drainageways and areas of Baymeade, Marvyn, Craven and Norfolk soils. The well drained, loamy Baymeade and Norfolk soils are near the main drainageways. The well drained, loamy Marvyn soils and the moderately

well drained, clayey Craven soils are on the steep side slopes along drainageways.

In most places drainage systems were installed as building site development progressed. In undrained areas seasonal wetness is a limitation affecting building site development, sanitary facilities, and recreational development. The wetness can be reduced by installing a drainage system that includes tile and open ditches. Land grading can improve surface drainage. Onsite investigation is needed before the development of specific areas.

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

Gt—Grifton fine sandy loam. This nearly level, poorly drained soil is in shallow depressions on uplands. Areas are irregular in shape. They range from 5 to about 25 acres in size.

The typical sequence, depth, color, and texture of the layers of this soil are:

Surface layer:
0 to 4 inches; very dark grayish brown fine sandy loam

Subsurface layer:
4 to 9 inches; light brownish gray fine sandy loam mottled with brownish yellow

Subsoil:
9 to 12 inches; light brownish gray sandy clay loam mottled with brownish yellow
12 to 45 inches; light gray sandy clay loam mottled with brownish yellow
45 to 58 inches; gray sandy loam that has brownish yellow mottles and thin layers of sandy clay loam

Substratum:
58 to 80 inches; greenish gray sandy clay loam that has brownish yellow and gray mottles and thin layers of clay and clay loam

Infiltration is moderate, and surface runoff is slow. Permeability is moderate in the subsoil. Available water capacity is moderate. The soil ranges from very strongly acid to neutral in the surface layer, subsurface layer, and upper part of the subsoil unless the surface has been limed. The lower part of the subsoil ranges from neutral to moderately alkaline. The seasonal high water table is 0.5 to 1.0 foot below the surface. The soil is subject to ponding.

Included with this soil in mapping are Muckalee soils on flood plains and Rains soils in interstream areas. Also included are small areas of a clayey soil and a somewhat poorly drained soil that is neutral in reaction. The included soils make up 20 percent of this unit.

Most of the acreage of this unit is used as woodland. A small acreage is used as cropland.

In the wooded areas, the dominant trees are loblolly pine, cherrybark oak, white oak, eastern cottonwood, water tupelo, and sweetgum. Other native trees are water oak, willow oak, red maple, eastern redcedar, and American sycamore. The understory includes redbay, sweetbay, American holly, gallberry, sweet pepperbush, switchcane, waxmyrtle, huckleberry, and greenbrier. Logging during wet periods results in the formation of ruts and damage to plant roots. The wooded areas provide habitat for deer, raccoon, fox, rabbit, bobcat, opossum, birds, and other wildlife.

If drained, this soil can be used for crops, such as corn and soybeans. Wetness is the main limitation. A well planned and constructed drainage system helps to lower the water table. The drainage system commonly requires open ditches, but constructing deep ditches is difficult because the substratum is marl. Grading the fields can improve surface drainage. Additions of plant nutrients, crop residue management, bedding, and cover crops are suitable measures on this soil.

This soil is generally not used for building site development, sanitary facilities, or recreational development. Wetness is the main limitation.

The capability subclass is Vlw in undrained areas and IIIw in drained areas. The woodland group is 9W.

KuB—Kureb fine sand, 1 to 6 percent slopes. This excessively drained soil is on uplands. It is near large drainageways and in undulating, convex areas that are irregular in shape. Individual areas range from 5 to 200 acres in size.

The typical sequence, depth, color, and texture of the layers of this soil are:

Surface layer:
0 to 6 inches; gray fine sand

Subsurface layer:
6 to 26 inches; light gray fine sand

Subsoil:
26 to 48 inches; brownish yellow and light gray fine sand that has brown concretions
48 to 62 inches; light yellowish brown and brown fine sand that has dark reddish brown concretions

Substratum:
62 to 69 inches; grayish brown and dark grayish brown fine sand that has pockets of loamy fine sand
69 to 80 inches; light gray fine sand that has dark reddish brown concretions and pockets of loamy fine sand

Infiltration is rapid, and surface runoff is slow. Permeability is rapid, and available water capacity is very low. The soil ranges from very strongly acid to neutral. The seasonal high water table is below a depth of 6 feet.

Included with this soil in mapping are scattered small areas of Alpin and Wando soils. These soils are in landscape positions similar to those of the Kureb soil. Also included are small areas of Baymeade, Leon, and Murville soils. The well drained Baymeade and somewhat poorly drained Leon soils are in narrow depressions, and the very poorly drained Murville soils are in narrow drainageways. The included soils make up about 15 percent of this unit.

Nearly all of the acreage of this unit is used as woodland. The vegetation generally is a sparse cover of drought-tolerant plants (fig. 6). The trees are longleaf pine, turkey oak, bluejack oak, blackjack oak, and live oak. The understory includes pineland threeawn, panicgrass, and sassafras. Because of droughtiness, seedling mortality is a problem. Poor traction on the sandy surface limits the use of equipment. The soil generally does not provide food and cover for wildlife.

Droughtiness, the leaching of plant nutrients, and wind erosion limit the use of this soil for crops.

The only major limitation affecting building site development is the instability of cutbanks. Lawn grasses are difficult to establish because of severe droughtiness and the leaching of plant nutrients. Seepage and a poor filtering capacity in the subsoil are limitations on sites for sanitary facilities. Loose sand is the main limitation affecting recreational development.

The capability subclass is VIIs, and the woodland group 3S.

La—Lafitte muck. This nearly level, very poorly drained soil is on flood plains along the White Oak River. It is at elevations less than 5 feet above sea level. Individual areas are long and vary in width. They range from 20 to 50 acres in size. The areas are not easily accessible, and observations were not so detailed as those in most other map units.

Typically, the Lafitte soil is dark brown, very dark brown, and black muck to a depth of 99 inches or more.

Infiltration is moderate, and surface runoff is very slow. Permeability is moderate. The soil ranges from extremely acid to mildly alkaline throughout. It is flooded daily with brackish water, and the water table is at or near the surface most of the time.

Included with this soil in mapping are narrow areas of a sandy soil near streambanks. Also included are small areas of a soil having an organic layer that is thinner than that of the Lafitte soil. The included soils make up about 10 percent of this unit.

This soil is used as habitat for marine and wetland wildlife. The vegetation is adapted to extreme wetness, flooding, and exposure to salt. Big cordgrass, cattail, alder, swamp dock, rose pogonia, saltgrass, grass pink, black needlerush, and sphagnum moss are dominant. Sparse stands of baldcypress, water tupelo, and redbay grow in the areas adjacent to uplands. Areas of this soil provide habitat for raccoon, deer, river otter, marsh rabbits, and alligators. The birds that inhabit these areas are clapper rail, sora rail, cattle egret, American egret, blue heron, and black duck.

Generally, this soil is not used for cropland, woodland, building site development, sanitary facilities, or recreational development. Wetness, flooding, and low strength are the main limitations.

The capability subclass is VIIIw. A woodland group has not been assigned.

Le—Lenoir loam. This nearly level, somewhat poorly drained soil is in interstream areas on uplands. Most of the acreage is northwest of Belgrade. Individual areas are irregular in shape and range from 15 to about 200 acres in size.

The typical sequence, depth, color, and texture of the layers of this soil are:

Surface layer:
0 to 4 inches; dark gray loam

Subsurface layer:
4 to 7 inches; brown fine sandy loam mottled with dark grayish brown

Subsoil:
7 to 10 inches; brownish yellow clay loam mottled with light brownish gray
10 to 15 inches; mottled brownish yellow, light brownish gray, and pale brown clay
15 to 45 inches; gray clay mottled with red and yellowish brown
45 to 60 inches; gray clay mottled with gray, reddish yellow, and red
60 to 70 inches; dark grayish brown clay that has brownish yellow mottles and thin layers of sandy clay loam

Substratum:
70 to 80 inches; dark grayish brown sandy clay loam that has brownish yellow and very dark grayish brown mottles and thin layers of sandy loam

Infiltration, surface runoff, and permeability are slow. Available water capacity is moderate. The shrink-swell potential also is moderate. The soil is very strongly acid or strongly acid throughout unless the surface has been

Figure 6.—The cover of plants, such as longleaf pine and turkey oak, is sparse on Kureb fine sand, 1 to 6 percent slopes. Droughtiness is the main limitation affecting the use of this soil.

limed. The seasonal high water table is 1.0 foot to 2.5 feet below the surface during wet periods in winter.

Included with this soil in mapping are scattered small areas of Lynchburg soils. These soils are in landscape positions similar to those of the Lenoir soil. Also included are poorly drained, clayey soils in small, shallow depressions and the moderately well drained Craven soils near drainageways. The included soils make up about 15 percent of this unit.

Most of the acreage of this unit is used as woodland. A small acreage is used as cropland.

In the wooded areas, the dominant trees are loblolly pine, sweetgum, and American sycamore. Other native trees are water oak, willow oak, red maple, and eastern redcedar. The understory includes American holly, gallberry, coast azalea, honeysuckle, sourwood, flowering dogwood, sweet pepperbush, switchcane, waxmyrtle, blueberry, and greenbrier. Some areas have been bedded and planted to loblolly pine. Fertilizer is applied in some areas. The use of equipment is limited during seasonal wet periods. Seedling mortality is a limitation. Areas of this soil provide habitat for deer, raccoon, fox, rabbit, bobcat, opossum, birds, and other wildlife.

If drained, this soil can be used for crops. Wetness and slow permeability are the main limitations. A well planned and constructed surface drainage system helps to control runoff, but the slow permeability limits internal drainage. Additions of plant nutrients, crop residue management, bedding, and cover crops help to maintain tilth.

The seasonal high water table, the moderate shrink-swell potential in the clayey subsoil, and slow permeability are the main limitations if this soil is used for building site development or sanitary facilities. The wetness can be somewhat reduced by a drainage system that includes open ditches. Land grading can improve surface drainage. Because the subsoil shrinks and swells as a result of changes in moisture, foundations should be designed so that they can resist

cracking. Seasonal wetness is the main limitation affecting recreational development.

The capability subclass is IIIw, and the woodland group is 9W.

Ln—Leon fine sand. This nearly level, poorly drained soil is on uplands. Individual areas are irregular in shape and range from 20 to 800 acres in size. The largest areas occur as broad interstream areas in the southwestern part of the county.

The typical sequence, depth, color, and texture of the layers of this soil are:

Surface layer:
0 to 5 inches; dark gray fine sand

Subsurface layer:
5 to 17 inches; light gray fine sand

Subsoil:
17 to 51 inches; dark reddish brown, weakly cemented fine sand
51 to 59 inches; grayish brown fine sand
59 to 95 inches; black, weakly cemented fine sand

Infiltration is rapid, and surface runoff is slow. Permeability is rapid in the surface layer and moderate in the subsoil. Available water capacity is low. Because of humus-coated sand grains, the subsoil is weakly cemented when wet and hard and brittle when dry. The weakly cemented subsoil restricts root penetration. The soil is extremely acid or very strongly acid throughout unless the surface has been limed. The seasonal high water table is at or near the surface.

Included with this soil in mapping are small areas of a somewhat poorly drained soil at the slightly higher elevations and the very poorly drained Murville soils in depressions. Also included are small areas of Pactolus and Stallings soils on narrow, low ridges. The included soils make up about 15 percent of this unit.

Nearly all of the acreage of this unit is used as woodland. A few small areas are used as cropland.

In the wooded areas, the dominant trees are loblolly pine and longleaf pine. The understory includes pineland threeawn, bitter panicum, bluestem, redbay, sweetbay, American holly, gallberry, huckleberry, waxmyrtle, blueberry, and greenbrier. The use of equipment is limited during seasonal dry periods because of the sandy material. Seedling mortality also is a limitation. Areas of this soil provide habitat for deer, raccoon, fox, rabbit, bobcat, opossum, birds, and other wildlife.

A few areas of this soil have been drained and are used mainly for blueberries. The leaching of plant nutrients, the seasonal high water table, and seasonal droughtiness are the main limitations.

If this soil is used for building site development or sanitary facilities, wetness, seepage, and the instability of cutbanks are the main limitations. Wetness and the sandy surface material are the main limitations affecting recreational development.

The capability subclass is IVw, and the woodland group is 8W.

Ly—Lynchburg fine sandy loam. This nearly level, somewhat poorly drained soil is on uplands. It is in broad interstream areas near shallow drainageways and in shallow depressions on slightly convex divides. The largest areas occur as interstream areas. They range from 200 to about 500 acres in size. The smaller areas are in shallow depressions. They range from 5 to 10 acres in size.

The typical sequence, depth, color, and texture of the layers of this soil are:

Surface layer:
0 to 6 inches; dark gray fine sandy loam

Subsurface layer:
6 to 9 inches; pale brown fine sandy loam
9 to 13 inches; light yellowish brown fine sandy loam mottled with light brownish gray

Subsoil:
13 to 21 inches; pale brown sandy clay loam that has mottles in shades of yellow and gray
21 to 63 inches; gray sandy clay loam that has mottles in shades of yellow, red, and gray

Substratum:
63 to 80 inches; light brownish gray sandy clay loam that has brownish yellow and brown mottles and thin layers of loamy sand and sandy loam

Infiltration is moderate, and surface runoff is slow. Permeability and available water capacity are moderate. The soil ranges from extremely acid to strongly acid throughout unless the surface has been limed. The seasonal high water table is 0.5 foot to 1.5 feet below the surface.

Included with this soil in mapping are scattered areas of Stallings and Lenoir soils. These soils are in landscape positions similar to those of the Lynchburg soil. Also included are some small areas of the moderately well drained Goldsboro soils and the poorly drained Rains soils. Goldsboro soils are in slightly convex areas on the outer edge of the unit, near the drainageways. Rains soils are nearer to the center of the interstream areas than the Lynchburg soil. The included soils make up about 15 percent of this unit.

About half of the acreage of this unit is used as cropland. The rest is used as woodland.

If drained, this soil can be used for corn and soybeans. Wetness is the main limitation (fig. 7). A well planned and constructed drainage system helps to lower the water table. The drainage system commonly requires tile and open ditches. Grading the fields can improve surface drainage. Additions of plant nutrients, crop residue management, and cover crops are suitable measures on this soil.

In the wooded areas, the dominant trees are loblolly pine, American sycamore, and sweetgum. Other native trees are water oak, willow oak, red maple, white oak, eastern redcedar, southern red oak, and yellow poplar. The understory includes American holly, gallberry, coast azalea, sourwood, flowering dogwood, sweet pepperbush, switchcane, waxmyrtle, blueberry, and greenbrier. Some areas have been bedded and planted to loblolly pine. Fertilizer is applied in some areas. The use of equipment is limited during wet periods in winter. Some areas provide habitat for deer, raccoon, fox, rabbit, bobcat, opossum, birds, and other wildlife.

Seasonal wetness is the main limitation affecting building site development, sanitary facilities, and recreational development. The wetness can be reduced by installing a drainage system that includes tile and open ditches. Land grading can improve surface drainage.

The capability subclass is IIw, and the woodland group is 9W.

MaC—Marvyn loamy fine sand, 6 to 15 percent slopes. This well drained soil is on short side slopes near large drainageways on uplands. Individual areas are long and narrow and range from 15 to about 300 acres in size.

The typical sequence, depth, color, and texture of the layers of this soil are:

Surface layer:
0 to 4 inches; brown loamy fine sand

Subsurface layer:
4 to 8 inches; pale brown loamy fine sand

Subsoil:
8 to 12 inches; strong brown sandy loam
12 to 26 inches; brownish yellow sandy clay loam
26 to 45 inches; brownish yellow sandy loam that has pale brown and light yellowish brown mottles

Substratum:
45 to 52 inches; gray sandy clay loam that has strong brown and red mottles and thin layers of fine sandy loam
52 to 75 inches; light gray loamy sand that has red and strong brown mottles and thin layers of sandy loam, sandy clay loam, and sand

Infiltration is moderate, and surface runoff is medium. Permeability and available water capacity are moderate. The soil is very strongly acid or strongly acid throughout unless the surface has been limed. The seasonal high water table is 3 to 5 feet below the surface.

Included with this soil in mapping are areas of soils that have short slopes of more than 15 percent and scattered small areas of eroded soils on the upper part of side slopes. Also included are some areas of soils that are similar to the Marvyn soil but have a thicker surface layer and are on toe slopes; scattered small areas of Craven soils, which are in landscape positions similar to those of the Marvyn soil; and areas of the poorly drained Muckalee soils in narrow drainageways. The included soils make up about 20 percent of this unit.

Most of the acreage of this unit is used as woodland. A few areas are used for building site development or pasture.

In the wooded areas, the major trees are loblolly pine, longleaf pine, southern red oak, white oak, and hickory. The understory includes American holly, flowering dogwood, persimmon, blueberry, black cherry, and greenbrier. Areas of this soil provide habitat for deer, squirrel, turkey, fox, quail, and other wildlife.

This soil is generally not used as cropland because of the slope and a severe hazard of erosion in areas that are not protected by vegetation.

The slope is the major limitation affecting building site development, sanitary facilities, and recreational development. Other soil properties generally favor these uses.

The capability subclass is IVe, and the woodland group is 9A.

Md—Masontown mucky fine sandy loam. This nearly level, very poorly drained soil is on flood plains. Nearly all of the acreage is northwest of Belgrade, on the banks of the White Oak River. Individual areas are long and vary in width. They range from 50 to 200 acres in size. The areas are not easily accessible, and observations were not so detailed as those in most other units.

The typical sequence, depth, color, and texture of the layers of this soil are:

Surface layer:
0 to 18 inches; very dark gray mucky fine sandy loam
18 to 28 inches; very dark gray mucky fine sandy loam that has grayish brown mottles and thin layers of fine sand

Figure 7.—Water ponds for short periods after rainstorms on Lynchburg fine sandy loam. If drained, however, the soil can be used for crops, such as corn and soybeans.

Substratum:

28 to 48 inches; dark gray fine sandy loam that has grayish brown mottles

48 to 65 inches; gray fine sand

Infiltration is moderate, and surface runoff is very slow. Permeability is moderately rapid. The soil ranges from medium acid to mildly alkaline. The seasonal high water table is at or near the surface most of the year. This soil is frequently flooded for brief periods in summer and for long periods in winter.

Included with this soil in mapping are small areas of a sandy soil near streambanks and Dorovan soils on wide flood plains. The included soils make up about 25 percent of this unit.

Nearly all of the acreage of this unit is used as woodland. The major canopy trees are sweetgum, blackgum, yellow poplar, swamp tupelo, water tupelo, swamp chestnut oak, red maple, willow oak, water oak, pond pine, American elm, green ash, and baldcypress. The understory includes redbay, sweetbay, American holly, river birch, black willow, American hornbeam, gallberry, sweet pepperbush, fetterbush lyonia, sundew, Venus flytrap, pitcherplant, switchcane, waxmyrtle, blueberry, honeysuckle, Virginia chainfern, cinnamon fern, poison ivy, brackenfern, and greenbrier. Tree growth is excellent. Because of wetness and flooding, however, managing this soil for timber production is difficult. Logging is difficult because of low soil strength. Areas of this soil provide habitat for deer, raccoon, fox,

rabbit, bobcat, opossum, mink, otter, squirrels, birds, and other wildlife.

This soil generally is not used for farming, woodland plantations, building site development, sanitary facilities, or recreational development because of wetness, flooding, and low strength.

The capability subclass is VIIw, and the woodland group is 7W.

Mk—Muckalee loam. This nearly level, poorly drained soil is on flood plains. Individual areas are long and narrow and generally are more than 100 acres in size. The areas are not easily accessible, and observations were not so detailed as those in most other units.

The typical sequence, depth, color, and texture of the layers of this soil are:

Surface layer:
0 to 10 inches; dark grayish brown loam

Substratum:
10 to 28 inches; gray loam that has thin layers of sandy loam
28 to 40 inches; gray sandy loam that has thin layers of clay loam
40 to 75 inches; grayish brown sandy loam that has gray mottles and thin layers of loamy sand

Infiltration is moderate, and surface runoff is very slow. Permeability is moderate. Ditchbanks are unstable because of the high content of sand. The surface layer is strongly acid, and the substratum ranges from medium acid to moderately alkaline. The seasonal high water table is 0.5 foot to 1.5 feet below the surface. This soil is frequently flooded for brief periods, and water ponds in low areas on the wider flood plains for long periods in winter.

Included with this soil in mapping are small areas of sandier soils near the streambanks and a soil that has a surface layer of mucky fine sand and is at the foot of side slopes. Also included, near Richlands, are small areas of a soil that has marl within 6 feet of the surface. The included soils make up about 25 percent of this unit.

Nearly all of the acreage of this unit is used as woodland. A small acreage is used for water impoundments or pasture.

In the wooded areas, the dominant trees are loblolly pine, sweetgum, and eastern cottonwood. Other native trees are water oak, willow oak, green ash, red maple, swamp tupelo, and baldcypress. The understory includes redbay, sweetbay, American holly, gallberry, sweet pepperbush, switchcane, cattail, waxmyrtle, blueberry, honeysuckle, Virginia chainfern, cinnamon fern, poison ivy, brackenfern, and greenbrier. Tree growth is excellent. Because of wetness and flooding, however, managing this soil for timber production is difficult. These wetland areas provide habitat for deer, raccoon, fox, rabbit, bobcat, opossum, mink, otter, squirrels, birds, and other wildlife.

This soil generally is not used for cropland, building site development, or recreational development. Wetness, flooding, the instability of cutbanks, and seepage are the main limitations.

The capability subclass is Vw, and the woodland group is 9W.

Mu—Murville fine sand. This nearly level, very poorly drained soil is in depressions and interstream areas on uplands. Individual areas are generally long and vary in width. They range from 20 to 200 acres in size.

The typical sequence, depth, color, and texture of the layers of this soil are:

Surface layer:
0 to 5 inches; black fine sand

Subsoil:
5 to 20 inches; black fine sand
20 to 46 inches; dark reddish brown fine sand
46 to 55 inches; dark brown fine sand mottled with dark reddish brown

Substratum:
55 to 75 inches; grayish brown sand that has thin layers of sandy loam

Infiltration is rapid, and surface runoff is slow. Permeability is rapid in the surface layer and moderately rapid in the subsoil. Available water capacity is moderate. Ditchbanks are unstable because of the high content of sand. Because of humus-coated sand grains, the subsoil is hard and brittle when dry. The soil ranges from extremely acid to strongly acid throughout unless the surface has been limed. The seasonal high water table is at or near the surface, and water ponds on the surface in winter.

Included with this soil in mapping are small areas of Murville soils that have a surface layer of mucky fine sand. These soils are in the lowest part of depressions. Also included are scattered small areas of Torhunta soils and a soil that has a surface layer of muck. These soils are in landscape positions similar to those of the Murville soil. The included soils make up about 15 percent of this unit.

Nearly all of the areas of this unit are used as woodland. A few small areas are used as cropland.

In the wooded areas, the dominant trees are pond pine, loblolly pine, and water tupelo. Other native trees are water oak, willow oak, red maple, loblollybay gordonia, sweetbay, and baldcypress. The understory includes redbay, gallberry, titi, southern bayberry, sweet pepperbush, waxmyrtle, blueberry, Venus flytrap, pitcherplant, sundew, and greenbrier. Some areas have been bedded and planted to loblolly pine. Fertilizer is applied in some areas. The use of equipment is limited during seasonal wet periods. Seedling mortality is a management concern because of the wetness. Some areas of this soil provide habitat for deer, raccoon, fox, rabbit, bobcat, opossum, birds, and other wildlife.

Drained areas of this soil are used mainly for corn or soybeans. Wetness is the main limitation. A well planned and constructed drainage system can lower the water table. The drainage system commonly requires open ditches and grading or "crowning" of the fields. Additions of plant nutrients, crop residue management, bedding, and cover crops are suitable measures on this soil.

This soil generally is not used for building site development, sanitary facilities, or recreational development. Wetness, seepage, ponding, and the instability of ditchbanks are the main limitations.

The capability subclass is Vw, and the woodland group is 6W.

NeE—Newhan fine sand, 0 to 30 percent slopes. This excessively drained soil is on undulating dunes and barrier ridges between the beach areas and the inland side of the Outer Banks. The barrier ridge joining the beach has nearly vertical slopes that have been cut by wave action during high tides. Elevation ranges from 5 to 30 feet. Individual areas are long and vary in width. They range from 5 to 500 acres in size.

Because of sparse vegetation and the instability of the dunes and barrier ridges, a surface layer and subsoil have not formed in this soil. The typical depth, color, and texture of the layers of this soil are:

0 to 36 inches; light gray fine sand
36 to 60 inches; light gray fine sand mixed with a few shell fragments
60 to 80 inches; light gray fine sand

Infiltration is very rapid, and surface runoff is slow. Permeability is very rapid, and available water capacity is very low. The soil is neutral or mildly alkaline. The seasonal high water table is below a depth of 6 feet.

Included with this soil in mapping are small areas of Corolla soils in depressions and a narrow, smooth strip of beach. Also included are a few areas of dunes. The area on Bear Island is denoted as Dunes on the soil maps. The included areas make up about 25 percent of this unit.

Most areas of the Newhan soil are covered with salt-tolerant grasses and shrubs (fig. 8). Some areas are sites for beach cottages and recreational development.

The dominant vegetation is American beachgrass, crown sedge, eastern baccharis, saltmeadow cordgrass, searocket, seaoats, smooth cordgrass, bitter panicum, bluestem, seaside goldenrod, live oak, eastern redcedar, waxmyrtle, yucca, and other species that tolerate salt spray, windblown sand, and droughtiness.

This soil is not suited to commercial tree production. Tree growth is minimal, and timber production is not feasible. Some areas provide habitat for deer, raccoon, loggerhead turtle, cottontail rabbit, eastern brown pelican, and bobwhite.

This soil is not used as cropland. The landscape position, salt spray, and droughtiness are the main limitations.

If this soil is used for building site development or sanitary facilities, the instability of ditchbanks and trench walls, seepage, and the slope are the main limitations. Wind erosion is a severe hazard in areas that do not have a plant cover. It can be controlled by revegetating disturbed areas around construction and road sites as soon as possible. Some areas are subject to erosion by ocean waves. A plant cover is difficult to establish because of droughtiness, the leaching of plant nutrients, and salt spray. Contamination of ground water by poorly filtered seepage from septic tanks can be a problem.

The slope, the sandy surface material, and summer droughtiness are the main limitations affecting recreational development. Wind and water erosion and sedimentation can be minimized by maintaining or regenerating an adequate plant cover. Selecting drought- and salt-tolerant plant species is essential.

The capability subclass is VIIIs. A woodland group has not been assigned.

NfC—Newhan fine sand, dredged, 2 to 10 percent slopes. This excessively drained soil consists of material deposited by dredging operations along the Intracoastal Waterway. Small areas are cone shaped, and large areas are irregular in shape and have a dike surrounding the dredge spoil. The large areas are undulating inside the dike and sloping along the outside edge. The areas range from 3 to 50 acres in size.

Because of sparse vegetation and the instability of the dunes and barrier ridges, a surface layer and subsoil have not formed in this soil. The typical depth, color, and texture of the layers of this soil are:

Figure 8.—Seaoats and American beachgrass on Newhan fine sand, 0 to 30 percent slopes.

0 to 36 inches; light gray fine sand
36 to 60 inches; light gray fine sand mixed with a few shell fragments
60 to 80 inches; light gray fine sand

Infiltration is rapid, and surface runoff is slow. Available water capacity is low, and permeability is rapid. The soil is neutral or mildly alkaline. The seasonal high water table is below a depth of 6 feet.

Included with this soil in mapping are areas of soils that have thin strata of clay and areas of thin, sandy dredge spoil overlying the clayey Bohicket soils. Also included, along the edge of the mapped areas, is a soil that is wetter than the Newhan soil. Included soils make up about 20 percent of this unit.

Most of the acreage of this unit supports sparse vegetation. A few shrubs, weeds, and grasses grow along the edge of the mapped areas. Eastern redcedar, live oak, myrtle oak, yaupon, and longleaf pine grow in areas of the older dredge spoil. The understory includes gallberry, blackberry, brackenfern, panicgrass, seaside goldenrod, loblolly pine, sea holly, grapes, and largeleaf pennywort. Seedling mortality and the equipment limitation are the main concerns in managing this soil for woodland.

This soil is not used for crops. Droughtiness, the leaching of plant nutrients, and wind erosion are the main limitations. Intracoastal Waterway easement

restrictions limit the use of most areas.

If this soil is used for building site development or sanitary facilities, the instability of ditchbanks and trench walls, seepage, and wind erosion are the main limitations. Areas that do not have a plant cover are subject to severe wind erosion. Vegetating dredge spoil areas as soon as possible helps to control wind erosion. Some areas are subject to erosion by waves. A plant cover is difficult to establish and maintain because of droughtiness, the leaching of plant nutrients, and salt spray. The sandy texture and summer droughtiness are the main limitations affecting recreational development. Selecting drought- and salt-tolerant plants is essential.

This soil has not been assigned to a capability subclass or to a woodland group.

NnE—Newhan-Corolla-Urban land complex, 0 to 30 percent slopes. This map unit is on Topsail Island. It includes the part of the island above about 4 feet in elevation. It is used for recreational purposes, such as swimming and fishing. About 30 percent of the unit consists of natural ridges and low hills, 30 percent is nearly level land and land that has been smoothed for building sites, and 40 percent is covered by buildings, parking lots, streets, and roads.

Because of sparse vegetation and the instability of the dunes and barrier ridges, a surface layer and subsoil have not formed in the Newhan soil. The typical sequence, depth, color, and texture of the layers of this soil are:

0 to 36 inches; light gray fine sand
36 to 60 inches; light gray fine sand mixed with a few shell fragments
60 to 80 inches; light gray fine sand

The Newhan soil is excessively drained. It is on undulating dunes and barrier ridges between the beach and the inland side of the island. The barrier ridge joining the beach has nearly vertical slopes that have been cut by wave action during high tides.

The typical sequence, depth, color, and texture of the layers of the Corolla soil are:

Surface layer:
0 to 1 inch; pale brown fine sand

Substratum:
1 to 8 inches; very pale brown fine sand
8 to 21 inches; pale brown fine sand
21 to 44 inches; light brownish gray fine sand
44 to 72 inches; grayish brown sand

The Corolla soil is moderately well drained and somewhat poorly drained. It is at a lower elevation than the Newhan soil.

In the undisturbed areas, infiltration is high and permeability is very rapid. As a result, almost no rainwater runs off the surface. The Newhan soil is neutral or mildly alkaline throughout, and the Corolla soil is medium acid to mildly alkaline throughout. The Corolla soil is subject to rare flooding in low areas.

The Urban land consists of areas where the original soil has been cut, filled, graded, or paved. Most soil properties have been so altered that a soil series is not recognized. This land is used for apartment complexes, parking lots, or other areas where buildings are closely spaced or the soil is covered with pavement. The slope generally has been modified and commonly ranges from 0 to 5 percent. The extent of site modification varies greatly. Many areas are relatively undisturbed. In the process of smoothing, however, high areas have been leveled and low areas have been filled.

Included in this unit in mapping are beaches and barrier ridges. Also included, on the seaward slopes of the barrier ridges, are small areas that range from strongly sloping to very steep.

The instability of ditchbanks and trench walls, seepage, wind erosion, and rare flooding in low areas limit the use of these soils for building site development or sanitary facilities. Wind erosion is a severe hazard in areas that do not have plant cover. This hazard can be reduced by revegetating disturbed areas around construction and road sites as soon as possible. The barrier ridges are subject to erosion by ocean waves. Wind and water erosion and sedimentation can be minimized by maintaining or regenerating an adequate plant cover. A plant cover is difficult to establish and maintain because of droughtiness, the leaching of plant nutrients, and salt spray. Selecting drought- and salt-tolerant plants is essential. The sandy texture and summer droughtiness limit recreational development.

This unit has not been assigned to a capability class or to a woodland group.

NoA—Norfolk loamy fine sand, 0 to 2 percent slopes. This well drained soil is on uplands. It is in slightly convex areas near large drainageways. Individual areas are oblong and range from 15 to about 50 acres in size.

The typical sequence, depth, color, and texture of the layers of this soil are:

Surface layer:
0 to 6 inches; brown loamy fine sand

Subsurface layer:
6 to 10 inches; pale brown loamy fine sand

Substratum:
10 to 25 inches; yellowish brown sandy clay loam

25 to 68 inches; brownish yellow sandy clay loam that has mottles in shades of brown, red, and gray
68 to 80 inches; mottled light gray, brownish yellow, and yellowish red sandy clay loam

Infiltration is moderate, and surface runoff is slow. Permeability and available water capacity are moderate. This soil is very strongly acid or strongly acid throughout unless the surface has been limed. The seasonal high water table is 3.5 to 6.0 feet below the surface.

Included with this soil in mapping are small areas that have slopes of more than 2 percent and a few small areas of soils that have a surface layer of fine sandy loam or loam. Also included are small areas of Autryville soils and scattered areas of the moderately well drained Goldsboro and Foreston soils. Autryville soils are in small areas near drainageways. Their surface layer is thicker than that of the Norfolk soil. Goldsboro and Foreston soils are in landscape positions similar to those of the Norfolk soil. The included soils make up about 15 percent of this unit.

Most areas of this unit are used as cropland. A small acreage is used for building site development or woodland.

In cultivated areas the major crops are tobacco, corn, and soybeans. Additions of plant nutrients improve crop production. Minimum tillage, inclusion of cover crops and grasses and legumes in the cropping system, and crop residue management conserve moisture.

In the wooded areas, the dominant trees are loblolly pine, hickory, southern red oak, and white oak. The understory includes American holly, flowering dogwood, persimmon, poison ivy, grape, huckleberry, blueberry, black cherry, and greenbrier. Areas of this soil provide habitat for deer, rabbit, fox, quail, and other wildlife.

If this soil is used for building site development or sanitary facilities, the high water table during wet periods is a limitation. No major limitations affect recreational development.

The capability class is I, and the woodland group is 9A.

NoB—Norfolk loamy fine sand, 2 to 6 percent slopes. This well drained soil is on uplands. It is in convex areas near large drainageways. Individual areas are long and vary in width. They range from 15 to about 45 acres in size.

The typical sequence, depth, color, and texture of the layers of this soil are:

Surface layer:
0 to 6 inches; brown loamy fine sand

Subsurface layer:
6 to 10 inches; pale brown loamy fine sand

Substratum:
10 to 25 inches; yellowish brown sandy clay loam
25 to 68 inches; brownish yellow sandy clay loam that has mottles in shades of brown, red, and gray
68 to 80 inches; mottled light gray, brownish yellow, and yellowish red sandy clay loam

Infiltration is moderate, and surface runoff is medium. Permeability and available water capacity are moderate. The soil is very strongly acid or strongly acid throughout unless the surface has been limed. The seasonal high water table is 3.5 to 6.0 feet below the surface.

Included with this soil in mapping are small areas of Marvyn soils that have slopes of more than 6 percent and a few small areas of soils that have a surface layer of fine sandy loam or loam. Also included are small areas of Autryville soils and the moderately well drained Goldsboro, Craven, and Foreston soils. Autryville and Craven soils are in small areas near drainageways. Autryville soils have a surface layer that is thicker than that of the Norfolk soil. Goldsboro and Foreston soils are in shallow depressions. The included soils make up about 15 percent of this unit.

Most areas of this unit are used as cropland. A few small areas are used for building site development or woodland.

In cultivated areas the major crops are tobacco, corn, and soybeans. Erosion is a hazard if the soil is used for row crops. Additions of plant nutrients, minimum tillage, inclusion of cover crops and grasses and legumes in the cropping system, contour cultivation (fig. 9), and crop residue management reduce the runoff rate and help to control erosion.

In the wooded areas, the major canopy trees are loblolly pine, longleaf pine, southern red oak, white oak, and hickory. The understory includes American holly, flowering dogwood, persimmon, blueberry, huckleberry, poison ivy, grape, black cherry, and greenbrier. Areas of this soil provide habitat for deer, rabbit, fox, quail, and other wildlife.

If this soil is used for building site development or sanitary facilities, the high water table during wet periods is a limitation. If not protected by a plant cover, the soil is susceptible to accelerated erosion. No major limitations affect recreational development.

The capability subclass is IIe, and the woodland group is 9A.

On—Onslow loamy fine sand. This nearly level, moderately well drained and somewhat poorly drained

Figure 9.—Planting row crops, such as soybeans, on the contour helps to control water erosion on Norfolk loamy fine sand, 2 to 6 percent slopes.

soil is near shallow drainageways on uplands. Areas are nearly as broad as they are long and range from 20 to about 300 acres in size.

The typical sequence, depth, color, and texture of the layers of this soil are:

Surface layer:

0 to 4 inches; very dark gray loamy fine sand

Subsurface layer:

4 to 8 inches; gray loamy fine sand

8 to 14 inches; very pale brown and light yellowish brown loamy fine sand that has reddish yellow concretions

14 to 17 inches; very pale brown loamy fine sand

17 to 21 inches; brownish yellow fine sandy loam mottled with very pale brown

Subsoil:

21 to 30 inches; brownish yellow sandy clay loam mottled with strong brown and light gray
30 to 41 inches; mottled light yellowish brown, strong brown, and light gray sandy clay loam
41 to 53 inches; light gray sandy clay loam mottled with brownish yellow and yellowish red
53 to 68 inches; light gray sandy clay loam that has yellowish red mottles and thin layers of sandy loam

Substratum:

68 to 80 inches; white sandy loam that has light yellowish brown and brownish yellow mottles and thin layers of loamy sand

Infiltration is moderate, and surface runoff is slow. Permeability and available water capacity are moderate. This soil is very strongly acid or strongly acid throughout unless the surface has been limed. The seasonal high water table is 1.5 to 3.0 feet below the surface.

Included with this soil in mapping are small areas of Goldsboro, Craven, and Foreston soils. These soils are in landscape positions similar to those of the Onslow soil. Also included are small areas of Baymeade soils near side slopes and somewhat poorly drained Stallings and Lynchburg soils in slight depressions. Baymeade soils are coarser textured than the Onslow soil. The included soils make up about 10 percent of this unit.

Most areas of this unit are used as cropland. The rest are used for woodland or building site development.

Wetness is a limitation affecting the use of this soil for some crops. If drained, the soil can be used for corn, soybeans, and tobacco. A drainage system reduces wetness and improves aeration in the lower part of the root zone. The drainage system commonly requires tile and open ditches. Grading the fields can improve surface drainage. Additions of plant nutrients, crop residue management, and cover crops are suitable measures on this soil. Subsoiling can break up the thin, weakly cemented subsurface layer.

In the wooded areas, the dominant trees are loblolly pine, sweetgum, southern red oak, white oak, and yellow poplar. The understory includes American holly, gallberry, coast azalea, sourwood, flowering dogwood, huckleberry, persimmon, black cherry, waxmyrtle, blueberry, and greenbrier. The use of equipment is limited during seasonal wet periods, mainly in winter. Logging during these periods results in the formation of ruts and damage to plant roots. The wooded areas provide habitat for deer, raccoon, fox, rabbit, bobcat, opossum, birds, and other wildlife.

Seasonal wetness, seepage, summer droughtiness, and the instability of ditchbanks and trench walls are the main limitations if this soil is used for building site development, sanitary facilities, or recreational development. The wetness can be reduced by installing a drainage system that includes tile and open ditches. Land grading can improve surface drainage.

The capability subclass is IIw, and the woodland group is 7A.

Pa—Pactolus fine sand. This nearly level, moderately well drained and somewhat poorly drained soil is on uplands and stream terraces. Individual areas are irregular in shape and range from 25 to 100 acres in size. The largest areas occur as broad interstream areas near the coast.

The typical sequence, depth, color, and texture of the layers of this soil are:

Surface layer:

0 to 3 inches; gray fine sand
3 to 6 inches; grayish brown fine sand

Substratum:

6 to 18 inches; light yellowish brown fine sand that has brownish yellow mottles and strong brown and dark brown concretions
18 to 30 inches; very pale brown fine sand that has light gray mottles and strong brown concretions
30 to 80 inches; light gray fine sand mottled with brownish yellow

Infiltration is rapid, and surface runoff is slow. Permeability is rapid, and available water capacity is low. The soil ranges from very strongly acid to medium acid throughout unless the surface has been limed. The seasonal high water table is 1.5 to 2.5 feet below the surface.

Included with this soil in mapping are small areas of Wando and Leon soils. The excessively drained Wando soils are on low ridges, and the poorly drained Leon soils are in depressions. The included soils make up about 10 percent of this unit.

Most areas of this unit are used as woodland. A few small areas are used as cropland or pasture.

In the wooded areas, the dominant trees are loblolly pine, sweetgum, water oak, willow oak, red maple, and eastern redcedar. The understory includes coast azalea, American holly, gallberry, huckleberry, waxmyrtle, blueberry, and greenbrier. Areas of this soil provide habitat for deer, raccoon, fox, rabbit, bobcat, opossum, birds, and other wildlife.

In cultivated areas the major crops are corn, soybeans, and peanuts. The leaching of plant nutrients, the seasonal high water table, and the instability of ditchbanks are the main limitations. The low available

water capacity is a limitation during dry periods. A drainage system may be needed. It commonly includes tile and open ditches. Grading the fields can improve surface drainage. Additions of plant nutrients, crop residue management, and cover crops help to overcome the effects of excessive leaching.

Seasonal wetness, seepage, summer droughtiness, and the instability of ditchbanks and trench walls are the main limitations if this soil is used for building site development or sanitary facilities. If roads, building foundations, or recreational facilities are constructed, a drainage system may be necessary because of the seasonal high water table. The drainage system commonly includes tile and open ditches. Land grading can improve surface drainage. Wetness and the sandy surface material are the main limitations affecting recreational development.

The capability subclass is IIIs, and the woodland group is 8W.

Pn—Pantego mucky loam. This nearly level, very poorly drained soil is on broad, smooth flats in the uplands. Individual areas are generally broad and range from 50 to about 500 acres in size. The largest areas are in the Hofmann Forest, in the north-central part of the county.

The typical sequence, depth, color, and texture of the layers of this soil are:

Surface layer:
0 to 14 inches; black mucky loam

Subsurface layer:
14 to 17 inches; grayish brown fine sandy loam mottled with very dark gray
17 to 23 inches; grayish brown sandy clay loam mottled with very dark gray

Subsoil:
23 to 45 inches; grayish brown sandy clay loam mottled with dark grayish brown
45 to 60 inches; grayish brown sandy clay loam that has brownish yellow mottles and pockets of sandy clay
60 to 70 inches; gray sandy clay loam that has thin layers of sandy clay

Substratum:
70 to 80 inches; dark gray sandy clay loam that has gray mottles and thin layers of loamy sand and clay

Infiltration is moderate, and surface runoff is very slow. Permeability is moderate, and available water capacity is high. The soil ranges from extremely acid to strongly acid throughout unless the surface has been limed. The organic matter content of the surface layer is high. The seasonal high water table is at or near the surface, and water ponds on the surface in winter.

Included with this soil in mapping are areas of Pantego soils that have a surface layer of fine sandy loam and scattered small areas of Torhunta and Murville soils. Torhunta and Murville soils are in landscape positions similar to those of the Pantego soil. They are sandier than the Pantego soil. Also included are a few areas of the very poorly drained, organic Croatan soils in small depressions and the poorly drained Rains soils near shallow drainageways. The included soils make up about 10 to 20 percent of this unit.

Most areas of this unit are used as woodland. A few areas are used as cropland.

In the wooded areas, the dominant trees are loblolly pine, water oak, red maple, pond pine, water tupelo, and sweetgum. The understory includes redbay, sweetbay, loblollybay gordonia, American holly, gallberry, Venus flytrap, sundew, pitcherplant, southern bayberry, sweet pepperbush, switchcane, waxmyrtle, blueberry, fetterbush lyonia, titi, and greenbrier. Some areas have been drained, cleared, bedded, fertilized, and planted to loblolly pine. Logging during wet periods results in the formation of deep ruts and damage to plant roots. The drained areas provide habitat for deer, raccoon, fox, black bear, rabbit, bobcat, opossum, birds, and other wildlife.

If drained, this soil can be used for corn and soybeans. Wetness is the main limitation. A well planned and constructed drainage system can lower the water table. The drainage system generally requires open ditches and grading or "crowning" of the fields. Additions of plant nutrients, crop residue management, bedding, and cover crops are suitable measures on this soil.

If this soil is used for building site development, sanitary facilities, or recreational development, wetness is the main limitation. It can be reduced by installing a drainage system that includes tile and open ditches. Land grading can improve surface drainage.

The capability subclass is VIw in undrained areas and IIIw in drained areas. The woodland group is 9W.

Pt—Pits. This map unit consists of areas where the soil has been excavated. The excavated areas commonly range from 5 to 15 feet in depth. Typically, they are subject to local ponding.

There is no typical pedon for this unit because the soil material has been extensively excavated and reworked and is highly variable. The material is generally light gray and sandy. Some areas consist of black to reddish brown, weakly cemented sand.

Vegetation typically is very sparse on this unit for the first few years following excavation. Later, the unit supports almost pure stands of loblolly pine.

Onsite investigation generally is needed before the development of specific areas.

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

Ra—Rains fine sandy loam. This nearly level, poorly drained soil is on uplands. It is an extensive soil in the county. The larger areas occur as broad, smooth interstream areas. They range from 100 to about 500 acres in size. The smaller areas are in shallow depressions on slightly convex divides. They range from 5 to 20 acres in size.

The typical sequence, depth, color, and texture of the layers of this soil are:

Surface layer:
0 to 5 inches; very dark gray fine sandy loam

Subsurface layer:
5 to 12 inches; grayish brown fine sandy loam mottled with dark gray

Subsoil:
12 to 45 inches; gray sandy clay loam mottled with brownish yellow and yellowish brown
45 to 58 inches; light brownish gray sandy clay mottled with brownish yellow
58 to 70 inches; gray sandy clay loam that has brownish yellow mottles and pockets of sandy loam

Substratum:
70 to 80 inches; gray sandy loam that has dark grayish brown mottles and thin layers of sandy clay loam and loamy sand

Infiltration is moderate, and surface runoff is slow. Permeability and available water capacity are moderate. The soil is very strongly acid or strongly acid throughout unless the surface has been limed. The seasonal high water table is at or near the surface. The soil is occasionally ponded in low areas.

Included with this soil in mapping are scattered small areas of Woodington soils. These soils are in landscape positions similar to those of the Rains soil. Also included are the somewhat poorly drained Lynchburg soils and very poorly drained Pantego soils. Lynchburg soils are in small areas along the outer edge of the unit, near drainageways. Pantego soils are in small, shallow depressions. The included soils make up about 15 percent of this unit.

Most areas of this unit are used as woodland. A few small areas are used as cropland.

In the wooded areas, the major canopy trees are loblolly pine, pond pine, sweetgum, blackgum, yellow poplar, swamp chestnut oak, red maple, willow oak, and water oak. The understory includes redbay, sweetbay, American holly, gallberry, sweet pepperbush, fetterbush lyonia, switchcane, waxmyrtle, huckleberry, blueberry, and greenbrier. Some areas have been bedded and planted to loblolly pine. Fertilizer is applied in some areas. Logging during wet periods results in the formation of deep ruts and damage to plant roots. Areas of this soil provide habitat for deer, raccoon, fox, rabbit, bobcat, opossum, black bear, birds, and other wildlife.

If drained, this soil can be used for corn and soybeans. Wetness is the main limitation. A well planned and constructed drainage system reduces the wetness. The drainage system commonly requires tile and open ditches. Grading the fields can improve surface drainage. Additions of plant nutrients, crop residue management, bedding, and cover crops are suitable measures on this soil.

If this soil is used for building site development, sanitary facilities, or recreational development, wetness is the main limitation. It can be reduced by installing a drainage system that includes tile and open ditches. Land grading can improve surface drainage.

The capability subclass is IIIw in drained areas, and the woodland group is 9W.

St—Stallings loamy fine sand. This nearly level, somewhat poorly drained soil is on uplands. The largest areas occur as interstream areas. They range from 20 to 80 acres in size. The smaller areas are in shallow depressions on slightly convex divides. They are 5 to 20 acres in size.

The typical sequence, depth, color, and texture of the layers of this soil are:

Surface layer:
0 to 7 inches; dark gray loamy fine sand

Subsurface layer:
7 to 12 inches; pale brown loamy fine sand
12 to 15 inches; very pale brown fine sandy loam mottled with brownish yellow and light brownish gray

Subsoil:
15 to 25 inches; light yellowish brown fine sandy loam mottled with light gray
25 to 45 inches; light gray fine sandy loam mottled with red and brownish yellow
45 to 66 inches; light gray fine sandy loam that has red and brownish yellow mottles and pockets of sandy clay loam

Substratum:

66 to 80 inches; mottled brownish yellow, gray, and red sandy clay loam that has thin layers of fine sandy loam

Infiltration is moderate, and surface runoff is slow. Permeability is moderately rapid, and available water capacity is moderate. The soil ranges from extremely acid to strongly acid throughout unless the surface layer has been limed. The seasonal high water table is 1.5 to 2.5 feet below the surface.

Included with this soil in mapping are scattered small areas of Lynchburg and Pactolus soils. These soils are in landscape positions similar to those of the Stallings soil. Also included are small areas of the moderately well drained Foreston and Onslow soils near drainageways along the edge of the unit and areas of Woodington soils in small depressions. The included soils make up about 20 percent of this unit.

Most areas of this unit are used as woodland. The rest are used as cropland.

In the wooded areas, the major canopy trees are loblolly pine, sweetgum, blackgum, southern red oak, white oak, yellow poplar, red maple, willow oak, and water oak. The understory includes American holly, gallberry, sweet pepperbush, coast azalea, sourwood, flowering dogwood, switchcane, waxmyrtle, huckleberry, blueberry, and greenbrier. Some areas have been bedded and planted to loblolly pine. Fertilizer is applied in some areas. Logging during wet periods results in the formation of ruts and damage to plant roots. Areas of this soil provide habitat for deer, raccoon, fox, rabbit, bobcat, opossum, birds, and other wildlife.

If drained, this soil can be used for crops, such as corn and soybeans. Wetness is the main limitation. A well planned and constructed drainage system reduces the wetness. The drainage system generally requires tile and open ditches. Grading the fields can improve surface drainage. The instability of ditchbanks is a problem. Additions of plant nutrients, crop residue management, bedding, and cover crops are suitable measures on this soil.

Wetness, the instability of ditchbanks and trench walls, and seepage are the main limitations if this soil is used for building site development or sanitary facilities. The wetness can be reduced by installing a drainage system that includes tile and open ditches. Land grading can improve surface drainage. Wetness is the main limitation affecting recreational development.

The capability subclass is IIw, and the woodland group is 8W.

To—Torhunta fine sandy loam. This nearly level, very poorly drained soil is in broad interstream areas on uplands. Individual areas are generally broad and long. The largest areas are in the west-central and north-central parts of the county. They are about 1,000 acres in size. The smaller areas are generally wide and long and range from 25 to 300 acres in size.

The typical sequence, depth, color, and texture of the layers of this soil are:

Surface layer:

0 to 9 inches; black fine sandy loam

9 to 14 inches; very dark gray fine sandy loam

Subsoil:

14 to 22 inches; dark gray fine sandy loam mottled with very dark gray

22 to 47 inches; grayish brown fine sandy loam mottled with very dark gray

Substratum:

47 to 72 inches; light gray loamy fine sand that has thin layers of sandy clay loam

72 to 80 inches; light greenish gray sandy loam that has thin layers of sandy clay loam

Infiltration is moderate, and surface runoff is slow. Permeability is moderately rapid, and available water capacity is high. The soil is extremely acid or very strongly acid throughout unless the surface has been limed. The seasonal high water table is at or near the surface, and water ponds on the surface for brief periods in winter.

Included with this soil in mapping are small areas of Torhunta soils that have a surface layer of mucky fine sandy loam and scattered small areas of the very poorly drained Pantego and Murville soils. Pantego and Murville soils are in landscape positions similar to those of the Torhunta soil. Also included are small areas of Woodington soils on the outer edge of the mapped areas, near shallow drainageways. The included soils make up about 20 percent of this unit.

Nearly all areas of this unit are used as woodland. A few areas are used as cropland.

In the wooded areas, the major canopy trees are loblolly pine, pond pine, sweetgum, water tupelo, yellow poplar, swamp chestnut oak, red maple, willow oak, baldcypress, and water oak. The understory includes redbay, sweetbay, American holly, southern bayberry, river birch, gallberry, fetterbush lyonia, sweet pepperbush, Venus flytrap, pitcherplant, titi, huckleberry, sundew, switchcane, waxmyrtle, blueberry, and greenbrier. Some areas have been drained, cleared, bedded, fertilized, and planted to loblolly pine. Woodland productivity is very high in these areas. Logging during wet periods results in the formation of deep ruts and damage to plant roots. Areas of this soil provide habitat for deer, raccoon, fox, rabbit, bobcat,

opossum, black bear, birds, and other wildlife.

If drained, this soil can be used for crops, such as corn and soybeans. Wetness is the main limitation. A well planned and constructed drainage system can reduce the wetness. The drainage system generally requires open ditches and grading or "crowning" of the fields. The instability of ditchbanks is a problem. Additions of plant nutrients, crop residue management, bedding, and cover crops are suitable measures on this soil.

Wetness, the instability of cutbanks and trench walls, and seepage are the main limitations if this soil is used for building site development, recreational development, or sanitary facilities. The wetness can be reduced by installing a drainage system that includes tile and open ditches. Land grading can improve surface drainage.

The capability subclass is VIw in undrained areas and IIIw in drained areas. The woodland group is 9W.

Ud—Udorthents, loamy. This map unit consists of areas of nearly level to gently sloping, covered-over landfills. Some of the landfills are active and have barren depressions that are covered over as waste material is deposited. The other landfills are closed and have been revegetated. The layer of covering generally is shaped for good surface drainage. Individual areas range from 10 to 60 acres in size and are generally rectangular.

Infiltration is moderate, and surface runoff is slow. Permeability is moderate, and available water capacity is low. The soil material is very strongly acid or strongly acid throughout unless the surface has been limed. The estimated depth to the seasonal high water table is at least 4 feet.

These soils have been revegeted with native plants, such as loblolly pine, broomsedge bluestem, and dogfennel.

This map unit generally is not used for building site development, sanitary facilities, or recreational development. Because the unit is highly variable, onsite investigation generally is needed before the development of specific areas.

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

Ur—Urban land. This map unit consists of areas where more than 85 percent of the surface is covered by buildings, houses, streets, parking lots, airports, railroad yards, and other urban structures. It is mainly in scattered areas throughout the county, in small towns and on industrial sites. Because of extensive urbanization, the original soils and the topography and original landscape have been altered. Individual areas are irregular in shape and range from 5 to more than 50 acres in size. Slope is generally 0 to 6 percent.

Nearly all of the precipitation that falls on this unit runs off the surface. The runoff can increase the hazard of flooding in low areas. Siltation of waterways and reservoirs is a hazard in areas that have been graded but are not stabilized.

Onsite investigation is needed before the development of specific areas.

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

WaB—Wando fine sand, 1 to 6 percent slopes. This excessively drained soil is in undulating areas on uplands. It is in areas on the mainland near the sound. Most areas are 10 to 25 feet above sea level. Individual areas are generally about as broad as they are long, and they range from 25 to 250 acres in size.

The typical sequence, depth, color, and texture of the layers of this soil are:

Surface layer:

0 to 6 inches; grayish brown fine sand

Substratum:

6 to 16 inches; yellowish brown fine sand
16 to 31 inches; strong brown fine sand that has dark yellowish brown mottles and brownish yellow concretions
31 to 36 inches; yellow fine sand
36 to 47 inches; very pale brown fine sand
47 to 75 inches; very pale brown fine sand mottled with brownish yellow
75 to 85 inches; light yellowish brown fine sand

Infiltration is rapid, and surface runoff is slow. Permeability is rapid, and available water capacity is very low. This soil is medium acid or slightly acid throughout. The seasonal high water table is below a depth of about 6 feet.

Included with this soil in mapping are small areas of the moderately well drained Pactolus soils in narrow depressions, the poorly drained Muckalee soils in narrow drainageways, and scattered small areas of Alpin and Kureb soils. Also included are areas of Baymeade soils on small flats. The included soils make up about 15 percent of this unit.

Most areas of this unit are used as woodland. A few areas are used for cropland or building site development.

In the wooded areas, the major canopy trees are longleaf pine, loblolly pine, live oak, myrtle oak, bluejack oak, blackjack oak, and sassafras. The understory includes pineland threeawn, panicgrass, turkey oak, waxmyrtle, sassafras, and American beautyberry. Seedling mortality is a management concern because of

droughtiness. Areas of this soil provide habitat for deer, turkey, rabbit, fox, quail, and other wildlife.

Sweet potatoes, peanuts, and corn are the main crops in cultivated areas. Some areas are used for small gardens. Droughtiness, the leaching of plant nutrients, and wind erosion are the main limitations affecting the use of this soil for crops. Additions of plant nutrients, minimum tillage, cover crops, crop residue management, and windbreaks help to control erosion and overcome the effects of excessive leaching.

Droughtiness, the instability of ditchbanks and trench walls, and seepage are limitations if this soil is used for building site development or sanitary facilities. This sandy soil provides a good support base for most structures. Wind erosion is a hazard in unprotected areas. It can be controlled by revegetating disturbed areas around construction and road sites as soon as possible. Lawns and shrubs are difficult to establish and maintain. Irrigating, frequently applying fertilizer, and adding organic matter can improve the growth of lawns and shrubs on this sandy soil. The sandy surface material and summer droughtiness are the main limitations affecting recreational development. Wind erosion and sedimentation can be minimized by maintaining or regenerating an adequate plant cover.

The capability subclass is IIIs, and the woodland group is 8S.

Wo—Woodington loamy fine sand. This nearly level, poorly drained soil is on uplands. The larger areas occur as broad, smooth interstream areas. They range from 25 to about 100 acres in size. The smaller areas are in shallow, narrow depressions on slightly convex divides. They range from 5 to about 25 acres in size.

The typical sequence, depth, color, and texture of the layers of this soil are:

Surface layer:
0 to 6 inches; very dark gray loamy fine sand

Subsurface layer:
6 to 12 inches; grayish brown loamy fine sand

Subsoil:
12 to 50 inches; light brownish gray fine sandy loam mottled with yellowish brown and brownish yellow
50 to 65 inches; gray fine sandy loam that has strong brown, brownish yellow, and brown mottles and thin layers of loamy sand and sandy clay loam

Substratum:
65 to 80 inches; light gray sandy loam that has strong brown and brown mottles and thin layers of sandy clay loam

Infiltration is moderate, and surface runoff is slow. Permeability is moderately rapid, and available water capacity is moderate. The soil ranges from extremely acid to strongly acid throughout unless the surface has been limed. The seasonal high water table is 0.5 to 1.0 foot below the surface. The soil is occasionally ponded in low areas.

Included with this soil in mapping are small areas of Rains soils and small areas of the somewhat poorly drained Stallings and very poorly drained Torhunta soils. Rains soils are in landscape positions similar to those of the Woodington soil. Stallings soils are on the outer edge of the mapped areas, near drainageways. Torhunta soils are in small, shallow depressions. Also included are a few areas of soils that have a thin, discontinuous hardpan in the subsurface layer. The included soils make up about 15 percent of this unit.

Most areas of this unit are used as woodland. A few small areas are used as cropland.

In the wooded areas, the major canopy trees are loblolly pine, pond pine, sweetgum, blackgum, yellow poplar, swamp chestnut oak, red maple, willow oak, and water oak. The understory includes redbay, sweetbay, American holly, gallberry, switchcane, waxmyrtle, huckleberry, blueberry, and greenbrier. Logging during wet periods results in the formation of ruts and damage to tree roots. A few large areas have been bedded and planted to loblolly pine. Fertilizer is applied in some areas. Areas of this soil provide habitat for deer, raccoon, fox, rabbit, bobcat, opossum, black bear, turkey, birds, and other wildlife.

If drained, this soil can be used for crops, such as corn and soybeans. Wetness is the main limitation. A well planned and constructed drainage system reduces the wetness. The drainage system generally requires tile and open ditches. Grading the fields can improve surface drainage. Additions of plant nutrients, crop residue management, bedding, and cover crops are suitable measures on this soil.

Wetness, the instability of ditchbanks and trench walls, and seepage are the main limitations if this soil is used for building site development or sanitary facilities. The wetness can be reduced by installing a drainage system that includes tile and open ditches. Land grading can improve surface drainage. Wetness is the main limitation affecting recreational development.

The capability subclass is VIw in undrained areas and IIIw in drained areas. The woodland group is 8W.

YaA—Yaupon fine sandy loam, 0 to 3 percent slopes. This somewhat poorly drained and moderately well drained soil consists of material deposited by dredging operations. It is near the Intracoastal

Waterway. The smaller areas are cone shaped, and the larger areas are irregular in shape and are surrounded by dikes. The diked areas have sloping edges. Individual areas range from 3 to 10 acres in size.

The typical sequence, depth, color, and texture of the layers of this soil are:

Surface layer:

0 to 1 inch; dark gray fine sandy loam
1 to 3 inches; light yellowish brown fine sandy loam

Substratum:

43 to 45 inches; gray clay mottled with brownish yellow
45 to 78 inches; greenish gray sandy clay mottled with olive yellow
78 to 85 inches; very dark gray fine sandy loam

Infiltration is slow, and surface runoff is medium. Permeability is slow, and available water capacity is high. The shrink-swell potential also is high. The surface layer ranges from very strongly acid to medium acid unless the surface has been limed. The substratum ranges from very strongly acid to moderately alkaline. Weathering alters the spoil material. The recent spoil areas are highly alkaline, and the older spoil areas have been leached and are highly acid. The seasonal high water table is about 2.0 to 3.5 feet below the surface.

Included with this soil in mapping are small areas of spoil material that is better drained and sandier than the Yaupon soil. Included areas make up about 20 percent of this unit.

Nearly all areas of this unit are used as woodland. The dominant trees are loblolly pine, eastern redcedar, sweetgum, and red maple. Black cherry, yaupon, live oak, myrtle oak, and waxmyrtle are important understory plants. Logging during wet periods results in the formation of deep ruts and damage to plant roots.

This soil generally is not used for cultivated crops, building site development, sanitary facilities, or recreational development. Wetness, the high shrink-swell potential in the clayey subsoil, and the slow permeability are the main limitations.

The capability subclass is IVe, and the woodland group is 8W.

Prime Farmland

This section defines prime farmland and lists the soils in Onslow County that are considered prime farmland.

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

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

Prime farmland soils may be used as cropland, pasture, or woodland or for other purposes. The soils either are used for food or fiber or are available for these uses. Urban or built-up 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.

Prime farmland soils usually receive an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The acidity or alkalinity 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 frequently flooded during the growing season. The slope ranges mainly from 0 to 6 percent.

About 224,399 acres in the county, or nearly 43 percent of the total acreage, is prime farmland. The northwestern part of the county is dominantly prime farmland. Many smaller areas of prime farmland are scattered throughout the rest of the county. The largest areas are in map units 1, 2, and 3 on the general soil map. Some scattered areas of prime farmland are in the other map units.

In some parts of the county, a recent trend in land use has been the conversion of prime farmland to urban and industrial uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are either wet, more erodible, droughty, difficult to cultivate, or less productive than prime farmland.

Following is a list of map units, or soils, that make up the prime farmland in Onslow 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 5. The soil qualities that affect use and management of each unit are described in the section "Detailed Soil Map Units." This list does not constitute a recommendation for a particular land use.

Some soils that have a high water table qualify as prime farmland only in areas where this limitation has been overcome by drainage measures. If applicable, the need for these measures is indicated in parentheses after the map unit name in the list. Onsite evaluation is needed to determine if the limitation has been overcome by corrective measures.

The soils identified as prime farmland in Onslow County are:

CrB	Craven fine sandy loam, 1 to 4 percent slopes
GoA	Goldsboro fine sandy loam, 0 to 2 percent slopes
Gt	Grifton fine sandy loam (where drained)
Ly	Lynchburg fine sandy loam (where drained)
Md	Masontown mucky fine sandy loam (where drained)
NoA	Norfolk loamy fine sand, 0 to 2 percent slopes

NoB	Norfolk loamy fine sand, 2 to 6 percent slopes	Ra	Rains fine sandy loam (where drained)
On	Onslow loamy fine sand	To	Torhunta fine sandy loam (where drained)
Pn	Pantego mucky loam (where drained)		

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 behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

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

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

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

Health officials, highway officials, engineers, and others will 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

Harry Tyson, district conservationist, and Foy D. Hendrix, conservation agronomist, Soil Conservation Service, helped prepare this section.

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

About 48,566 acres in Onslow County is used as cropland *(26)*. Of this, 3,836 acres is used for tobacco; 18,786 acres for soybeans; 19,713 acres for corn; and 1,634 acres for pasture. Other crops, such as wheat, hay, peanuts, and cucumbers, are grown on small acreages. Corn and soybeans are commonly grown in drained areas of Pantego, Torhunta, Rains, Woodington, Lynchburg, and Stallings soils. Tobacco is grown on soils that are characterized by good natural drainage, such as Goldsboro, Norfolk, Foreston, Onslow, and Autryville soils. Many soils are suited to vegetable crops. Information about growing specialty crops can be obtained from local offices of the North Carolina Agricultural Extension Service or the Soil Conservation Service.

Although the soils vary in their suitability for specific crops and require different kinds of management, some management practices are needed on most soils used for crops and pasture.

In Onslow County, wetness is a problem on about 57 percent of the cropland. Only limited practices, such as surface and subsurface drains, are needed on the moderately well drained, nearly level Craven, Onslow, Foreston, and Goldsboro soils. If excess water is removed by surface or subsurface drains, or both, crops grow well on most of the somewhat poorly drained, poorly drained, and very poorly drained soils. Land grading is needed on some soils.

Surface drainage systems range from large, open ditches to small, shallow furrows between areas of row crops. The large, open ditches commonly are used as outlets for the discharged water.

Figure 10.—A field border in an area of Goldsboro fine sandy loam, 0 to 2 percent slopes, is effective in controlling water erosion.

The design of drainage systems varies with the kind of soil. A subsurface drainage system is not so effective on the clayey, slowly permeable Craven and Lenoir soils as on the more loamy soils in the county. Open ditches on the Stallings, Murville, Pactolus, Torhunta, Leon, and Woodington soils are unstable. Sloping the ditchbanks and seeding with permanent grass improve the stability.

Parallel ditches are commonly used to drain cropland in broad, flat areas where the soils have a surface layer that is high in content of organic matter. These soils are those of the Rains, Croatan, Murville, Pantego, Woodington, and Torhunta series. The ditches are spaced about 330 feet apart. The area between the ditches is crowned in the middle to facilitate surface runoff. Furrows, or hoe drains, are used to carry the surface water to the parallel ditches. Where these furrows drain into the open ditches, drop structures generally are needed to keep the ditchbank from eroding.

Land grading is used to fill low areas and depressions, to smooth fields, and to establish a uniform grade for removing rainwater.

Control of water and wind erosion is needed on some of the soils in Onslow County. Water erosion is a hazard on the gently sloping and sloping Craven, Marvyn, and Norfolk soils. Diversions, grassed waterways, field borders (fig. 10), conservation tillage, crop residue, close-growing crops, and, on some soils, a permanent plant cover help to control erosion. A combination of these practices generally is needed to control water erosion in areas where tobacco, corn, or soybeans are grown. Reducing the hazard of erosion improves crop production and water quality and reduces the loss of nutrients.

Alpin, Wando, Autryville, Baymeade, and Kureb soils are susceptible to wind erosion. These soils are droughty and are subject to leaching of plant nutrients. Leaving crop residue on the surface or growing a cover crop until planting time effectively conserves moisture

and minimizes the leaching of nutrients. Strips of small grain between rows of corn or tobacco help to prevent the crop damage caused by windblown sand on newly planted fields (fig. 11).

Corn, soybeans, tobacco, and wheat are the main crops on the soils susceptible to wind erosion. Well drained soils are well suited to hybrid bermudagrass for hay and pasture. The excessively drained Alpin, Wando, and Kureb soils are poorly suited to crops and pasture.

In most areas the soils in the county are naturally acid and low in content of plant nutrients. As a result, applications of lime and fertilizer are needed. The amounts and kinds to be applied should be based on the results of soil tests, the needs of the crop, and the expected level of production.

The surface layer in light colored soils contains low to moderate amounts of organic matter. Crop residue can be incorporated into the soils or kept near the surface by using chisels or cultivators or by light disking. If soybeans or other crops that produce little residue are grown, the cropping system should include cover or sod crops, or both. Maintaining a high organic matter content helps to ensure good soil structure and tilth.

The soils in Onslow County are not high enough in natural fertility for the good production of crops. They are naturally acid and require additions of lime for the production of most crops.

Liming requirements are a major concern because the acidity of the soil affects the availability of many nutrients to plants and the activity of beneficial bacteria. Additions of lime neutralize exchangeable aluminum (Al), high levels of which adversely affect many crops. Liming also adds calcium (calcitic lime) or calcium and magnesium (dolomitic lime) to the soil.

Recommendations for liming are based on the results of soil tests. These tests indicate the kinds and amounts of lime to be applied. For example, soils that have a sandy surface layer can have low amounts of

Figure 11.—Planting small grain between strips of tobacco reduces the hazard of wind erosion on Norfolk loamy fine sand, 2 to 6 percent slopes.

magnesium and available calcium. The desired pH levels vary, depending on the soil properties and the crops to be grown.

Nitrogen fertilizer is required for most crops, except peanuts, clover, soybeans in some rotations, and alfalfa after it has been established. Soil tests that determine nitrogen requirements are not available. The amounts of nitrogen needed are indicated under the heading "Yields Per Acre." Because nitrogen can be readily leached from sandy soils, more than one application may be needed during the growing season.

The need for phosphorus (P) and potassium (K) fertilizers can be determined by soil tests. Because these nutrients tend to build up in soils, it is important to test a sample from each field to determine the needs for specific crops.

Herbicides are commonly used for weed control on the cropland in Onslow County. They can reduce the amount of tillage needed. Soil properties, such as organic matter content and texture of the surface layer, affect the amounts of herbicide needed. Estimates of these properties have been determined for the soils described in this survey. Table 15 shows the range of organic matter content, and table 14 shows the texture of the surface layer.

In some cases the organic matter content for a particular soil is outside the range shown in table 15. A higher organic matter content can occur in soils that have received high amounts of animal or manmade waste. Soils undergoing conversion to cropland can have a higher organic matter content in the surface layer than similar soils that have been cultivated for a long time. Conservation tillage also increases the content of organic matter in the surface layer. Lower levels of organic matter are common in areas where the surface layer has been partly or completely removed by erosion, land smoothing, or other activities. Therefore, up-to-date soil tests should be used to measure the organic matter content before the required herbicide application rates are determined. Specific rates should be based on the organic matter content and texture of the surface layer.

Yields Per Acre

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

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations also are 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 methods that ensure the smallest possible crop loss.

A high level of management includes maintaining proper soil reaction and fertility levels as indicated by standard soil tests. Nitrogen application rates for corn on soils that have a yield potential of 125 to 150 bushels per acre should be 140 to 160 pounds per acre. Where the yield potential is only 100 bushels per acre, rates of 100 to 120 pounds per acre should be used. Applying excessive amounts of nitrogen fertilizer can cause water pollution and result in an unnecessary expense. In areas where corn or cotton is planted after soybeans or peanuts are harvested, nitrogen application rates can be reduced by 20 to 30 pounds per acre.

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

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

Land Capability Classification

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

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

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

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices (fig. 12).

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

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

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

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

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

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

Figure 12.—Sediment eroded from Norfolk loamy fine sand, 2 to 6 percent slopes, accumulates at the end of downhill rows. This soil is in capability subclass IIe.

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

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, woodland, wildlife habitat, or recreation. Class V contains only the subclasses indicated by *w, s,* or *c.*

The capability classification of each map unit is given in the section "Detailed Soil Map Units" and in table 6.

Woodland Management and Productivity

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

Forest managers in Onslow County are faced with the challenge of producing greater yields from smaller areas of forest land. Meeting this challenge requires intensive management and use of silvicultural practices. Many of the silvicultural techniques resemble the measures used in agriculture. They include establishing, weeding, and thinning desirable young stands; propagating the more productive species and genetic varieties; providing short rotations and complete fiber utilization; controlling insects, diseases, and weeds; and using fertilizer and drainage systems to increase growth rates. Even though timber crops require decades to mature, the goal of intensive management is similar to that of intensive agriculture—to produce the greatest yield of the most valuable crop as quickly as possible.

Commercial forest makes up 341,875 acres in Onslow County, or about 70 percent of the land area *(24).* Commercial forest is land that produces or is capable of producing crops of industrial wood and is not withdrawn from timber production. Loblolly pine is the most important timber species in the county because it grows fast, is suited to the soil and climate, is valuable, and is easy to establish and manage.

Soils vary in their ability to produce trees. Available water capacity and depth of the root zone strongly influence tree growth. Fertility and texture also influence tree growth. Elevation, aspect, and climate determine the kinds of trees that can grow on a site. Elevation and aspect are of particular importance in mountainous areas. The amount of rainfall and length of the growing season affect productivity.

This survey can be used by woodland managers planning ways to increase the productivity of forest land. Some soils respond better to applications of fertilizer better than others (fig. 13), and some are more susceptible to erosion after roads are built and timber is harvested. Some require special reforestation efforts. In the section "Detailed Soil Map Units," the description of each map unit in the survey area suitable for timber includes information about productivity, limitations in harvesting timber, and management concerns in producing timber. The common forest understory plants also are listed. Table 7 summarizes this forestry information and rates the soils for a number of management factors. *Slight, moderate,* and *severe* ratings are used to indicate the degree of the major soil limitations to be considered in forest management.

Table 7 lists the *ordination symbol* for each soil. Only those soils suitable for wood crops, and likely to be available for that use, are listed. 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.

The second part of the ordination symbol, a letter, indicates the major kind of soil limitation affecting 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 having no significant limitations that affect 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 or harvesting activities expose the soil. The risk is *slight* if no particular preventive measures are needed under ordinary conditions; *moderate* if erosion-control measures are needed for particular silvicultural activities; and *severe* if special precautions are needed to control erosion for most silvicultural activities. Ratings of *moderate* or *severe* indicate the need for construction of higher standard roads, additional maintenance of roads, additional care in planning harvesting and reforestation activities, or the use of special equipment.

Ratings of *equipment limitation* indicate limits on the use of forest management equipment, year-round or seasonal, because of such soil characteristics as slope, wetness, stoniness, or susceptibility of the surface layer to compaction. As slope gradient and length increase, it becomes more difficult to use wheeled equipment. On the steeper slopes, tracked equipment is needed. On the steepest slopes, even tracked equipment cannot be

Figure 13.—Fertilizer is needed on Woodington loamy fine sand to increase the productivity of loblolly pine.

operated and more sophisticated systems are needed. The rating is *slight* if equipment use is restricted by soil wetness for less than 2 months and if special equipment is not needed. The rating is *moderate* if slopes are so steep that wheeled equipment cannot be operated safely across the slope, if wetness restricts equipment use from 2 to 6 months per year, if stoniness restricts the use of ground-based equipment, or if special equipment is needed to prevent or minimize compaction. The rating is *severe* if slopes are so steep that tracked equipment cannot be operated safely across the slope, if wetness restricts equipment use for more than 6 months per year, if stoniness restricts the use of ground-based equipment, or if special equipment is needed to prevent or minimize 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 activities.

Ratings of *seedling mortality* refer to the probability of the 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 to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, aspect of the slope, and rooting depth. The mortality rate generally is highest on soils that have a sandy or clayey surface layer. The risk is *slight* if, after site preparation, expected mortality is less than 25 percent; *moderate* if expected mortality is between 25 and 50 percent; and *severe* if expected mortality exceeds 50 percent. Ratings of *moderate* or *severe* indicate that it may be necessary to use containerized or larger than usual planting stock or to make special site preparations, such as bedding, furrowing, installing a surface drainage system,

constructing fire lanes (fig. 14), and 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* and a *volume* number. Common trees are listed in the order of their observed general occurrence. Generally, only two or three tree species dominate. The first tree listed for each soil 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.

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. Loblolly pine, longleaf pine, shortleaf pine, water oak, white oak, cottonwood, sweetgum, and yellow poplar can have different absolute indices *(3, 4, 5, 6, 9, 15, 22)*.

The *volume* is the yield likely to be produced by the most important trees, expressed in cubic feet per acre per year calculated at the age of culmination of mean annual increment.

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

Recreation

Harry Tyson, district conservationist, Soil Conservation Service, helped prepare this section.

Recreation is a major part of Onslow County's economy. It is important in all parts of the county, particularly on the Outer Banks and in adjacent mainland areas.

The beaches of the Outer Banks face south and provide excellent opportunities for swimming and other water sports. Vacation cottages, golf courses, and camp sites are common in the dune areas. Soil blowing can be a serious problem on the droughty, sandy soils. Breaks in the foredunes and blowouts can form where vegetation is disturbed. Maintaining or reestablishing vegetation minimizes these problems.

The Intracoastal Waterway, which is between the Outer Banks and the mainland, provides opportunities for boating, fishing, and waterskiing.

The mainland areas near the Intracoastal Waterway also are significant. Many permanent homes and vacation cottages, golf courses, and riding stables are in these areas.

The Hofmann Forest is inhabited by many game animals, particularly deer and bear. It thus provides significant hunting opportunities. The Great Sandy Run Pocosin is used for the study of natural plant and animal life.

The various streams and rivers in the county, particularly the New River, the White Oak River, and Southwest Creek, are used for fishing and boating and as scenic nature areas.

The soils of the survey area are rated in table 8 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 sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation also are 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 recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

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

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

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

Figure 14.—A fire lane constructed with material excavated from Woodington loamy fine sand.

stones or boulders can greatly increase the cost of constructing campsites.

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

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

Paths and trails for hiking, horseback riding, and bicycling should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface. Special management practices may be required in ecologically sensitive areas (fig. 15).

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

Wildlife Habitat

Harry Tyson, district conservationist, and John P. Edwards, biologist, Soil Conservation Service, helped prepare this section.

The wildlife habitat in Onslow County is highly varied, primarily because of the different landforms and land uses. Small farms that have intermingled cropland and woodland are in scattered areas throughout the county, except in the areas of Camp Lejeune, Hofmann Forest, and Great Sandy Run Pocosin. The edges of fields near areas of cover provide excellent habitat for wildlife. Numerous ditches bordered by trees and shrubs and

Figure 15.—A walkover structure used to protect fragile vegetation in a sensitive dune area.

many abandoned fields also provide habitat, particularly for upland wildlife species.

Populations of songbirds and small game are plentiful throughout Onslow County. Small game species are cottontail and marsh rabbits, raccoon, and opossum. Red fox, gray fox, mink, beaver, muskrat, and other furbearers thrive in some areas. White-tailed deer is the only big game species that has a significant and widespread population in the county. Black bear is common in a few areas. Waterfowl populations are varied and extensive in the coastal marshes. Loggerhead turtles are along the ocean shoreline.

Hofmann Forest, Great Sandy Run Pocosin, and Camp Lejeune are mostly wooded, and few or no farmsteads are within their boundaries. Abundant browse is available along the edges of the roads and ditches throughout these areas. Deer and other game animals and many nongame species are abundant. Black bear and wild turkey are in the Camp Lejeune area. Because of the diversity of the soils in Camp Lejeune and Great Sandy Run Pocosin, a wide range of habitat is available for wildlife.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect

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

In table 9, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

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

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

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

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

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

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 hardwoods and shrubs are depth of the root zone, the available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, 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, cedar, and juniper.

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

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

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

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

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, 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, shore birds, muskrat, mink, otter, alligator, water snakes, 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. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil but not shown on the map.

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 should be considered in planning, in site selection, and in design.

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

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreation uses; make preliminary estimates of construction conditions; evaluate routes for roads, streets, highways, pipelines, and underground cables; evaluate 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 10 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

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

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are

made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

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

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

Sanitary Facilities

Table 11 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 11 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

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

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

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

Table 11 gives ratings for the natural soil that makes up the lagoon floor. Generally, the surface layer and 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high

content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and the cemented pan can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed 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 should be considered.

The ratings in table 11 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

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

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

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

Construction Materials

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

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

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

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

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

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 12, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

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

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is as much as 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

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

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

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

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

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

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

Water Management

Table 13 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed excavated ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, and grassed waterways.

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

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

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

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material, and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

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

Drainage is the removal of excess surface and

subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; and subsidence of organic layers. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

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

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

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

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 17.

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

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

Engineering Index Properties

Table 14 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

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

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 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 17.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates

determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

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

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

Physical and Chemical Properties

Table 15 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

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

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence the 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 earth-moving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 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 that 1.6 can restrict water storage and root penetration. Bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

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

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil. 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.

The 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 15, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

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

Soil and Water Features

Table 16 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The 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. These soils have a high rate of water transmission.

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

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

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

If a soil is assigned to two hydrologic groups in table 16, the first letter is for drained areas and the second letter is for undrained areas.

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

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

Frequency, duration, and probable dates of occurrence are estimated. Frequency is generally 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 (the chance of flooding is nearly 0 percent to 5 percent in any year). *Occasional* means that flooding occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year). *Frequent* means that flooding occurs often under normal weather conditions (the chance of flooding is more than 50 percent in any year). Duration is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 days to 1 month), and *very long* (more than 1 month). The time of year that floods are most likely to occur is expressed in months. 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 characteristic of soils that are not subject to flooding.

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

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 16 are the depth to the seasonal high water table; the kind of water table, such as *apparent*; and the months of the year that the water table commonly is highest. A water table that is seasonally high for less than 1 month is not indicated in table 16.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil.

Two numbers in the column showing depth to the water table 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. If a plus sign precedes the range in depth, the first number indicates how high the water table rises above the surface of the soil. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

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 factors such as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

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

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

Engineering Index Test Data

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

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

The tests and methods are AASHTO classification—M 145 (AASHTO), 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 *(21)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 18 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

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

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquult (*Aqu*, meaning water, 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 Paleaquults (*Pale*, meaning maximum horizonation, plus *aquult*, the suborder of the Ultisols that has an aquic moisture regime).

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

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

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 alphabetical 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" *(20)*. Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" *(21)*. 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."

Alpin Series

The Alpin series consists of excessively drained soils on uplands. These soils formed in coarse textured sediments. Slope ranges from 1 to 6 percent.

Typical pedon of Alpin fine sand, 1 to 6 percent

slopes, 5 miles south of Hubert, 0.7 mile north of the intersection of North Carolina Highway 172 and Bear Creek Tower Road, 100 feet west of North Carolina Highway 172 (2,532,000X; 332,000Y):

A—0 to 4 inches; gray (10YR 5/1) fine sand; single grain; loose; common fine particles of organic matter; very strongly acid; clear wavy boundary.
E1—4 to 13 inches; very pale brown (10YR 7/4) fine sand; single grain; loose; medium acid; clear wavy boundary.
E2—13 to 48 inches; very pale brown (10YR 8/3) fine sand; few medium distinct brownish yellow (10YR 6/6) mottles; many pockets of coarse faint white (10YR 8/2) uncoated sand grains; few bodies of loamy fine sand; single grain; loose; medium acid; clear wavy boundary.
E/B—48 to 80 inches; white (10YR 8/2) fine sand; single grain; loose; few yellowish brown (10YR 5/8) lamellae of loamy fine sand about ¼ to 1 inch thick and 2 to 5 inches apart; medium acid.

The sandy material extends to a depth of 80 inches or more. The soils range from very strongly acid to medium acid throughout unless the surface has been limed. The E part of the E/B horizon ranges from 2 to 10 inches in thickness between the B layers. Each B layer is ¼ to 1 inch thick, and the cumulative thickness of the B layers is less than 6 inches.

The Ap or A horizon has hue of 10YR, value of 4 or 5, and chroma of 1 to 3. The E horizon has hue of 10YR, value of 6 to 8, and chroma of 3 or 4. It is fine sand or sand. The E part of the E/B horizon has hue of 10YR or 2.5Y, value of 7 or 8, and chroma of 1 to 4. The B part has hue of 10YR or 7.5YR, value of 5 to 8, and chroma of 4 to 8. The E part is fine sand, and the B part is loamy fine sand or sandy loam.

Autryville Series

The Autryville series consists of well drained soils on uplands. These soils formed in moderately coarse textured sediments. Slope ranges from 1 to 6 percent.

Typical pedon of Autryville loamy fine sand, 1 to 6 percent slopes, 5.7 miles west of Richlands, 0.3 mile northeast of the intersection of North Carolina Highway 24 and State Road 1230, about 0.6 mile southeast of State Road 1230 and a farm path, 0.1 mile east of a farm road (2,412,000X; 429,000Y):

Ap—0 to 8 inches; grayish brown (10YR 5/2) loamy fine sand; weak medium granular structure; very friable; few fine roots; medium acid; abrupt smooth boundary.
E—8 to 24 inches; very pale brown (10YR 7/3) loamy fine sand; weak medium granular structure; very friable; few fine white (10YR 8/1) clean sand grains; strongly acid; clear smooth boundary.
BE—24 to 27 inches; brownish yellow (10YR 6/6) fine sandy loam; weak medium granular structure; very friable; strongly acid; gradual wavy boundary.
Bt—27 to 38 inches; strong brown (7.5YR 5/6) fine sandy loam; few medium distinct very pale brown (10YR 7/3) mottles; weak fine subangular blocky structure; friable; strongly acid; gradual wavy boundary.
E′—38 to 53 inches; light gray (10YR 7/2) fine sand; few fine distinct light yellowish brown (10YR 6/4) mottles; single grain; loose; few white (10YR 8/1) clean sand grains; strongly acid; gradual wavy boundary.
BE′—53 to 64 inches; strong brown (7.5YR 5/8) fine sandy loam; weak medium granular structure; friable; strongly acid; gradual wavy boundary.
Btg—64 to 77 inches; light gray (10YR 7/1) sandy clay loam; common medium distinct weak red (2.5YR 5/2) and few fine prominent yellowish red (5YR 5/8) mottles; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; few small pockets of very pale brown (10YR 7/3) uncoated sand grains; very strongly acid; gradual wavy boundary.
BCg—77 to 99 inches; light gray (10YR 7/1) sandy loam; common fine distinct brownish yellow (10YR 6/6) and few fine prominent red (2.5YR 4/8) mottles; weak fine subangular blocky structure; friable; very strongly acid.

These soils are bisequal and have a sandy A horizon, a sandy E horizon, and a loamy B horizon that extends to a depth of more than 60 inches. The soils are very strongly acid or strongly acid throughout unless the surface has been limed.

The Ap or A 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 6 or 7, and chroma of 3 or 4. It is loamy fine sand or fine sand.

The BE and BE′ horizons, if they occur, have hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 3 to 8. They are loamy sand, loamy fine sand, sandy loam, or fine sandy loam.

The Bt horizon has hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 4 to 8. It is fine sandy loam or sandy clay loam.

The E′ horizon has hue of 10YR or 2.5Y, value of 6 to 8, and chroma of 1 to 8. It is loamy fine sand or fine sand.

The Btg horizon has hue of 10YR or 2.5Y, value of 5

to 7, and chroma of 1 to 8. It is fine sandy loam or sandy clay loam.

The BCg horizon has hue of 10YR or 2.5Y, value of 6 to 8, and chroma of 1 to 3 and is mottled in shades of yellow, brown, and red. It is sand, sandy loam, or sandy clay loam.

Baymeade Series

The Baymeade series consists of well drained soils on uplands. These soils formed in moderately coarse textured sediments. Slope ranges from 0 to 6 percent.

Typical pedon of Baymeade fine sand, 0 to 6 percent slopes, 1.9 miles south of Hubert, 1.6 miles south of the intersection of North Carolina Highways 24 and 172, and 100 feet west of the intersection of North Carolina Highway 172 and a logging road (2,529,000X; 344,000Y):

A—0 to 2 inches; gray (10YR 5/1) fine sand; single grain; loose; few fine roots; strongly acid; clear wavy boundary.

E—2 to 9 inches; light gray (10YR 7/2) fine sand; single grain; loose; few fine roots; strongly acid; clear wavy boundary.

E/Bh—9 to 15 inches; light yellowish brown (10YR 6/4) fine sand; single grain; loose; few soft nodules of dark yellowish brown (10YR 4/4), organic-coated sand ⅛ to ¼ inch in diameter; few fine roots; strongly acid; clear wavy boundary.

E′—15 to 30 inches; white (10YR 8/2) fine sand; few coarse distinct very pale brown (10YR 7/4) mottles; single grain; loose; few brownish yellow (10YR 6/8) lamellae of fine sandy loam ⅛ to ¼ inch thick; strongly acid; clear wavy boundary.

Bt—30 to 40 inches; brownish yellow (10YR 6/6) fine sandy loam; weak fine subangular blocky structure; very friable; strongly acid; clear wavy boundary.

BC—40 to 56 inches; light yellowish brown (10YR 6/4) fine sandy loam that has strata of fine sand; few fine distinct light gray (10YR 7/1) mottles; weak fine subangular blocky structure; very friable; strongly acid; gradual wavy boundary.

Cg—56 to 80 inches; light gray (10YR 7/2) fine sand that has strata of loamy fine sand; common medium distinct brown (10YR 5/3) mottles; single grain; loose; strongly acid.

The loamy and sandy layers extend to a depth of 72 inches or more. The soils are strongly acid or medium acid throughout unless the surface has been limed.

The A or Ap horizon has hue of 10YR, value of 4 to 6, and chroma of 1. The E and E′ horizons have hue of 10YR, value of 6 to 8, and chroma of 1 to 4. The Bh part of the E/Bh horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 2 to 4. It is fine sand, fine sandy loam, or sand. It makes up 5 to 20 percent of the horizon.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 4 to 8. It is fine sandy loam or sandy clay loam.

The BC horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 4 to 8. It is loamy sand, sandy loam, or fine sandy loam.

The C horizon has hue of 10YR, value of 6 to 8, and chroma of 1 to 8. It is fine sand or loamy fine sand.

Bohicket Series

The Bohicket series consists of very poorly drained soils in tidal marshes that are less than 3 feet above sea level. These soils formed in silty and clayey sediments that were washed from the drainage areas of freshwater streams. Slope is less than 1 percent.

Typical pedon of Bohicket silty clay loam, on the eastern side of Sanders Channel, 0.2 mile east of an inlet from the Intracoastal Waterway (2,546,000X; 328,000Y):

A—0 to 8 inches; dark gray (N 4/0) silty clay loam; massive; friable, slightly sticky and slightly plastic; slightly acid; gradual wavy boundary.

Cg1—8 to 38 inches; dark gray (N 4/0) silty clay that has pockets of silt loam; massive; friable, slightly sticky and slightly plastic; slightly acid; gradual wavy boundary.

Cg2—38 to 60 inches; gray (N 5/0) loamy sand; massive; very friable; neutral.

The clayey part of the C horizon extends to a depth of 38 inches or more. The soils generally range from slightly acid to moderately alkaline throughout. After drying, however, they are extremely acid.

The A horizon has hue of 10YR to 5G, value of 2 to 5, and chroma of 1 or 2, or it is neutral in hue and has value of 2 to 5.

The Cg horizon has hue of 10YR to 5GY, value of 2 to 7, and chroma of 1 or 2, or it is neutral in hue and has value of 2 to 7. The upper part of the horizon is silty clay, clay, or sandy clay. Below a depth of about 40 inches, the horizon ranges from sand to clay.

Carteret Series

The Carteret series consists of very poorly drained soils in tidal marshes along the Intracoastal Waterway. These soils formed in sandy marine sediments. Slope ranges from 0 to 2 percent.

Typical pedon of Carteret fine sand, 5 miles southwest of the intersection of North Carolina Highway 210 and State Road 1568, about 0.1 mile north of the intersection of North Carolina Highway 210 and Wildlife Road, 100 feet northwest of Wildlife Island Road (3,029,000X; 7,727,000Y):

Oi—7 inches to 0; very dark grayish brown (10YR 3/2), slightly decomposed litter and roots.
Cg1—0 to 7 inches; gray (10YR 5/1) fine sand; single grain; loose; neutral; gradual wavy boundary.
Cg2—7 to 45 inches; dark gray (5Y 4/1) fine sand; single grain; loose; moderately alkaline; gradual wavy boundary.
Cg3—45 to 50 inches; dark greenish gray (5GY 4/1) sandy loam; massive; slightly sticky; moderately alkaline; gradual wavy boundary.
Cg4—50 to 65 inches; dark gray (5Y 4/1) fine sand; single grain; slightly sticky; moderately alkaline.

The sandy and loamy horizons extend to a depth of 65 inches or more. The soils range from medium acid to moderately alkaline throughout. Some pedons have few to many shell fragments.

The O horizon, if it occurs, has hue of 10YR, value of 3, and chroma of 1 or 2. It is a dense root mat and decaying organic matter.

The A horizon, if it occurs, has hue of 10YR to 5GY, value of 3 to 5, and chroma of 1 to 3, or it is neutral in hue and has value of 3 to 5.

The Cg horizon has hue of 10YR to 5GY, value of 4 or 5, and chroma of 1, or it is neutral in hue and has value of 4 or 5. It is loamy sand, sandy loam, or fine sand. Some pedons have thin, intermittent layers of clay loam, silty clay loam, or shells throughout.

Corolla Series

The Corolla series consists of moderately well drained and somewhat poorly drained soils on the Outer Banks. These soils formed in coarse textured sediments. Slope ranges from 1 to 3 percent.

Typical pedon of Corolla fine sand, on Onslow Island, 0.3 mile northeast of Onslow Island Bridge, 200 feet northwest of Beach Road (2,522,000X; 304,500Y):

A—0 to 1 inch; pale brown (10YR 6/3) fine sand; single grain; loose; moderately alkaline; clear wavy boundary.
C1—1 to 8 inches; very pale brown (10YR 7/3) fine sand; single grain; loose; moderately alkaline; gradual wavy boundary.
C2—8 to 21 inches; pale brown (10YR 6/3) fine sand; single grain; loose; moderately alkaline; gradual wavy boundary.
Cg1—21 to 44 inches; light brownish gray (2.5Y 6/2) fine sand; single grain; loose; moderately alkaline; gradual wavy boundary.
Cg2—44 to 72 inches; grayish brown (10YR 5/2) sand; single grain; loose; about 5 percent shells and small shell fragments; common black mineral grains; moderately alkaline.

The sandy horizons extend to a depth of 72 inches or more. The soils range from medium acid to mildly alkaline throughout.

The A horizon has hue of 10YR or 2.5Y, value of 3 to 6, and chroma of 1 to 3, or it is neutral in hue and has value of 3 to 6. Some pedons have an Ab horizon. This horizon is 24 to 72 inches below the surface. It is similar in color to the A horizon.

The C horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 2 to 4. The Cg horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2, or it is neutral in hue and has value of 4 to 7. It is fine sand to coarse sand.

Craven Series

The Craven series consists of moderately well drained soils on uplands. These soils formed in fine textured marine sediments. Slope ranges from 1 to 8 percent.

Typical pedon of Craven fine sandy loam, 1 to 4 percent slopes, 1.7 miles northwest of Belgrade, 1.6 miles southeast of the intersection of State Roads 1332 and 1331, and 20 feet north of State Road 1331 (2,521,500X; 422,000Y):

Ap—0 to 8 inches; grayish brown (10YR 5/2) fine sandy loam; weak medium granular structure; very friable; few fine roots; strongly acid; abrupt smooth boundary.
BA—8 to 11 inches; brownish yellow (10YR 6/6) clay loam; weak fine subangular blocky structure; friable; few fine roots; very strongly acid; clear wavy boundary.
Bt1—11 to 20 inches; brownish yellow (10YR 6/6) clay; few medium distinct strong brown (7.5YR 5/6) mottles; moderate fine angular blocky structure; very firm, sticky and very plastic; few fine roots between peds; thin clay films on faces of peds; very strongly acid; gradual wavy boundary.
Bt2—20 to 34 inches; light yellowish brown (10YR 6/4) clay; common fine distinct light brownish gray (10YR 6/2) and few fine prominent red (2.5YR 5/8) mottles; moderate fine subangular blocky structure; very firm, sticky and very plastic; thin clay films on faces of peds and in pores; very strongly acid; gradual wavy boundary.

Btg—34 to 48 inches; gray (10YR 6/1) clay; common fine distinct light yellowish brown (10YR 6/4), few fine prominent red (2.5YR 5/8), and few medium distinct strong brown (7.5YR 5/8) mottles; moderate fine angular blocky structure; very firm, sticky and very plastic; thin clay films on faces of peds and in pores; very strongly acid; gradual wavy boundary.

BCg—48 to 55 inches; gray (10YR 6/1) clay loam; common coarse distinct yellowish brown (10YR 5/8) and common fine prominent red (10R 4/8) mottles; moderate fine angular blocky structure; firm, sticky and plastic; very strongly acid; clear wavy boundary.

Cg—55 to 80 inches; gray (10YR 6/1) sandy loam that has lenses of loamy sand and sandy clay; common coarse distinct light gray (10YR 7/1) and few medium distinct reddish brown (5YR 5/4) mottles; massive; friable, slightly sticky and slightly plastic; very strongly acid.

The combined thickness of the A and B horizons ranges from 40 to 60 inches. The soils are very strongly acid or strongly acid throughout unless the surface has been limed.

The A horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. The BA horizon has hue of 10YR and value and chroma of 4 to 6. It is clay loam, loam, or sandy clay loam. Some pedons do not have a BA horizon.

The Bt horizon has hue of 10YR, value of 5 to 7, and chroma of 4 to 8. The Btg horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. The Bt and Btg horizons are dominantly clay but in some pedons are silty clay, silty clay loam, or clay loam.

The BCg horizon is similar in color to the Btg horizon, or it is mottled. It is sandy clay loam, clay loam, or clay.

The Cg horizon is similar in color to the Btg horizon. It is loamy sand to clay.

Croatan Series

The Croatan series consists of very poorly drained, organic soils on uplands. These soils formed in herbaceous plant residue over loamy material. Slope ranges from 0 to 2 percent.

Typical pedon of Croatan muck, 4 miles northwest of Deppe Lookout Tower, 0.5 mile northwest of the intersection of Deppe Trail and Roper Road, 50 feet northeast of Deppe Trail (2,501,000X; 417,500Y):

Oa1—0 to 9 inches; black (N 2/0) muck; about 8 percent fiber, 2 percent rubbed; weak fine granular structure; very friable; common fine and medium roots; few clean sand grains; about 80 percent organic material; very strongly acid; gradual wavy boundary.

Oa2—9 to 23 inches; black (N 2/0) muck; about 5 percent fiber, 1 percent rubbed; weak medium granular structure; very friable; few fine and medium roots; few clean sand grains; about 75 percent organic material; extremely acid; gradual wavy boundary.

Oa3—23 to 34 inches; black (7.5YR 2/1) muck; about 10 percent fiber, 2 percent rubbed; massive; very friable; few fine roots; few clean sand grains; about 65 percent organic material; extremely acid; diffuse wavy boundary.

2Cg1—34 to 40 inches; dark reddish brown (5YR 2/2) mucky sandy loam; massive; very friable; about 80 percent mineral material; extremely acid; gradual wavy boundary.

2Cg2—40 to 50 inches; dark grayish brown (10YR 4/2) sandy clay loam that has strata of sandy loam; massive; friable, slightly sticky and slightly plastic; few nearly decomposed medium roots; extremely acid; gradual wavy boundary.

2Cg3—50 to 70 inches; grayish brown (10YR 5/2) sandy clay loam that has strata of sandy loam; massive; slightly sticky and slightly plastic; few nearly decomposed medium roots; extremely acid; gradual smooth boundary.

2Cg4—70 to 80 inches; light brownish gray (10YR 6/2) sandy loam that has strata of sandy clay loam; massive; very friable; extremely acid.

The organic material ranges from 16 to 51 inches in thickness. It is extremely acid unless the surface has been limed. The underlying mineral horizons range from extremely acid to slightly acid. Logs, stumps, and fragments of wood make up 0 to 10 percent of the organic layers in undisturbed areas. Some pedons have charcoal particles and pockets of ash.

The organic horizons have hue of 7.5YR to 5Y, value of 2 or 3, and chroma of 1 or 2, or they are neutral in hue and have value of 2 or 3. The content of fibers in the organic layers is 5 to 25 percent before rubbing and less than 10 percent after rubbing. The organic material is typically massive under natural wet conditions. If the soils are drained and cultivated, however, a granular or blocky structure develops in all or part of the organic material, depending on the nature and depth of the organic material and the duration of drainage.

The underlying mineral horizons commonly have hue of 5YR to 5Y, value of 2 to 6, and chroma of 1 to 3. They are sandy clay loam or sandy loam.

Dorovan Series

The Dorovan series consists of very poorly drained, organic soils on flood plains. These soils formed in plant residue over sandy sediments. Slope is less than 1 percent.

Typical pedon of Dorovan muck, 1.7 miles southwest of Tar Landing, 0.1 mile east of the intersection of Deerfield and Wilberry Roads, 0.7 mile east of the intersection of Wilberry and Woods Roads, 300 feet north of a power line (2,460,000X; 372,500Y):

Oe—0 to 4 inches; very dark grayish brown (10YR 3/2) muck; about 60 percent fiber, 20 percent rubbed; massive; many medium roots; about 25 percent silt and fine sand; strongly acid; clear wavy boundary.

Oa1—4 to 32 inches; dark reddish brown (5YR 2/2) muck; about 40 percent fiber, 6 percent rubbed; massive; common fine roots; about 30 percent silt and fine sand; strongly acid; gradual wavy boundary.

Oa2—32 to 80 inches; dark reddish brown (5YR 2/2) muck; about 25 percent fiber, 5 percent rubbed; massive; about 30 percent silt and fine sand; very strongly acid; gradual wavy boundary.

2Cg—80 to 99 inches; very dark grayish brown (10YR 3/2) sandy loam that has strata of loamy sand; few medium distinct dark gray (10YR 4/1) mottles; massive; very friable; neutral.

The decomposed organic layers extend to a depth of 51 inches or more. They are very strongly acid or strongly acid.

The surface and subsurface organic layers have hue of 5YR to 10YR, value of 2 or 3, and chroma of 1 or 2. They have few or common clean sand grains. The substratum is sand to sandy loam.

The Dorovan soils in this county are a taxadjunct to the series because they are less acid than is definitive for the series. This difference, however, does not significantly affect the use, management, or behavior of the soils.

Duckston Series

The Duckston series consists of poorly drained soils that formed in sandy windblown material deposited in shallow depressions or on flats between sand ridges and marshes. Slope ranges from 0 to 2 percent.

Typical pedon of Duckston fine sand, on Onslow Island, 0.5 mile north of New River Inlet (2,503,000X; 290,500Y):

A—0 to 7 inches; dark grayish brown (10YR 4/2) fine sand; single grain; loose; many fine roots; neutral; gradual wavy boundary.

Cg1—7 to 19 inches; light brownish gray (10YR 6/2) fine sand; single grain; loose; neutral; gradual wavy boundary.

Cg2—19 to 60 inches; gray (5Y 5/1) fine sand; single grain; loose; about 4 percent fine shell fragments; neutral.

The sandy horizons extend to a depth of 60 inches or more. The soils range from medium acid to moderately alkaline throughout. Some pedons have small, calcareous shell fragments. The soils have few or common grains of black, red, pink, dark brown, and white minerals. Some pedons have a sulfur odor below the surface layer.

The A horizon has hue of 10YR to 5Y, value of 3 to 5, and chroma of 1 or 2, or it is neutral in hue and has value of 3 to 5. The Cg horizon has hue of 10YR to 5Y, value of 4 to 8, and chroma of 1 or 2; has hue of 5GY, value of 5 or 6, and chroma of 1; or is neutral in hue and has value of 4 to 8. It is fine sand or sand.

Foreston Series

The Foreston series consists of moderately well drained soils on uplands. These soils formed in moderately coarse textured sediments. Slope ranges from 0 to 2 percent.

Typical pedon of Foreston loamy fine sand, 0 to 2 percent slopes, 1.3 miles northeast of Piney Green, 0.7 mile east of the intersection of State Road 1411 and Lake Cole Road, in a road cut on the northern side of State Road 1411 (2,511,500X; 362,000Y):

A—0 to 6 inches; dark gray (10YR 4/1) loamy fine sand; weak medium granular structure; very friable; common fine roots; strongly acid; clear wavy boundary.

EB—6 to 12 inches; light yellowish brown (10YR 6/4) fine sandy loam; few fine distinct strong brown (7.5YR 5/8) mottles; weak medium granular structure; very friable; very strongly acid; clear wavy boundary.

Bt1—12 to 21 inches; brownish yellow (10YR 6/6) fine sandy loam; weak medium granular structure; very friable; few patchy clay films on sand grains; very strongly acid; gradual wavy boundary.

Bt2—21 to 36 inches; brownish yellow (10YR 6/6) fine sandy loam; common coarse distinct light gray (10YR 7/1) and common fine distinct yellowish red (5YR 5/8) mottles; weak medium granular structure; very friable; few patchy clay films on sand grains; very strongly acid; gradual wavy boundary.

Btg—36 to 58 inches; light gray (10YR 7/1) fine sandy loam; common medium distinct brownish yellow (10YR 6/6) and few coarse prominent red (2.5YR

5/8) mottles; weak medium granular structure; very friable; common patchy clay films on sand grains; very strongly acid; gradual wavy boundary.
BCg—58 to 70 inches; light gray (10YR 7/1) fine sandy loam that has strata of sandy clay loam; common fine distinct brownish yellow (10YR 6/6) mottles; weak medium granular structure; very friable; very strongly acid; gradual wavy boundary.
Cg—70 to 80 inches; light gray (10YR 7/1) loamy fine sand that has strata of fine sand; single grain; loose; very strongly acid.

The sandy and loamy horizons extend to a depth of 60 inches or more. The soils are very strongly acid or strongly acid throughout unless the surface has been limed.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 1 or 2. The upper part of the Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 4 to 6. The lower part has hue of 10YR or 2.5Y, value of 5 to 8, and chroma of 1 or 2. The mottles in this horizon are in shades of yellow, brown, gray, or red. The Bt horizon is sandy loam or fine sandy loam. The BCg and Cg horizons have hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 1 or 2. They are sand, loamy fine sand, loamy sand, sandy loam, fine sandy loam, or sandy clay loam.

Goldsboro Series

The Goldsboro series consists of moderately well drained soils on uplands. These soils formed in moderately fine textured sediments. Slope ranges from 0 to 2 percent.

Typical pedon of Goldsboro fine sandy loam, 0 to 2 percent slopes, 12 miles northeast of Jacksonville, 1.2 miles southeast of Deppe on State Road 1436, and 25 feet south of State Road 1436 (2,520,000X; 400,000Y):

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak medium granular structure; very friable; few fine roots; medium acid; abrupt smooth boundary.
E—7 to 11 inches; pale brown (10YR 6/3) fine sandy loam; weak medium granular structure; very friable; few fine roots; strongly acid; clear wavy boundary.
EB—11 to 13 inches; light yellowish brown (10YR 6/4) fine sandy loam; weak fine subangular blocky structure; very friable; few fine roots; strongly acid; clear wavy boundary.
Bt1—13 to 24 inches; yellowish brown (10YR 5/4) sandy clay loam; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; thin patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.
Bt2—24 to 40 inches; light yellowish brown (10YR 6/4) sandy clay loam; common medium distinct light gray (10YR 7/2) and strong brown (7.5YR 5/8) mottles; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; thin patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.
Btg—40 to 60 inches; light gray (10YR 6/1) sandy clay loam; few medium prominent red (2.5YR 5/8) and common medium distinct strong brown (7.5YR 5/8) mottles; weak fine 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 68 inches; light gray (10YR 7/1) sandy clay loam that has thin strata of sandy loam; common fine faint brownish yellow and few medium distinct strong brown (7.5YR 5/8) mottles; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; very strongly acid; gradual wavy boundary.
Cg—68 to 80 inches; gray (10YR 6/1) sandy loam that has thin strata of loamy sand; massive; friable; very strongly acid.

The loamy horizons extend to a depth of 60 inches or more. The soils are very strongly acid or strongly acid throughout unless the surface has been limed.

The Ap or A horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. The Bt horizon has hue of 10YR, value of 5 or 6, and chroma of 1 to 8. It has grayish mottles at a depth of 20 to 30 inches. It is sandy clay loam or sandy loam in the upper part, sandy clay loam in the next part, and sandy clay loam or sandy clay in the lower part. The BCg and Cg horizons have hue of 10YR, value of 5 to 7, and chroma of 1 or 2. They are stratified sandy loam, loamy sand, and sandy clay loam.

Grifton Series

The Grifton series consists of poorly drained soils on uplands. These soils formed in moderately fine textured sediments mixed with soft marl. Slope ranges from 0 to 2 percent.

Typical pedon of Grifton fine sandy loam, 2.1 miles south of Hargett's Cross Roads, 0.2 mile west of the intersection of U.S. Highway 258 and State Road 1235, and 75 feet southwest of U.S. Highway 258 (2,409,000X; 447,500Y):

A—0 to 4 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak medium granular structure;

very friable; slightly acid; clear wavy boundary.
Eg—4 to 9 inches; light brownish gray (10YR 6/2) fine sandy loam; few fine distinct brownish yellow (10YR 6/6) mottles; weak medium granular structure; very friable; slightly acid; clear wavy boundary.
BEg—9 to 12 inches; light brownish gray (10YR 6/2) sandy clay loam; common medium distinct brownish yellow (10YR 6/6) mottles; weak fine subangular blocky structure; friable; neutral; clear wavy boundary.
Btg1—12 to 32 inches; light gray (10YR 6/1) sandy clay loam; common medium distinct brownish yellow (10YR 6/8) mottles; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; neutral; gradual wavy boundary.
Btg2—32 to 45 inches; light gray (10YR 7/1) sandy clay loam; many medium distinct brownish yellow (10YR 6/8) mottles; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; neutral; gradual wavy boundary.
B/Cg—45 to 58 inches; gray (5Y 6/1) sandy loam that has strata of sandy clay loam; common coarse distinct brownish yellow (10YR 6/8) mottles; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; few strong brown (7.5YR 5/8) concretions; moderately alkaline; gradual wavy boundary.
2Cg—58 to 80 inches; greenish gray (5G 5/2) sandy clay loam that has strata of clay and clay loam; few fine prominent brownish yellow (10YR 6/8) and common medium distinct gray (N 5/0) mottles; massive; firm, sticky and plastic; common fine shell fragments; moderately alkaline.

The loamy horizons extend to a depth of 40 inches or more. The surface layer, subsurface layer, and upper part of the subsoil range from very strongly acid to neutral unless the surface has been limed. The lower part of the subsoil and the substratum range from medium acid to moderately alkaline. The seasonal high water table is 0.5 to 1.0 foot below the surface.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 1 or 2. The Btg horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. It has brown, yellowish brown, brownish yellow, or red mottles. It is sandy clay loam, sandy loam, or clay loam. The 2Cg horizon has hue of 2.5Y, 5Y, or 5G, value of 6 to 8, and chroma of 1 or 2. It has red, brown, yellowish brown, brownish yellow, or gray mottles. It is sand, loamy sand, sandy loam, or sandy clay loam and has shell fragments and thin layers of clay or clay loam.

Kureb Series

The Kureb series consists of excessively drained soils on uplands. These soils formed in coarse textured sediments. Slope ranges from 1 to 6 percent.

Typical pedon of Kureb fine sand, 1 to 6 percent slopes, 1.1 miles southeast of Folkston, 1.1 miles southeast of the intersection of U.S. Highway 17 and State Road 1518, and 50 feet north of State Road 1518 (2,455,000X; 288,000Y):

A—0 to 6 inches; gray (10YR 6/1) fine sand; single grain; loose; organic matter and sand grains have salt-and-pepper appearance; few fine roots; very strongly acid; clear wavy boundary.
E—6 to 26 inches; light gray (10YR 7/1) fine sand; single grain; loose; few large roots; very strongly acid; clear irregular boundary.
C/Bh1—26 to 48 inches; brownish yellow (10YR 6/6) fine sand; single grain; loose; few tongues of light gray (10YR 7/1) material extending from the E horizon; few brown (7.5YR 4/2) concretions and bands along walls of tongues; very strongly acid; clear irregular boundary.
C/Bh2—48 to 62 inches; light yellowish brown (10YR 6/4) fine sand; single grain; loose; few brown (7.5YR 4/2) horizontal and vertical bands and few dark reddish brown (5YR 3/3) concretions ¼ to ½ inch in diameter; very strongly acid; gradual irregular boundary.
C1—62 to 69 inches; mottled pale brown (10YR 6/3), grayish brown (10YR 5/2), and dark grayish brown (10YR 4/2) fine sand that has pockets of loamy fine sand; massive; very friable; very strongly acid; gradual irregular boundary.
C2—69 to 80 inches; light gray (10YR 6/1) fine sand that has pockets of loamy fine sand; massive; very friable; few dark reddish brown (5YR 3/2) concretions ¼ to ½ inch in diameter; very strongly acid.

The sandy layers extend to a depth of 80 inches or more. The soils range from very strongly acid to neutral throughout.

The A horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. The E horizon has hue of 10YR, value of 7 or 8, and chroma of 1 or 2. It is sand or fine sand. Some pedons do not have an E horizon. The C part of the C/Bh horizon has hue of 10YR, value of 5 to 7, and chroma of 1 to 8. The Bh part has hue of 5YR or 7.5YR, value of 3 or 4, and chroma of 2 to 4. The C/Bh

horizon is sand or fine sand. The C horizon has hue of 10YR, value of 4 to 8, and chroma of 1 to 8. It is sand, fine sand, or loamy sand.

Lafitte Series

The Lafitte series consists of very poorly drained soils on flood plains at elevations of less than 5 feet. These soils formed in plant residue over sandy sediments. Slope is less than 1 percent.

Typical pedon of Lafitte muck, 1.5 miles east of Silverdale, 0.3 mile southwest of the State Road 1442 bridge, 50 feet south of State Road 1442 (2,554,000X; 377,000Y):

Oa1—0 to 30 inches; dark brown (10YR 4/3) muck; about 50 percent fiber, 10 percent rubbed; massive; many fine and medium roots; about 20 percent silt and fine sand; strongly acid; clear wavy boundary.

Oa2—30 to 50 inches; very dark brown (10YR 2/2) muck; about 45 percent fiber, 5 percent rubbed; massive; common fine roots; about 15 percent silt and fine sand; medium acid; gradual wavy boundary.

Oa3—50 to 70 inches; very dark brown (10YR 2/2) muck; about 65 percent fiber, 5 percent rubbed; massive; about 10 percent mineral grains; very strongly acid; gradual wavy boundary.

Oa4—70 to 85 inches; black (10YR 2/1) muck, very dark grayish brown (10YR 3/2) broken face and rubbed; about 20 percent fiber, 3 percent rubbed; massive; about 10 percent mineral grains; very strongly acid; clear wavy boundary.

Oa5—85 to 99 inches; very dark brown (10YR 2/2) muck; about 15 percent fiber, 3 percent rubbed; massive; about 25 percent mineral grains; very strongly acid.

The decomposed organic material ranges from 51 to more than 99 inches in thickness. The soils range from extremely acid to mildly alkaline throughout.

The organic layers have hue of 10YR, value of 2 to 4, and chroma of 1 to 3. They have few or common clean sand grains. The substratum is stratified clayey, loamy, or sandy sediments.

Lenoir Series

The Lenoir series consists of somewhat poorly drained soils on uplands. These soils formed in fine textured marine sediments. Slope is less than 2 percent.

Typical pedon of Lenoir loam, 2.5 miles west of Belgrade, 1.1 miles southeast of the intersection of State Roads 1331 and 1332, and 50 feet south of State Road 1331 (2,518,000X; 423,500Y):

A—0 to 4 inches; dark gray (10YR 4/1) loam; weak medium granular structure; very friable; common fine roots; very strongly acid; abrupt smooth boundary.

E—4 to 7 inches; brown (10YR 5/3) fine sandy loam; few medium faint dark grayish brown (10YR 4/2) mottles; weak medium granular structure; very friable; very strongly acid; clear smooth boundary.

BE—7 to 10 inches; brownish yellow (10YR 6/6) clay loam; few fine faint light brownish gray mottles; weak fine subangular blocky structure; friable; very strongly acid; gradual wavy boundary.

Bt—10 to 15 inches; mottled brownish yellow (10YR 6/6), light brownish gray (10YR 6/2), and pale brown (10YR 6/3) clay; moderate fine angular blocky structure; firm, slightly sticky and slightly plastic; thin patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg1—15 to 45 inches; gray (10YR 6/1) clay; few fine prominent red (2.5YR 5/8) and few fine distinct yellowish brown (10YR 5/8) mottles; moderate fine angular blocky structure; firm, sticky and plastic; thin patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg2—45 to 60 inches; gray (10YR 6/1) clay; few coarse faint gray (10YR 5/1), few fine prominent reddish yellow (7.5YR 6/8), and few fine prominent red (2.5YR 4/8) mottles; moderate fine angular blocky structure; firm, sticky and plastic; thin patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

BCg—60 to 70 inches; dark grayish brown (10YR 4/2) clay that has strata of sandy clay loam; few fine distinct brownish yellow (10YR 6/6) mottles; moderate fine angular blocky structure; firm, sticky and plastic; thin patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

Cg—70 to 80 inches; dark grayish brown (10YR 4/2) sandy clay loam that has strata of sandy loam; few fine distinct brownish yellow (10YR 6/6) and few coarse faint very dark grayish brown (10YR 3/2) mottles; massive; friable; very strongly acid.

The clayey Bt horizon extends to a depth of 60 inches or more. The soils are very strongly acid or strongly acid throughout unless the surface has been limed.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 1 or 2. The upper part of the Bt horizon has hue of 10YR or 2.5Y, value of 5 to 7, and

chroma of 3 to 6. It has grayish mottles. The lower part has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. The Bt horizon is clay or clay loam. The BCg and Cg horizons have hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. They are clay, clay loam, sandy clay, sandy clay loam, or loam.

Leon Series

The Leon series consists of poorly drained soils on uplands. These soils formed in coarse textured sediments. Slope ranges from 0 to 3 percent.

Typical pedon of Leon fine sand, 2.7 miles northeast of Holly Ridge, 0.1 mile northwest of the intersection of U.S. Highway 17 and Forest Road, 0.2 mile southeast of a railroad crossing (2,446,000X; 283,000Y):

A—0 to 5 inches; dark gray (10YR 4/1) fine sand; single grain; loose; about one-third of sand grains are uncoated; common medium and fine roots; extremely acid; clear wavy boundary.

E—5 to 17 inches; light gray (10YR 7/1) fine sand; single grain; loose; very strongly acid; abrupt wavy boundary.

Bh1—17 to 24 inches; dark reddish brown (5YR 2/2) fine sand; massive; weakly cemented; very strongly acid; gradual wavy boundary.

Bh2—24 to 51 inches; dark reddish brown (5YR 3/2) fine sand; massive; weakly cemented; very strongly acid; gradual wavy boundary.

E′—51 to 59 inches; grayish brown (10YR 5/2) fine sand; massive; very friable; very strongly acid; clear wavy boundary.

B′h—59 to 95 inches; black (5YR 2/1) fine sand; massive; weakly cemented; very strongly acid.

The sandy horizons extend to a depth of 80 inches or more. The soils are extremely acid or very strongly acid throughout unless the surface has been limed.

The A or Ap horizon has hue of 10YR, value of 2 to 4, and chroma of 1. The Bh horizon has hue of 5YR, value of 2 or 3, and chroma of 1 to 3. It is weakly cemented when wet and strongly cemented when dry. The E′ horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. The B′h horizon is similar in color to the Bh horizon. It is weakly cemented when wet and strongly cemented when dry.

Lynchburg Series

The Lynchburg series consists of somewhat poorly drained soils on uplands. These soils formed in moderately fine textured sediments. Slope is less than 2 percent.

Typical pedon of Lynchburg fine sandy loam, 1.4 miles north of Deppe, 0.5 mile southwest of the intersection of State Road 1330 and U.S. Highway 17, and 100 feet east of the intersection of State Road 1330 and a farm path (2,517,500X; 423,500Y):

Ap—0 to 6 inches; dark gray (10YR 4/1) fine sandy loam; weak medium granular structure; very friable; few medium roots; slightly acid; abrupt smooth boundary.

E—6 to 9 inches; pale brown (10YR 6/3) fine sandy loam; weak medium granular structure; very friable; few fine roots; slightly acid; clear smooth boundary.

EB—9 to 13 inches; light yellowish brown (10YR 6/4) fine sandy loam; few fine distinct light brownish gray (10YR 6/2) mottles; weak fine subangular blocky structure; very friable; few fine roots; medium acid; gradual wavy boundary.

Bt—13 to 21 inches; pale brown (10YR 6/3) sandy clay loam; few fine distinct brownish yellow (10YR 6/8) and few medium faint light brownish gray (10YR 6/2) mottles; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; thin patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg1—21 to 36 inches; gray (10YR 6/1) sandy clay loam; common fine distinct reddish yellow (7.5YR 6/8) mottles; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; thin patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg2—36 to 45 inches; gray (10YR 6/1) sandy clay loam; common medium distinct reddish yellow (7.5YR 6/8) and few fine prominent red (2.5YR 5/8) mottles; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; thin patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

BCg—45 to 63 inches; gray (10YR 6/1) sandy clay loam that has strata of sandy clay; common fine distinct reddish yellow (7.5YR 6/8), few fine prominent red (2.5YR 5/8), and few fine faint light gray mottles; weak fine subangular blocky structure; friable, sticky and plastic; very strongly acid; gradual wavy boundary.

Cg—63 to 80 inches; light brownish gray (10YR 6/2) sandy clay loam that has strata of loamy sand and sandy loam; few fine distinct brownish yellow (10YR 6/6) and brown (7.5YR 5/2) mottles; massive; friable; very strongly acid.

The loamy horizons extend to a depth of 60 inches or more. The soils are very strongly acid or strongly acid throughout unless the surface has been limed.

The Ap or A horizon has hue of 10YR, value of 2 to

4, and chroma of 1 or 2. The Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 to 8. It has few to many grayish mottles in the upper part. Below a depth of 20 inches, the Btg horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. It is sandy clay loam in the upper part and sandy clay loam, sandy clay, or clay loam in the lower part. The BCg horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. It is stratified sandy clay, sandy clay loam, sandy loam, or loamy sand. The Cg horizon has colors similar to those of the BCg horizon. It is stratified loamy sand, sandy loam, or sandy clay loam.

Marvyn Series

The Marvyn series consists of well drained soils on uplands. These soils formed in moderately fine textured sediments. Slope ranges from 6 to 15 percent.

Typical pedon of Marvyn loamy fine sand, 6 to 15 percent slopes, 2 miles east of Richlands, 0.5 mile southeast of the intersection of State Roads 1311 and 1307, and 200 feet southwest of State Road 1311 (2,445,000X; 419,000Y):

Ap—0 to 4 inches; brown (10YR 5/3) loamy fine sand; weak medium granular structure; very friable; few fine roots; slightly acid; abrupt smooth boundary.

E—4 to 8 inches; pale brown (10YR 6/3) loamy fine sand; weak medium granular structure; very friable; few fine roots; slightly acid; clear wavy boundary.

BE—8 to 12 inches; strong brown (7.5YR 5/6) sandy loam; weak fine subangular blocky structure; friable; few fine roots; strongly acid; clear wavy boundary.

Bt—12 to 26 inches; brownish yellow (10YR 6/8) sandy clay loam; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; thin patchy clay films on faces of peds; strongly acid; gradual wavy boundary.

BC—26 to 45 inches; brownish yellow (10YR 6/6) sandy loam; common medium distinct pale brown (10YR 6/3) and few fine distinct light yellowish brown (10YR 6/4) mottles; weak fine subangular blocky structure; friable; thin patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

Cg1—45 to 52 inches; gray (10YR 5/1) sandy clay loam that has strata of fine sandy loam; few medium distinct strong brown (7.5YR 5/8) and common medium prominent red (2.5YR 4/8) mottles; massive; friable; very strongly acid; gradual wavy boundary.

Cg2—52 to 75 inches; light gray (10YR 7/1) loamy sand that has strata of sandy loam, sandy clay loam, and sand; common fine prominent red (2.5YR 5/8) and common medium prominent strong brown (7.5YR 5/6) mottles; massive; friable; very strongly acid.

The sandy and loamy horizons extend to a depth of 40 to more than 60 inches. The soils are very strongly acid or strongly acid throughout unless the surface has been limed.

The Ap or A horizon has hue of 10YR, value of 3 to 5, and chroma of 3 or 4. The Bt horizon has hue of 10YR or 7.5YR, value 5 or 6, and chroma of 4 to 8. It is sandy clay loam to sandy clay. The BC horizon has hue of 10YR, value of 6, and chroma of 4 to 8. The C horizon has hue of 10YR, value of 4 to 7, and chroma of 1 to 8. It has few or common red, gray, or strong brown mottles. It is stratified sandy loam, sandy clay loam, or loamy sand.

Masontown Series

The Masontown series consists of very poorly drained soils on flood plains. These soils formed in moderately coarse textured recent alluvium. Slope is 0 to 2 percent.

Typical pedon of Masontown mucky fine sandy loam, 3 miles west of Belgrade, 0.5 mile northeast of the intersection of Roper Tram Road and State Road 1331, and 50 feet east of Roper Tram Road (3,455,000X; 7,716,000Y):

A1—0 to 18 inches; very dark gray (10YR 3/1) mucky fine sandy loam; moderate medium granular structure; very friable; many fine and medium roots; medium acid; gradual wavy boundary.

A2—18 to 28 inches; very dark gray (10YR 3/1) mucky fine sandy loam; few medium distinct grayish brown (10YR 5/2) mottles; common thin strata of fine sand; weak medium granular structure; very friable; common fine roots; medium acid; clear irregular boundary.

Cg1—28 to 48 inches; dark gray (10YR 4/1) fine sandy loam; many medium and coarse distinct grayish brown (10YR 5/2) mottles; common lenses and pockets of loamy fine sand; single grain; loose; few fine roots; neutral; gradual wavy boundary.

Cg2—48 to 65 inches; gray (10YR 5/1) fine sand; single grain; loose; mildly alkaline.

The loamy and sandy horizons extend to a depth of 65 inches or more. The soils range from medium acid to mildly alkaline.

The A horizon has hue of 10YR to 5Y, value of 2 or 3, and chroma of 1 or 2, or it is neutral in hue and has value of 2 or 3. The C horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2, or it is neutral in hue and has value of 4 to 7. It is sand, loamy sand, sandy loam, fine sand, fine sandy loam, loam, or silt

loam. It is finely stratified with these textures in some pedons.

Muckalee Series

The Muckalee series consists of poorly drained soils on low flood plains. These soils formed in moderately coarse textured recent alluvium. Slope ranges from 0 to 2 percent.

Typical pedon of Muckalee loam, 2 miles east of Richlands, 0.4 mile southeast of the intersection of State Roads 1311 and 1307, and 200 feet northeast of State Road 1311 (2,446,000X; 420,000Y):

A—0 to 10 inches; dark grayish brown (10YR 4/2) loam; weak medium granular structure; friable; many fine and medium roots; strongly acid; gradual wavy boundary.
Cg1—10 to 28 inches; gray (10YR 5/1) loam that has strata of sandy loam; massive; friable; few fine roots; slightly acid; gradual wavy boundary.
Cg2—28 to 40 inches; gray (10YR 5/1) sandy loam that has strata of clay loam; massive; friable; neutral; gradual wavy boundary.
Cg3—40 to 75 inches; grayish brown (10YR 5/2) sandy loam that has strata of loamy sand; common coarse faint gray (10YR 6/1) mottles; massive; loose; slightly alkaline.

The loamy material extends to a depth of 72 inches or more. The A horizon is strongly acid, and the C horizon ranges from medium acid to moderately alkaline.

The A horizon has hue of 10YR to 5Y, value of 3 to 5, and chroma of 1 or 2. In areas where value is less than 3, this horizon is less than 6 inches thick.

The C horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2. It is dominantly fine sandy loam, sandy loam, loam, or loamy fine sand but has thin strata of clay loam, sandy clay loam, sandy loam, or loamy sand.

Murville Series

The Murville series consists of very poorly drained soils on uplands. These soils formed in coarse textured sediments. Slope is less than 2 percent.

Typical pedon of Murville fine sand, 1.7 miles southeast of Holly Ridge, 0.1 mile southeast of the intersection of State Road 1538 and 1534, and 50 feet northeast of State Road 1538 (2,444,000X; 271,000Y):

A—0 to 5 inches; black (10YR 2/1) fine sand; weak medium granular structure; very friable; common medium and fine roots; extremely acid; gradual wavy boundary.
Bh1—5 to 20 inches; black (5YR 2/1) fine sand; massive; very friable; few large roots; extremely acid; gradual wavy boundary.
Bh2—20 to 46 inches; dark reddish brown (5YR 3/2) fine sand; massive; very friable; very strongly acid; gradual wavy boundary.
Bh3—46 to 55 inches; dark brown (7.5YR 3/2) fine sand; few fine faint dark reddish brown (5YR 3/2) mottles; massive; very friable; very strongly acid; gradual wavy boundary.
Cg—55 to 75 inches; grayish brown (10YR 5/2) sand that has strata of sandy loam; massive; very friable; very strongly acid.

The sandy horizons extend to a depth of 72 inches or more. The soils range from extremely acid to strongly acid throughout unless the surface has been limed.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The Bh horizon has hue of 5YR to 10YR, value of 2 or 3, and chroma of 1 or 2. It is sand or fine sand. The sand grains are coated with organic matter. The C horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. It is sand, loamy sand, or sandy loam.

Newhan Series

The Newhan series consists of excessively drained soils that formed in coastal sandy material deposited by the wind. Slope ranges from 0 to 30 percent.

Typical pedon of Newhan fine sand, 0 to 30 percent slopes, on Onslow Island, 2.6 miles southwest of the intersection of Onslow Island Road and Onslow Beach Road, 100 feet east of an observation tower (2,513,000X; 296,000Y):

C1—0 to 36 inches; light gray (10YR 7/2) fine sand; single grain; loose; neutral; gradual wavy boundary.
C2—36 to 60 inches; light gray (10YR 7/2) fine sand; single grain; loose; about 3 percent small fragments of marine shells; neutral; gradual wavy boundary.
C3—60 to 80 inches; light gray (10YR 7/1) fine sand; single grain; loose; common black minerals; neutral.

The soils are at least 72 inches thick. They are neutral or mildly alkaline. Calcareous shell fragments, mostly of sand size, make up as much as 25 percent of the soils, by volume. The soils have few or common grains of dark minerals.

Some pedons have an A horizon. This horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. It is fine sand or sand. The C horizon has hue of 10YR or

2.5Y, value of 6 to 8, and chroma of 1 to 4. It is fine sand or sand.

Norfolk Series

The Norfolk series consists of well drained soils on uplands. These soils formed in moderately fine textured sediments. Slope ranges from 0 to 6 percent.

Typical pedon of Norfolk loamy fine sand, 0 to 2 percent slopes, 0.7 mile south of Jarman's Crossroads, 0.3 mile southwest of the intersection of State Road 1238 and a farm road, 20 feet west of the farm road (2,423,500X; 422,000Y):

Ap—0 to 6 inches; brown (10YR 5/3) loamy fine sand; weak medium granular structure; very friable; few fine roots; slightly acid; abrupt smooth boundary.

E—6 to 10 inches; pale brown (10YR 6/3) loamy fine sand; weak medium granular structure; very friable; few fine roots; slightly acid; clear wavy boundary.

Bt1—10 to 25 inches; yellowish brown (10YR 5/8) sandy clay loam; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; thin patchy clay films on faces of peds; strongly acid; gradual wavy boundary.

Bt2—25 to 47 inches; brownish yellow (10YR 6/8) sandy clay loam; few fine faint light olive brown and few fine distinct yellowish red (5YR 5/8) mottles; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; thin patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt3—47 to 68 inches; brownish yellow (10YR 6/8) sandy clay loam; common medium prominent yellowish red (5YR 5/8), few fine distinct light gray (10YR 7/1), and common medium faint light olive brown (2.5Y 5/4) mottles; weak fine subangular blocky structure; firm, slightly sticky and slightly plastic; thin patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

BCg—68 to 80 inches; mottled light gray (10YR 7/1), brownish yellow (10YR 6/8), and yellowish red (5YR 5/8) sandy clay loam; massive; friable; very strongly acid.

The sandy and loamy horizons extend to a depth of 60 inches or more. The soils are very strongly acid or strongly acid throughout unless the surface has been limed.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 to 3. The Bt horizon has hue of 10YR or 7.5YR, value of 5 to 8, and chroma of 4 to 8. In some pedons the lower part has mottles with chroma of 1 or 2. This horizon is sandy clay loam or clay loam in the upper part and ranges to sandy clay in the lower part. The BC horizon is commonly mottled and has hue of 10YR to 2.5YR, value of 5 to 8, and chroma of 1 to 8. It is loamy sand to sandy clay. It is commonly stratified.

Onslow Series

The Onslow series consists of moderately well drained and somewhat poorly drained soils on uplands. These soils formed in moderately fine textured sediments. Slope ranges from 0 to 3 percent.

Typical pedon of Onslow loamy fine sand, 0.6 mile southwest of Swansboro, 0.3 mile north of the intersection of State Roads 1444 and 1447, and 100 feet east of State Road 1444 (2,564,000X; 351,000Y):

A—0 to 4 inches; very dark gray (10YR 3/1) loamy fine sand; weak medium granular structure; very friable; many fine roots; very strongly acid; clear wavy boundary.

E—4 to 8 inches; gray (10YR 6/1) loamy fine sand; weak medium granular structure; very friable; common fine roots; very strongly acid; clear wavy boundary.

E/Bh—8 to 14 inches; very pale brown (10YR 7/3) and light yellowish brown (10YR 6/4) loamy fine sand; massive; very friable; reddish brown (5YR 5/4), strongly cemented concretions; about one-third of the horizon is weakly cemented, and one-third is concretions ranging from ¼ to ¾ inch in size; few fine roots; very strongly acid; clear wavy boundary.

E′—14 to 17 inches; very pale brown (10YR 7/3) loamy fine sand; weak medium granular structure; very friable; few fine roots; very strongly acid; clear wavy boundary.

EB—17 to 21 inches; brownish yellow (10YR 6/6) fine sandy loam; few coarse distinct very pale brown (10YR 7/3) mottles; weak fine subangular blocky structure; very friable; few fine roots; very strongly acid; clear wavy boundary.

Bt1—21 to 30 inches; brownish yellow (10YR 6/6) sandy clay loam; few fine distinct strong brown (7.5YR 5/8) and light gray (10YR 7/1) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few medium roots; few thin clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt2—30 to 41 inches; mottled light yellowish brown (10YR 6/4), strong brown (7.5YR 5/8), and light gray (10YR 7/2) sandy clay loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few thin clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg—41 to 53 inches; light gray (10YR 7/2) sandy clay loam; common medium distinct brownish yellow (10YR 6/8) and few fine prominent reddish yellow (5YR 6/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few thin clay films on faces of peds; very strongly acid; gradual wavy boundary.

BCg—53 to 68 inches; light gray (10YR 7/1, 6/1) sandy clay loam that has lenses of sandy loam; common fine distinct yellowish red (5YR 5/8) mottles; weak medium subangular blocky structure; friable, slightly sticky; few small bodies of clean sand; very strongly acid; gradual wavy boundary.

Cg—68 to 80 inches; white (10YR 8/1) sandy loam that has common lenses of loamy sand; few medium distinct light yellowish brown (10YR 6/4) and brownish yellow (10YR 6/8) mottles; massive; friable; very strongly acid.

The sandy and loamy horizons extend to a depth of 60 inches or more. The soils are very strongly acid or strongly acid throughout unless the surface has been limed.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 1 or 2. The E horizon has hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 1 or 2. It is fine sandy loam or loamy fine sand.

The E/Bh horizon has hue of 5YR, 10YR, or 2.5Y, value of 4 to 7, and chroma of 3 or 4. It is loamy fine sand that is very friable in about one-third of its volume, is weakly cemented in one-third, and has strongly cemented concretions in one-third.

The E′ horizon, if it occurs, has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 2 to 4. It is fine sandy loam or loamy fine sand.

The Bt horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 to 8. The middle or lower part has mottles in shades of gray, brown, or red. This horizon is sandy clay loam, sandy loam, or clay loam.

The Cg horizon has hue of 10YR to 5Y, value of 6 to 8, and chroma of 1 or 2. It is sandy clay loam, clay loam, sandy loam, loamy sand, or sand.

Pactolus Series

The Pactolus series consists of moderately well drained and somewhat poorly drained soils on uplands and stream terraces. These soils formed in coarse textured sediments. Slope ranges from 1 to 3 percent.

Typical pedon of Pactolus fine sand, 8.3 miles south of Hubert, 2.4 miles northeast of the intersection of North Carolina Highway 172 and Sneeds Ferry Road, and 0.6 mile east of the intersection of North Carolina Highway 172 and Anti-tank Range Road (2,532,000X; 320,000Y):

A1—0 to 3 inches; gray (10YR 5/1) fine sand; single grain; loose; few fine roots; strongly acid; clear smooth boundary.

A2—3 to 6 inches; grayish brown (10YR 5/2) fine sand; single grain; loose; few fine roots; strongly acid; clear wavy boundary.

C1—6 to 18 inches; light yellowish brown (10YR 6/4) fine sand; few fine faint brownish yellow mottles; single grain; loose; few strong brown (7.5YR 5/6) and dark brown (7.5YR 3/2) concretions 1/8 to 1/4 inch in diameter; few fine roots; medium acid; clear wavy boundary.

C2—18 to 30 inches; very pale brown (10YR 7/3) fine sand; few medium faint light gray (10YR 7/1) mottles; single grain; loose; few strong brown (7.5YR 5/6) and dark brown (7.5YR 3/2) concretions 1/8 to 1/4 inch in diameter; medium acid; gradual wavy boundary.

Cg—30 to 80 inches; light gray (10YR 7/2) fine sand; few medium distinct brownish yellow (10YR 6/8) mottles; single grain; loose; strongly acid.

The sandy horizons extend to a depth of 80 inches or more. The soils range from very strongly acid to medium acid throughout unless the surface has been limed.

The A horizon has hue of 10YR or 2.5Y, value of 2 to 5, and chroma of 1 or 2. The upper part of the C horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 3 to 8. The lower part has hue of 10YR or 2.5Y, value of 6 to 8, and chroma of 1 or 2. The C horizon is fine sand or loamy fine sand.

Pantego Series

The Pantego series consists of very poorly drained soils on uplands. These soils formed in moderately fine textured sediments. Slope is 0 to 1 percent.

Typical pedon of Pantego mucky loam, 3.2 miles northwest of the intersection of U.S. Highway 17 and State Road 1327, about 2.4 miles northwest of the intersection of State Road 1327 and Gum Swamp Road, and 50 feet north of the intersection of Gum Swamp Road and Equipment Shed Road (2,490,000X; 405,500Y):

Ap—0 to 6 inches; black (10YR 2/1) mucky loam; weak medium granular structure; very friable; common fine roots; common fine pores; very strongly acid; clear wavy boundary.

A—6 to 14 inches; black (10YR 2/1) mucky loam; weak medium granular structure; very friable; common fine roots; common fine pores; strongly acid; clear wavy boundary.

E—14 to 17 inches; grayish brown (10YR 5/2) fine sandy loam; few fine distinct very dark gray (10YR 3/1) mottles; weak medium granular structure; very friable; common fine roots; very strongly acid; clear wavy boundary.
EBg—17 to 23 inches; grayish brown (10YR 5/2) sandy clay loam; few fine distinct very dark gray (10YR 3/1) mottles; weak fine subangular blocky structure; friable; few coarse roots; very strongly acid; gradual wavy boundary.
Btg1—23 to 45 inches; grayish brown (10YR 5/2) sandy clay loam; few coarse faint dark grayish brown (10YR 4/2) mottles; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; thin patchy clay films on faces of peds; few coarse roots; extremely acid; gradual wavy boundary.
Btg2—45 to 60 inches; grayish brown (10YR 5/2) sandy clay loam that has pockets of sandy clay; few fine distinct brownish yellow (10YR 6/6) mottles; weak fine subangular blocky structure; firm, slightly sticky and slightly plastic; thin patchy clay films on faces of peds; few coarse roots; extremely acid; gradual wavy boundary.
BCg—60 to 70 inches; gray (10YR 5/1) sandy clay loam that has thin strata of sandy clay; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; few coarse roots; very strongly acid; gradual wavy boundary.
Cg—70 to 80 inches; dark gray (10YR 4/1) sandy clay loam that has strata of loamy sand and clay; common coarse faint gray (10YR 5/1) mottles; massive; friable, slightly sticky and slightly plastic; very strongly acid.

The loamy horizons extend to a depth of 60 inches or more. The soils range from extremely acid to strongly acid throughout unless the surface has been limed.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1. The Btg horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. It is sandy clay loam in the upper part and sandy clay loam, sandy clay, or sandy loam in the lower part. The Cg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. It is sandy clay loam or occurs as thin strata of loamy sand, sandy loam, sandy clay loam, or clay.

Rains Series

The Rains series consists of poorly drained soils on uplands. These soils formed in moderately fine textured sediments. Slope is less than 2 percent.

Typical pedon of Rains fine sandy loam, 2 miles north of the intersection of U.S. Highway 17 and State Road 1326, about 0.5 mile east of the intersection of State Roads 1324 and 1326, and 0.1 mile northeast of the intersection of a farm road and State Road 1324 (2,488,500X; 391,000Y):

Ap—0 to 5 inches; very dark gray (10YR 3/1) fine sandy loam; weak medium granular structure; very friable; many fine roots; medium acid; abrupt smooth boundary.
E—5 to 12 inches; grayish brown (10YR 5/2) fine sandy loam; few fine faint dark gray mottles; weak medium granular structure; very friable; very strongly acid; clear wavy boundary.
Btg1—12 to 17 inches; gray (10YR 6/1) sandy clay loam; common fine distinct brownish yellow (10YR 6/6) mottles; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; few root channels filled with dark gray material; few patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.
Btg2—17 to 45 inches; gray (10YR 6/1) sandy clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; few root channels filled with gray material; very strongly acid; gradual wavy boundary.
Btg3—45 to 58 inches; light brownish gray (10YR 6/2) sandy clay; many medium distinct brownish yellow (10YR 6/8) mottles; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; few large root channels filled with grayish brown material; very strongly acid; gradual wavy boundary.
BCg—58 to 70 inches; gray (10YR 6/1) sandy clay loam that has pockets of sandy loam; common medium distinct brownish yellow (10YR 6/6) mottles; moderate fine angular blocky structure; friable, slightly sticky and slightly plastic; very strongly acid; gradual wavy boundary.
Cg—70 to 80 inches; gray (10YR 5/1) sandy loam that has strata of sandy clay loam and loamy sand; common fine distinct dark grayish brown (10YR 4/2) mottles; massive; friable; very strongly acid.

The loamy and clayey horizons extend to a depth of 60 inches or more. The soils are very strongly acid or strongly acid throughout unless the surface has been limed.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 1 or 2. The Btg horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. It is dominantly sandy clay loam or clay loam but in some pedons is sandy clay below a depth of 40 inches. The Cg horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. It is sandy clay loam, sandy loam, loamy sand, or sandy clay.

Stallings Series

The Stallings series consists of somewhat poorly drained soils on uplands. These soils formed in moderately coarse textured sediments. Slope ranges from 0 to 3 percent.

Typical pedon of Stallings loamy fine sand, 4.8 miles northwest of Richlands, 0.3 mile south of the intersection of U.S. Highway 258 and State Road 1233, in a road cut on the eastern side of State Road 1233 (2,418,500X; 432,000Y):

A—0 to 7 inches; dark gray (10YR 4/1) loamy fine sand; weak medium granular structure; very friable; few fine roots; strongly acid; abrupt smooth boundary.

E—7 to 12 inches; pale brown (10YR 6/3) loamy fine sand; weak medium granular structure; very friable; few fine roots; strongly acid; clear smooth boundary.

EB—12 to 15 inches; very pale brown (10YR 7/3) fine sandy loam; few fine distinct brownish yellow (10YR 6/6) and few fine faint light brownish gray mottles; weak fine subangular blocky structure; very friable; strongly acid; clear wavy boundary.

Bt—15 to 25 inches; light yellowish brown (10YR 6/4) fine sandy loam; common fine distinct light gray (10YR 7/2) mottles; weak fine subangular blocky structure; very friable; few patchy clay coatings on sand grains; strongly acid; gradual wavy boundary.

Btg—25 to 45 inches; light gray (10YR 7/1) fine sandy loam; few fine prominent red (2.5YR 5/8) and common medium distinct brownish yellow (10YR 6/8) mottles; weak fine subangular blocky structure; very friable; strongly acid; gradual wavy boundary.

BCg—45 to 66 inches; light gray (10YR 7/1) fine sandy loam that has pockets of sandy clay loam; few fine prominent red (2.5YR 5/8) and common coarse distinct brownish yellow (10YR 6/8) mottles; weak fine subangular blocky structure; friable; very strongly acid; gradual wavy boundary.

Cg—66 to 80 inches; mottled brownish yellow (10YR 6/6), gray (10YR 6/1), and red (10R 4/8) sandy clay loam that has strata of fine sandy loam; massive; friable; very strongly acid.

The sandy and loamy horizons extend to a depth of 60 inches or more. The soils range from extremely acid to strongly acid throughout unless the surface has been limed.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 or 2. The upper part of the Bt horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 3 to 6. The lower part has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. The Bt horizon is sandy loam or fine sandy loam. The Cg horizon has hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 1 or 2, or it is mottled. It is sand, loamy sand, fine sandy loam, or sandy clay loam.

Torhunta Series

The Torhunta series consists of very poorly drained soils on uplands. These soils formed in moderately coarse textured sediments. Slope ranges from 0 to 2 percent.

Typical pedon of Torhunta fine sandy loam, 9.3 miles north of Richlands, 0.8 mile northwest of Huffman, 0.3 mile north of the intersection of Forest Roads, in a large ditchbank on the eastern side of Forest Road (2,428,000X; 449,000Y):

A1—0 to 9 inches; black (10YR 2/1) fine sandy loam; weak medium granular structure; very friable; common fine and medium roots; about 2 percent uncoated sand grains; very strongly acid; clear wavy boundary.

A2—9 to 14 inches; very dark gray (10YR 3/1) fine sandy loam; weak medium granular structure; very friable; common fine and medium roots; extremely acid; gradual wavy boundary.

BA—14 to 22 inches; dark gray (10YR 4/1) fine sandy loam; few fine faint very dark gray mottles; few light gray (10YR 7/1) uncoated sand grains; weak medium granular structure; very friable; few fine and medium roots; extremely acid; gradual wavy boundary.

Bg—22 to 47 inches; grayish brown (10YR 5/2) fine sandy loam; few coarse faint very dark gray (10YR 3/1) mottles; weak fine subangular blocky structure; very friable; extremely acid; gradual wavy boundary.

Cg1—47 to 72 inches; light gray (10YR 6/1) loamy fine sand that has strata of sandy clay loam; massive; very friable; very strongly acid; clear wavy boundary.

Cg2—72 to 80 inches; light greenish gray (5GY 7/1) sandy loam that has strata of sandy clay loam; few medium distinct brownish yellow (10YR 6/8) mottles; massive; friable; very strongly acid.

The loamy horizons extend to a depth of 20 to 50 inches. The soils are extremely acid or very strongly acid throughout unless the surface has been limed.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The Bg horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. It is sandy loam or fine sandy loam. The Cg horizon has hue of 10YR or 5GY, value of 4 to 7, and chroma of 1 or 2. It is stratified loamy sand, loamy fine sand, sand, sandy loam, or sandy clay loam.

Wando Series

The Wando series consists of excessively drained soils on uplands. These soils formed in coarse textured sediments. Slope ranges from 1 to 6 percent.

Typical pedon of Wando fine sand, 1 to 6 percent slopes, 5.6 miles south of Hubert, 1.2 miles east of the intersection of North Carolina Highway 172 and Bear Creek Tower Road, and 50 feet north of Bear Creek Tower Road (2,533,500X; 326,000Y):

A—0 to 6 inches; grayish brown (10YR 5/2) fine sand; single grain; loose; few fine roots; medium acid; clear wavy boundary.

C1—6 to 16 inches; yellowish brown (10YR 5/4) fine sand; single grain; loose; few fine roots; medium acid; clear wavy boundary.

C2—16 to 31 inches; strong brown (7.5YR 5/6) fine sand; few fine distinct dark yellowish brown (10YR 4/4) mottles; single grain; loose; few medium brownish yellow (10YR 6/8), weakly cemented concretions; medium acid; clear wavy boundary.

C3—31 to 36 inches; yellow (10YR 7/6) fine sand; single grain; loose; medium acid; gradual wavy boundary.

C4—36 to 47 inches; very pale brown (10YR 7/4) fine sand; single grain; loose; medium acid; clear wavy boundary.

C5—47 to 75 inches; very pale brown (10YR 7/4) fine sand; few medium distinct brownish yellow (10YR 6/8) mottles; single grain; loose; medium acid; clear wavy boundary.

C6—75 to 85 inches; light yellowish brown (10YR 6/4) fine sand; single grain; loose; slightly acid.

The sandy horizons extend to a depth of 60 to more than 80 inches. The soils are medium acid or slightly acid throughout.

The A horizon has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 2 to 4. The upper part of the C horizon has hue of 7.5YR or 10YR, value of 4 to 7, and chroma of 3 to 6. The lower part has hue of 10YR, value of 6 to 8, and chroma of 3 or 4. The C horizon is fine sand or loamy fine sand in the upper part and fine sand or sand in the lower part.

Woodington Series

The Woodington series consists of poorly drained soils on uplands. These soils formed in moderately coarse textured sediments. Slope ranges from 0 to 2 percent.

Typical pedon of Woodington loamy fine sand, 1.8 miles northeast of the intersection of U.S. Highway 258 and State Road 1235, about 1.3 miles east of the intersection of U.S. Highway 258 and Paper Company Road, 50 feet north of the road (2,412,500X; 449,000Y):

Ap—0 to 6 inches; very dark gray (10YR 3/1) loamy fine sand; weak medium granular structure; very friable; common fine roots; strongly acid; clear smooth boundary.

E—6 to 12 inches; grayish brown (10YR 5/2) loamy fine sand; weak medium granular structure; very friable; common fine roots; strongly acid; gradual wavy boundary.

Btg1—12 to 30 inches; light brownish gray (10YR 6/2) fine sandy loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; friable; few patchy clay films on sand grains; very strongly acid; gradual wavy boundary.

Btg2—30 to 50 inches; light brownish gray (10YR 6/2) fine sandy loam; common medium distinct brownish yellow (10YR 6/6) mottles; weak fine subangular blocky structure; friable; very strongly acid; gradual wavy boundary.

BCg—50 to 65 inches; gray (10YR 6/1) fine sandy loam that has strata of loamy sand and sandy clay loam; few fine prominent strong brown (7.5YR 5/8), few fine distinct brownish yellow (10YR 6/6), and few medium distinct brown (7.5YR 5/2) mottles; massive; friable, slightly sticky; very strongly acid; gradual wavy boundary.

Cg—65 to 80 inches; light gray (10YR 7/2) sandy loam that has strata of sandy clay loam; few fine prominent strong brown (7.5YR 5/8) and common medium distinct brown (7.5YR 5/2) mottles; massive; friable, slightly sticky; very strongly acid.

The sandy and loamy horizons extend to a depth of 60 inches or more. The soils range from extremely acid to strongly acid throughout unless the surface has been limed.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 2 to 4, and chroma of 1 or 2. The Btg horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. It is fine sandy loam or sandy loam. The Cg horizon has hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 1 or 2. It is sandy loam, sandy clay loam, loamy sand, or sand.

Yaupon Series

The Yaupon series consists of somewhat poorly drained and moderately well drained soils near the edges of the Intracoastal Waterway. These soils formed in fine textured material deposited by dredging operations. Slope ranges from 0 to 3 percent.

Typical pedon of Yaupon fine sandy loam, 0 to 3 percent slopes, 0.5 mile east of Thomas Landing, 1.3

miles southwest of the bridge over North Carolina Highway 210 and the Intracoastal Waterway, at the end of the dredge spoil island near the channel of the waterway (2,461,000X; 272,000Y):

A1—0 to 1 inch; dark gray (10YR 4/1) fine sandy loam; weak medium granular structure; very friable; few fine roots; very strongly acid; abrupt smooth boundary.

A2—1 to 3 inches; light yellowish brown (10YR 6/4) fine sandy loam; massive; single grain; few fine roots; very strongly acid; clear smooth boundary.

Cg1—3 to 45 inches; gray (N 5/0) clay; few medium distinct brownish yellow (10YR 6/8) mottles; massive; very firm, very sticky and very plastic; few small shells; medium acid; clear smooth boundary.

Cg2—45 to 78 inches; greenish gray (5GY 5/1) sandy clay; few medium distinct olive yellow (2.5Y 6/8) mottles; massive; firm, very sticky and very plastic; neutral; clear smooth boundary.

Cg3—78 to 85 inches; very dark gray (5Y 3/1) fine sandy loam; massive; very friable; neutral.

The thickness of the dredge spoil ranges from 20 to more than 80 inches. Cracks open at the surface as a result of shrinkage. The cracks are 15 to 35 inches apart, are 2 to 8 inches wide, are about 30 inches deep, and are commonly filled with fine sand or silt loam. The surface layer ranges from very strongly acid to medium acid unless the surface has been limed. The substratum ranges from very strongly acid to moderately alkaline. Few or common small shells and fragments of shells are in most layers. The gleyed color is not indicative of the present drainage but of the condition of the original sediments.

The A horizon has hue of 10YR to 5Y, value of 3 to 6, and chroma of 1 to 4, or it is neutral in hue and has value of 3 to 6. The C horizon has hue of 10YR to 5G or 5B, value of 3 to 6, and chroma of 1 to 8, or it is neutral in hue and has value of 3 to 6. It is fine sandy loam, sandy clay, clay loam, silty clay, or clay. The 10- to 40-inch control section ranges from 35 to 60 percent clay and from 15 to 65 percent silt. The underlying buried material varies in color and texture.

Formation of the Soils

Soil is the product of the combined effects of plants and animals, climate, parent material, relief, and time. These five factors determine the characteristics of the soil. The processes of soil formation include additions of organic and mineral material to the soil as solids, liquids, and gases; losses of this material from the soil; translocation of material from one point to another within the soil; and transformation of mineral and organic substances within the soil *(8)*.

Plant and Animal Life

Plants and animals determine the kinds of organic matter that form and the way they are incorporated into the soil. Organic matter is the primary source of nutrients and energy in many soils. For example, organic matter provides the energy needed for micro-organisms to consume oxygen in a saturated horizon. The micro-organisms can reduce the oxygen levels in the water, and the resulting anaerobic conditions can exist for days or even weeks. The saturation and anaerobic conditions of the soil are responsible for the gleyed colors in the subsoil of poorly drained soils *(11)*.

Plants and micro-organisms release organic and inorganic compounds that influence the chemical breakdown of minerals. Plant roots take up nutrients from the lower parts of the soil and deposit them on the surface when the foliage dies. Plant roots also improve soil structure and porosity. The roots hold soil in place, the foliage protects the surface, and both minimize erosion by wind and water.

Plant communities can affect soil formation over large areas. Pine forests, which enhance the formation of acid soils, cover most of the dissected uplands in Onslow County.

Animals and insects transfer soil particles from one horizon to another. The activity of earthworms and micro-organisms aids in the chemical breakdown of minerals and improves soil structure and porosity.

Climate

Climate has a major influence on the kinds of plants and animals living in and on the soil. The climate of Onslow County is warm and humid. Summers are long and hot, and winters are short and mild. Mild temperatures and abundant rainfall promote the rapid decomposition of organic matter, hasten chemical reactions, speed leaching of soluble bases, and promote the translocation of fine particles in the soil profile. Consequently, the soils generally are acid, strongly leached, and low in natural fertility, except for those that formed in marl. All of the soils have a higher content of clay in the B horizon than in the A or C horizon, except for those that formed in sandy material or recent alluvium.

Parent Material

Parent material has been an important factor in the formation of the soils of Onslow County. The soils formed in surficial sediments on the Wicomico and Talbot marine terraces, in alluvium recently deposited in drainageways, in accumulations of organic material on broad, undissected interstream divides, and in material weathered from limestone, which occurs very irregularly near the surface in the northern part of the county and in many sinks that are partially filled with sandy or clayey material.

The parent material was highly weathered when deposited, and it varied in mineral and chemical composition. Differences in soil characteristics, such as thickness and texture of horizons, mineralogy, color, and reaction, are determined by the differences in parent material.

Bohicket, Craven, Lenoir, and Yaupon soils formed in sediments that have a relatively high amount of clay and silt. Goldsboro, Grifton, Lynchburg, Marvyn, Norfolk, Onslow, Pantego, and Rains soils formed in sediments that have nearly equal amounts of sand, silt, and clay. Alpin, Carteret, Corolla, Duckston, Kureb, Leon, Murville, Newhan, Pactolus, and Wando soils formed mainly in sandy sediments. Autryville, Baymeade, Foreston, Masontown, Muckalee, Stallings, Torhunta, and Woodington soils formed in sediments that have a relatively high content of sand. Grifton and Muckalee soils formed in sediments containing marl that is high in content of calcium carbonate. These soils

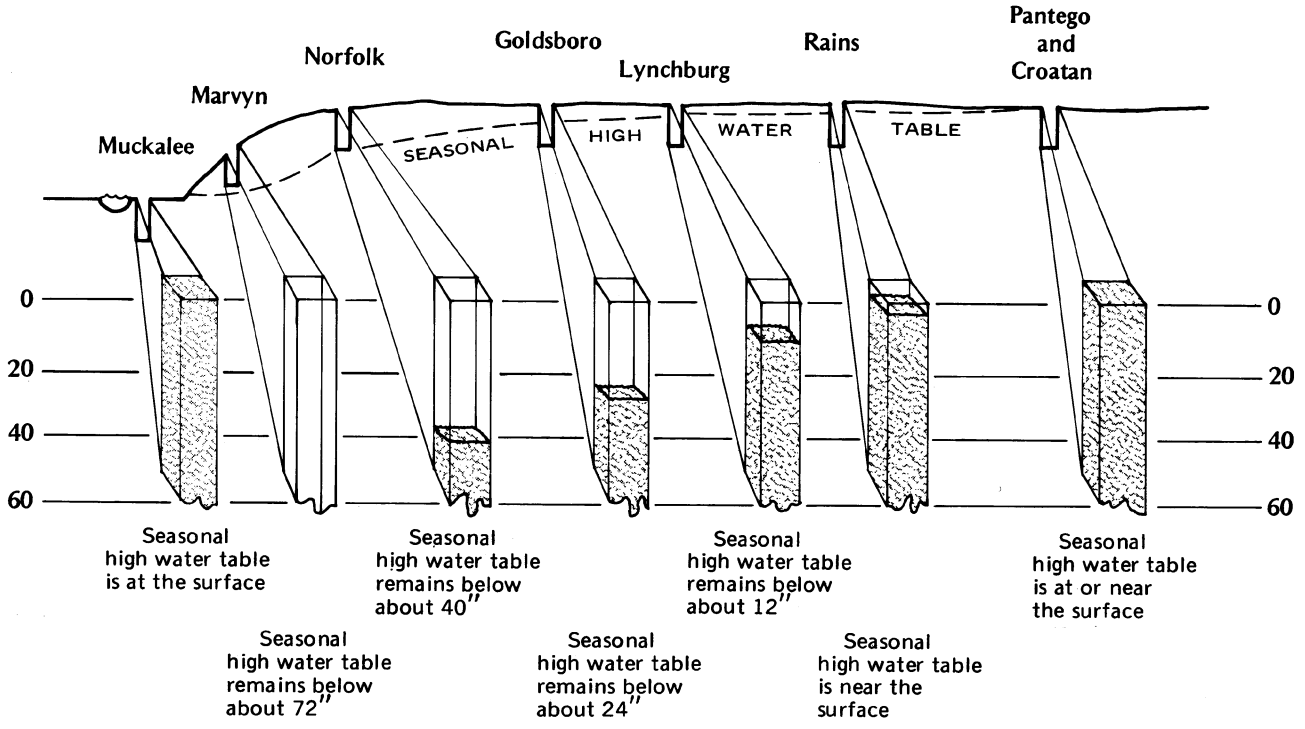


Figure 16.—A typical landscape from a drainageway to the center of an interstream area shows the relative location of some of the soils in Onslow County and depth to the seasonal high water table.

have a high base saturation. Croatan, Dorovan, and Lafitte soils formed in a thick accumulation of organic matter.

Bohicket, Carteret, and Lafitte soils formed in material that is subject to flooding by tides. These tidal marsh soils commonly are alkaline, and they are wet.

Relief

The relief in Onslow County is largely the result of the dissection of about two-thirds of the original plains by the New River and White Oak River and their tributaries and by short streams flowing into the Atlantic Ocean. The degree of dissection of the landscape affects the formation of the soils through its effect on depth to the water table (fig. 16) and the geologic removal of soil material resulting from the slope.

Soils in areas near short, sharply rounded side slopes are deep to the water table and have a light colored A1 or Ap horizon, a thick E horizon, and a bright colored B horizon *(12)*. Autryville, Baymeade, Craven, Goldsboro, Foreston, Marvyn, Norfolk, and Onslow soils are in these areas.

Soils in smooth, broad interstream areas are shallow to the water table and have a dark A1 or Ap horizon, a thin E horizon, and a gray Bt horizon that has small lenses or bodies that have a low content of clay. Lenoir, Lynchburg, Pantego, Rains, Stallings, Torhunta, and Woodington soils are in these areas.

The less dissected parts of the large interstream areas have an accumulation of organic matter. The rainfall exceeds both the evapotranspiration rate and the slow overland flow of water to the shallow streams nearby, resulting in wet conditions for extended periods. The major soil in these areas is Croatan muck.

Time

The horizons in a profile take a long time to develop. Relief changes with time. Some of the differences among the soils in Onslow County reflect a difference in age and changes in relief caused by natural or geologic erosion. The older soils, such as those of the Autryville, Baymeade, Goldsboro, Norfolk, and Rains series, are in the more stable interstream areas. They have well developed horizons and thick profiles. By contrast, the younger soils, such as those of the Masontown and Muckalee series, formed in recent sediments on flood plains and show almost no evidence of horizon development. Marvyn and Craven soils have well developed horizons but have only thin profiles because of the slope.

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Glossary

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

AC soil. A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

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

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

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Basal area. The cross-sectional area of a tree bole measured at 4.5 feet above ground level. It is generally expressed in square feet of cross-sectional area per acre.

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.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

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.

Clayey. A general textural term that includes sandy clay, silty clay, and clay. According to family level criteria in the soil taxonomic system, a specific textural name referring to fine earth (particles less than 2 millimeters in size) containing 35 percent or more clay by weight within the control section. The content of rock fragments is less than 35 percent by volume.

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

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose.—Noncoherent when dry or moist; does not hold together in a mass.
Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.
Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.
Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.
Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.
Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.
Soft.—When dry, breaks into powder or individual grains under very slight pressure.
Cemented.—Hard; little affected by moistening.

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

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

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, 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, 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, they can have moderate or high slope gradients.

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

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.
Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as

flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Erosion classes. Classes based on estimates of past erosion. The classes are as follows:

Class 1.—Soils that have lost some of the original A horizon but on the average less than 25 percent of the original A horizon or of the uppermost 8 inches (if the original A horizon was less than 8 inches thick). Throughout most of the area, the thickness of the surface layer is within the normal range of variability of the uneroded soil. Class 1 erosion typically is not designated in the name of the map unit or in the map symbol.

Class 2.—Soils that have lost an average of 25 to 75 percent of the original A horizon or of the uppermost 8 inches (if the original A horizon was less than 8 inches thick). Throughout most cultivated areas of class 2 erosion, the surface layer consists of a mixture of the original A horizon and material from below. Some areas may have intricate patterns ranging from uneroded spots to spots where all of the original A horizon has been removed.

Class 3.—Soils that have lost an average of 75 percent or more of the original A horizon or of the uppermost 8 inches (if the original A horizon was less than 8 inches thick). In most cultivated areas of class 3 erosion, material that was below the original A horizon is exposed. The plow layer consists entirely or largely of this material.

Class 4.—Soils that have lost all of the original A horizon or the uppermost 8 inches (if the original A horizon was less than 8 inches thick) plus some or all of the deeper horizons throughout most of the area. The original soil can be identified only in spots. Some areas may be smooth, but most have an intricate pattern of gullies.

Erosion hazard. Terms describing the potential for future erosion, inherent in the soil itself, in inadequately protected areas. The following definitions are based on estimated annual soil loss in metric tons per hectare (values determined by the Universal Soil Loss Equation assuming bare soil conditions and using rainfall and climate factors for North Carolina):

0 tons per hectare ..... none
Less than 2.5 tons per hectare..... slight
2.5 to 10 tons per hectare ..... moderate
10 to 25 tons per hectare ..... severe
More than 25 tons per hectare ..... very severe

Evapotranspiration. The combined loss of water from a given area through surface evaporation and through transpiration by plants during a specified period.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Excess salts (in tables). Excess water-soluble salts in the soil that restrict the growth of most plants.

Excess sulfur (in tables). Excessive amount of sulfur in the soil. The sulfur causes extreme acidity if the soil is drained, and the growth of most plants is restricted.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water had 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, or 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.

Foot slope. The inclined surface at the base of a hill.

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.

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

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.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric material.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. 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 (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Arabic numeral 2 precedes the letter C.

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

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Interstream area. The nearly level land between drainageways on relatively undissected parts of the coastal plain. It is in areas on uplands, low marine terraces, and stream terraces where the soils generally are poorly drained or very poorly drained.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin.—Water is applied rapidly to nearly level

plains surrounded by levees or dikes.
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.
Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.
Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.
Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.
Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.
Sprinkler.—Water is sprayed over the surface through pipes or nozzles from a pressure system.
Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.
Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Lamellae. Very thin, mostly horizontal layers of accumulated clay, iron, or other material common in some sands or loamy sands; associated with soil formation rather than geologic deposition.

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.

Loamy. A general textural term that includes coarse sandy loam, sandy loam, fine sandy loam, very fine sandy loam, loam, silt loam, silt, clay loam, sandy clay loam, and silty clay loam. According to family level criteria in the soil taxonomic system, a specific textural name referring to fine earth (particles less than 2 millimeters in size) of loamy very fine sand or finer textured material that contains less than 35 percent clay by weight within the control section. The content of rock fragments is less than 35 percent by volume.

Low strength. The soil is not strong enough to support loads.

Marsh. Periodically wet or continually flooded areas where the surface is not deeply submerged. These areas generally are covered with sedges, cattails, rushes, or other hydrophytic (water-loving) plants. Subgroups are:
Freshwater.—Lowland areas bordering rivers, creeks, and lakes that are flooded by fresh water and dominated by halophobic (salt-intolerant) plants.
Salt.—Lowland areas bordering coastal islands, sounds, bays, and sloughs that are flooded by salt water and dominated by halophytic (salt-tolerant) plants.
Tidal.—Lowland areas bordering rivers, creeks, and sloughs and traversed by interlacing channels. During high tides these areas are inundated by either salt water or brackish water. They dominated by halophytic (salt-tolerant) plants.

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.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or 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 three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

No-till planting. A method of planting crops in which there is virtually no seedbed preparation. A thin slice of the soil is opened, and the seed is planted at the desired depth.

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

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 through the soil.

Percs slowly (in tables). The slow movement of water through the soil, adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 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, such as slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

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

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Pocosin. Waterlogged land in large, flat interstream areas that are elevated above the distant flood plains. The soils are typically high in content of organic matter and support plants that are tolerant of wetness.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability the soil may not adequately filter effluent from a waste disposal system.

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.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

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

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

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

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

Road cut. A sloping surface made by mechanical means during road construction. It is generally on the uphill section of a road.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

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.

Salty water (in tables). Water that is too salty for consumption by livestock.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandy. A general textural term that includes coarse sand, sand, fine sand, very fine sand, loamy coarse sand, loamy sand, loamy fine sand, and loamy very fine sand. According to family level criteria in the soil taxonomic system, a specific textural name referring to fine earth (particles less than 2 millimeters in size) of sand or loamy sand that contains less than 50 percent very fine sand by weight within the control section. The content of rock fragments is less than 35 percent by volume.

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.

Seasonal high water table. The highest level of a saturated zone (the apparent or perched water table) over a continuous period of more than 2 weeks in most years, but not a permanent water table.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the substratum. 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.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

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

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 vertical 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 refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

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 compaction. An alteration of soil structure that ultimately can affect the biological and chemical properties of the soil. Compaction decreases the extent of voids and increases bulk density.

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 which provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates.

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

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. 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.

Subsidence. A pronounced reduction in volume in some drained soils because of the removal of water, shrinkage of organic material, and the oxidation of organic compounds. Generally associated with soils that have a high organic matter content.

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

Substratum. Technically, the C horizon; the part of the soil below the biologically altered A and B horizons.

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

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

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

Sands (coarse sand, sand, fine sand, and very fine sand).—Soil material in which the content of sand is 85 percent or more and the percentage of silt plus 1½ times the percentage of clay does not exceed 15.

Loamy sands (loamy coarse sand, loamy sand, loamy fine sand, and loamy very fine sand).—Soil material in which, at the upper limit, the content of sand is 85 to 90 percent and the percentage of silt plus 1½ times the percentage of clay is not less than 15; at the lower limit, the content of sand is 70 to 85 percent and the percentage of silt plus twice the percentage of clay does not exceed 30.

Sandy loams (coarse sandy loam, sandy loam, fine sandy loam, and very fine sandy loam).—Soil material in which the content of clay is 20 percent or less, the percentage of silt plus twice the percentage of clay exceeds 30, and the content of sand is 52 percent or more or soil material in which the content of clay is less than 7 percent, the content of silt is less than 50 percent, and the content of sand is 43 to 52 percent.

Loam.—Soil material that contains 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand.

Silt loam.—Soil material that contains 50 or more percent silt and 12 to 27 percent clay or 50 to 80 percent silt and less than 12 percent clay.

Silt.—Soil material that contains 80 or more percent silt and less than 12 percent clay.

Sandy clay loam.—Soil material that contains 20 to 35 percent clay, less than 28 percent silt, and 45 or more percent sand.

Clay loam.—Soil material that contains 27 to 40 percent clay and 20 to 45 percent sand.

Silty clay loam.—Soil material that contains 27 to 40 percent clay and less than 20 percent sand.

Sandy clay.—Soil material that contains 35 or more percent clay and 45 or more percent sand.

Silty clay.—Soil material that contains 40 or more percent clay and 40 or more percent silt.

Clay.—Soil material that contains 40 or more percent clay, less than 45 percent sand, and less than 40 percent silt.

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

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.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the

earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wetness. A general term applied to soils that hold water at or near the surface long enough to be a common management problem.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1951-79 at Maysville, North Carolina)

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average	Maximum temperature higher than--	Minimum temperature lower than--	Average number of growing degree days*	Average	Less than--	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	56.3	31.0	43.7	78	9	69	4.10	2.36	5.64	8	1.2
February	58.3	32.2	45.3	79	9	55	4.01	2.38	5.46	7	.8
March	65.5	38.3	51.9	85	18	155	3.96	2.37	5.38	8	.5
April	74.7	46.0	60.4	90	25	312	3.11	1.66	4.36	5	.0
May	80.8	54.5	67.7	95	32	549	4.80	3.23	6.24	8	.0
June	85.5	61.7	73.6	97	42	708	6.00	3.18	8.47	8	.0
July	88.6	66.4	77.5	97	51	853	7.01	4.64	9.17	10	.0
August	87.9	65.7	76.8	97	50	831	6.87	4.03	9.39	9	.0
September	83.8	59.9	71.9	93	39	657	5.96	2.80	8.67	7	.0
October	75.2	48.9	62.1	88	23	381	3.34	1.30	5.04	5	.0
November	67.4	39.3	53.4	83	17	147	3.11	1.58	4.43	5	.0
December	59.1	32.8	46.0	78	10	85	3.69	1.91	5.23	6	.4
Yearly:											
Average	73.6	48.1	60.9	---	---	---	---	---	---	---	---
Extreme	---	---	---	98	6	---	---	---	---	---	---
Total	---	---	---	---	---	4,802	55.96	47.23	64.30	86	2.9

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1951-79 at Maysville, 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--	Apr. 14	Apr. 26	May 7
2 years in 10 later than--	Apr. 6	Apr. 20	May 2
5 years in 10 later than--	Mar. 23	Apr. 8	Apr. 22
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 25	Oct. 19	Oct. 8
2 years in 10 earlier than--	Nov. 1	Oct. 24	Oct. 13
5 years in 10 earlier than--	Nov. 14	Nov. 5	Oct. 24

TABLE 3.--GROWING SEASON

(Recorded in the period 1951-79 at Maysville, 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	201	179	162
8 years in 10	212	190	170
5 years in 10	235	210	184
2 years in 10	257	231	198
1 year in 10	269	242	205

TABLE 4.--PLANT LIST

Common name	Scientific name
American beachgrass	Ammophila breviligulata
American beautyberry	Callicarpa americana
American elm	Ulmus americana
American holly	Ilex opaca
American hornbeam	Carpinus caroliniana
American sycamore	Platanus occidentalis
Atlantic white cedar	Chamaecyparis thyoides
baldcypress	Taxodium distichum
beachgrass	Ammophila
big bluestem	Andropogon gerardii
big cordgrass	Spartina cynosuroides
bitter panicum	Panicum amarum
black cherry	Prunus serotina
black needlerush (needlegrass rush)	Juncus roemeranus
black willow	Salix nigra
blackberry	Rubus
blackgum	Nyssa sylvatica
blackjack oak	Quercus marilandica
blueberry	Vaccinium
bluejack oak	Quercus incana
brackenfern	Pteridium aquilinum
bushy seaoxeye	Borrichia frutescens
cattail	Typha
cherrybark oak	Quercus falcata pagodifolia
cinnamon fern	Osmunda cinnamomea
coast azalea	Rhododendron atlanticum
dotted smartweed	Polygonum punctatum
eastern baccharis	Baccharis halimifolia
eastern cottonwood	Populus deltoides
eastern redcedar	Juniperus virginiana
eveningprimrose	Oenothera
fetterbush lyonia	Lyonia lucida
flowering dogwood	Cornus florida
gallberry (inkberry)	Ilex glabra
giant cane	Arundinaria gigantea
grass pink	Calopogon tuberosus
green ash	Fraxinus pennsylvanica
greenbrier	Smilax
groundsel	Senecio
hazel alder	Alnus serrulata
hickory	Carya
honeysuckle	Lonicera
huckleberry	Gaylussacia
large gallberry	Ilex coriacea
largeleaf pennywort	Hydrocotyle bonariensis
little bluestem	Schizachyrium scoparium
live oak	Quercus virginiana
loblollybay gordonia	Gordonia lasianthus
loblolly pine	Pinus taeda
longleaf pine	Pinus palustris
marshelder	Iva
marshhay cordgrass (saltmeadow cordgrass)	Spartina patens
myrtle oak	Quercus myrtifolia
northern bayberry	Myrica pensylvanica
panicgrass	Panicum
persimmon	Diospyros virginiana
pineland threeawn	Aristida stricta
pitcherplant	Sarracenia purpurea
poison ivy	Toxicodendron radicans
pond pine	Pinus serotina
post oak	Quercus stellata
red maple	Acer rubrum
redbay	Persea borbonia
river birch	Betula nigra

TABLE 4.--PLANT LIST--Continued

Common name	Scientific name
rose pogonia	Pogonia ophioglossoides
saltgrass	Distichlis
saltmarsh bulrush	Scirpus robustus
saltwort	Batis maritima
sassafras	Sassafras albidum
seablite	Suaeda
seaholly	Eryngium maritimum
seaoats	Uniola paniculata
searocket	Cakile edentula
seashore mallow (Virginia saltmarsh)	Kosteletzkya virginica
seaside goldenrod (willowleaf)	Solidago stricta
smooth cordgrass	Spartina alterniflora
sourwood	Oxydendrum arboreum
southern bayberry	Myrica cerifera
southern red oak	Quercus falcata
sphagnum moss	Sphagnum
summer grape	Vitis aestivalis
sundew	Drosera
swamp chestnut oak	Quercus michauxii
swamp cyrilla	Cyrilla racemiflora
swamp dock	Rumex verticillatus
swamp tupelo	Nyssa sylvatica biflora
sweet pepperbush (summersweet clethra)	Clethra alnifolia
sweetbay	Magnolia virginiana
sweetgum	Liquidambar styraciflua
switchcane	Arundinaria tecta
tearthumb	Tracaulon
titi	Cliftonia monophylla
turkey oak	Quercus laevis
venus flytrap	Dionaea muscipula
Virginia chainfern	Woodwardia virginica
Virginia creeper	Parthenocissus quinquefolia
water oak	Quercus nigra
water tupelo	Nyssa aquatica
waxmyrtle	Myrica cerifera
white oak	Quercus alba
wild common olive	Olea europaea oleaster
willow oak	Quercus phellos
yaupon	Ilex vomitoria
yellow poplar	Liriodendron tulipifera
yucca	Yucca

TABLE 5.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
AnB	Alpin fine sand, 1 to 6 percent slopes	2,238	0.4
AuB	Autryville loamy fine sand, 1 to 6 percent slopes	10,069	1.9
BaB	Baymeade fine sand, 0 to 6 percent slopes	51,023	9.7
BmB	Baymeade-Urban land complex, 0 to 6 percent slopes	5,461	1.0
Bo	Bohicket silty clay loam	9,236	1.8
Ca	Carteret fine sand	722	0.1
Co	Corolla fine sand	525	0.1
CrB	Craven fine sandy loam, 1 to 4 percent slopes	4,430	0.8
CrC	Craven fine sandy loam, 4 to 8 percent slopes	4,077	0.8
Ct	Croatan muck	33,207	6.3
Da	Dorovan muck	3,371	0.6
Dc	Duckston fine sand	464	0.1
FoA	Foreston loamy fine sand, 0 to 2 percent slopes	25,937	5.0
GoA	Goldsboro fine sandy loam, 0 to 2 percent slopes	18,211	3.5
GpB	Goldsboro-Urban land complex, 0 to 5 percent slopes	6,868	1.3
Gt	Grifton fine sandy loam	685	0.1
KuB	Kureb fine sand, 1 to 6 percent slopes	8,750	1.7
La	Lafitte muck	433	0.1
Le	Lenoir loam	1,418	0.3
Ln	Leon fine sand	32,907	6.3
Ly	Lynchburg fine sandy loam	10,270	2.0
MaC	Marvyn loamy fine sand, 6 to 15 percent slopes	20,143	3.8
Md	Masontown mucky fine sandy loam	1,196	0.2
Mk	Muckalee loam	29,878	5.7
Mu	Murville fine sand	16,840	3.2
NeE	Newhan fine sand, 0 to 30 percent slopes	2,092	0.4
NfC	Newhan fine sand, dredged, 2 to 10 percent slopes	1,739	0.3
NnE	Newhan-Corolla-Urban land complex, 0 to 30 percent slopes	650	0.1
NoA	Norfolk loamy fine sand, 0 to 2 percent slopes	4,314	0.8
NoB	Norfolk loamy fine sand, 2 to 6 percent slopes	26,229	5.0
On	Onslow loamy fine sand	21,836	4.2
Pa	Pactolus fine sand	6,287	1.2
Pn	Pantego mucky loam	17,743	3.4
Pt	Pits	1,359	0.3
Ra	Rains fine sandy loam	29,344	5.6
St	Stallings loamy fine sand	16,783	3.2
To	Torhunta fine sandy loam	23,810	4.5
Ud	Udorthents, loamy	532	0.1
Ur	Urban land	2,040	0.4
WaB	Wando fine sand, 1 to 6 percent slopes	8,756	1.7
Wo	Woodington loamy fine sand	25,492	4.9
YaA	Yaupon fine sandy loam, 0 to 3 percent slopes	705	0.1
	Water	36,864	7.0
	Total	524,934	100.0

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Corn	Soybeans	Tobacco	Wheat	Oats	Improved bermuda-grass	Grass-clover
		Bu	Bu	Lbs	Bu	Bu	AUM*	AUM*
AnB---------- Alpin	IVs	---	---	1,500	---	---	8.0	---
AuB---------- Autryville	IIs	80	28	2,200	40	---	9.0	---
BaB---------- Baymeade	IIIs	65	28	2,200	40	---	8.0	---
BmB** Baymeade-Urban land								
Bo---------- Bohicket	VIIIw	---	---	---	---	---	---	---
Ca---------- Carteret	VIIIw	---	---	---	---	---	---	---
Co---------- Corolla	VIIw	---	---	---	---	---	---	---
CrB---------- Craven	IIIe	105	40	2,500	50	---	---	10.0
CrC---------- Craven	IVe	---	---	---	---	---	---	8.0
Ct***---------- Croatan	IVw	125	40	---	50	---	6.0	6.0
Da---------- Dorovan	VIIw	---	---	---	---	---	---	---
Dc---------- Duckston	VIIw	---	---	---	---	---	---	---
FoA---------- Foreston	IIw	110	35	2,600	50	---	10.0	---
GoA---------- Goldsboro	IIw	130	45	3,000	60	---	---	11.5
GpB**. Goldsboro-Urban land								
Gt***---------- Grifton	IIIw	110	40	---	---	---	---	12.0
KuB---------- Kureb	VIIs	---	---	---	---	---	3.5	---
La---------- Lafitte	VIIIw	---	---	---	---	---	---	---

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Tobacco	Wheat	Oats	Improved bermuda-grass	Grass-clover
		Bu	Bu	Lbs	Bu	Bu	AUM*	AUM*
Le---------- Lenoir	IIIw	90	35	2,200	45	---	---	10.0
Ln---------- Leon	IVw	50	---	---	---	---	8.0	---
Ly---------- Lynchburg	IIw	125	45	2,800	55	75	---	10.0
MaC---------- Marvyn	IVe	50	25	---	40	---	9.0	---
Md---------- Masontown	VIIw	---	---	---	---	---	---	---
Mk---------- Muckalee	Vw	---	---	---	---	---	---	---
Mu---------- Murville	Vw	---	---	---	---	---	---	---
NeE---------- Newhan	VIIIs	---	---	---	---	---	---	---
NfC. Newhan								
NnE**. Newhan-Corolla-Urban land								
NoA---------- Norfolk	I	120	40	3,000	60	---	10.0	9.0
NoB---------- Norfolk	IIe	110	35	2,900	55	---	10.0	9.0
On---------- Onslow	IIw	115	40	2,700	60	---	10.0	10.0
Pa---------- Pactolus	IIIs	65	25	1,800	---	---	6.0	---
Pn***---------- Pantego	IIIw	135	50	---	45	70	---	11.0
Pt**. Pits								
Ra---------- Rains	IIIw	120	40	2,300	45	70	---	10.0
St---------- Stallings	IIw	110	35	2,500	50	---	---	8.0
To***---------- Torhunta	IIIw	120	40	---	45	70	---	10.0
Ud**. Udorthents								

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Tobacco	Wheat	Oats	Improved bermuda-grass	Grass-clover
		Bu	Bu	Lbs	Bu	Bu	AUM*	AUM*
Ur**. Urban land								
WaB---------- Wando	IIIs	---	---	---	---	---	8.0	---
Wo***---------- Woodington	IIIw	110	35	---	50	---	---	9.0
YaA---------- Yaupon	IVe	---	---	---	---	---	---	10.0

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

*** For this unit the capability subclass and yields shown are for drained areas. Yield data for undrained areas are not available. See the map unit description for the capability subclass in undrained areas.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils that are suitable for production of commercial trees and that are likely to be used for this purpose are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Ordination symbol	Management concerns			Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Common trees	Site index	Volume	
AnB Alpin	6S	Slight	Moderate	Moderate	Loblolly pine Longleaf pine Turkey oak Post oak Blackjack oak Bluejack oak	66 48 --- --- --- ---	86 33 --- --- --- ---	Loblolly pine.
AuB Autryville	7S	Slight	Moderate	Moderate	Loblolly pine Longleaf pine Southern red oak Shumard oak Hickory Sweetgum Red maple White oak Post oak	77 --- --- --- --- --- --- --- ---	105 --- --- --- --- --- --- --- ---	Loblolly pine, longleaf pine.
BaB Baymeade	6S	Slight	Moderate	Moderate	Loblolly pine Longleaf pine	66 63	86 63	Loblolly pine, longleaf pine.
CrB, CrC Craven	8W	Slight	Moderate	Slight	Loblolly pine Longleaf pine Water oak Sweetgum White oak Southern red oak Red maple Blackgum Yellow poplar	89 70 --- --- --- --- --- --- ---	129 79 --- --- --- --- --- --- ---	Loblolly pine.
Ct Croatan	4W	Slight	Severe*	Severe*	Pond pine Water tupelo Baldcypress Loblolly pine Sweetgum Swamp tupelo Atlantic white cedar	55 --- --- --- --- --- ---	66** --- --- --- --- --- ---	Loblolly pine.
Da Dorovan	7W	Slight	Severe	Severe	Blackgum Sweetbay Baldcypress Swamp tupelo Green ash	--- --- --- --- ---	--- --- --- --- ---	Baldcypress.***
FoA Foreston	9W	Slight	Moderate	Slight	Loblolly pine Longleaf pine	90 75	131 90	Loblolly pine.
GoA Goldsboro	9W	Slight	Moderate	Slight	Loblolly pine Longleaf pine Sweetgum Southern red oak White oak Water oak Red maple	90 77 90 --- --- --- ---	131 94 106 --- --- --- ---	Loblolly pine.

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume	Trees to plant
Gt Grifton	9W	Slight	Severe*	Severe*	Loblolly pine	89	129**	Loblolly pine.
KuB Kureb	3S	Slight	Severe	Severe	Longleaf pine	52	40	Longleaf pine.
Le Lenoir	9W	Slight	Moderate	Slight	Loblolly pine	90	131	Loblolly pine.***
Ln Leon	8W	Slight	Moderate	Moderate	Loblolly pine	76	103	Loblolly pine.
					Longleaf pine	65	67	
Ly Lynchburg	9W	Slight	Moderate	Slight	Loblolly pine	86	123	Loblolly pine.
					Longleaf pine	74	88	
					Yellow poplar	92	93	
					Sweetgum	90	106	
					Southern red oak	---	---	
					White oak	---	---	
					Blackgum	---	---	
MaC Marvyn	9A	Slight	Slight	Slight	Loblolly pine	90	131	Loblolly pine.
					Longleaf pine	80	100	
Md Masontown	7W	Slight	Severe	Severe	Water oak	103	101	***
					Swamp tupelo	---	---	
					Green ash	---	---	
					Sweetgum	111	111	
					Baldcypress	---	---	
					American elm	---	---	
					Willow oak	---	---	
					Swamp chestnut oak	---	---	
Mk Muckalee	9W	Slight	Severe	Severe	Loblolly pine	90	131	***
					Sweetgum	90	106	
					Water oak	90	---	
					Green ash	85	---	
					Eastern cottonwood	100	---	
Mu Murville	6W	Slight	Severe*	Severe*	Loblolly pine	70	93**	Loblolly pine.
					Pond pine	50	56	
					Longleaf pine	60	56	
					Red maple	---	---	
NoA, NoB Norfolk	9A	Slight	Slight	Slight	Loblolly pine	86	123	Loblolly pine.
					Longleaf pine	68	74	
On Onslow	7A	Slight	Slight	Slight	Loblolly pine	76	103	Loblolly pine.
					Longleaf pine	67	72	
Pa Pactolus	8W	Slight	Moderate	Moderate	Loblolly pine	84	118	Loblolly pine.
					Longleaf pine	70	79	
Pn Pantego	9W	Slight	Severe*	Severe*	Loblolly pine	95	142**	Loblolly pine.
					Pond pine	73	98	
					Baldcypress	---	---	
					Water tupelo	---	---	
					Water oak	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns			Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Common trees	Site index	Volume	
Ra Rains	9W	Slight	Severe*	Severe*	Loblolly pine Sweetgum	94 90	140** 106	Loblolly pine, sweetgum, American sycamore.
St Stallings	8W	Slight	Moderate	Slight	Loblolly pine Longleaf pine Sweetgum Yellow poplar Water oak	79 --- --- --- ---	108 --- --- --- ---	Loblolly pine.
To Torhunta	9W	Slight	Severe*	Severe*	Loblolly pine Sweetgum Water tupelo	90 90 ---	131** 106 ---	Loblolly pine.
WaB Wando	8S	Slight	Moderate	Moderate	Loblolly pine Longleaf pine	80 70	110 79	Loblolly pine, longleaf pine.
Wo Woodington	8W	Slight	Severe*	Severe*	Loblolly pine Sweetgum White oak Southern red oak Water tupelo	83 --- --- --- ---	116** --- --- --- ---	Loblolly pine.
YaA Yaupon	8W	Slight	Moderate	Slight	Loblolly pine Longleaf pine Water oak Sweetgum	--- --- --- ---	--- --- --- ---	Loblolly pine, longleaf pine.

* Equipment use is moderately restricted and seedling mortality is moderate in areas where the soil is adequately drained.

** The potential productivity is attainable only where the soil is drained and bedded. Applications of fertilizer can further increase the site index.

*** The landscape position favors natural regeneration of tree species.

TABLE 8.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
AnB Alpin	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
AuB Autryville	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Moderate: droughty.
BaB Baymeade	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
BmB*: Baymeade	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
Urban land.					
Bo Bohicket	Severe: flooding, ponding, percs slowly.	Severe: ponding, excess salt.	Severe: ponding, flooding.	Severe: ponding.	Severe: excess salt, excess sulfur, ponding.
Ca Carteret	Severe: flooding, ponding, too sandy.	Severe: ponding, too sandy, excess salt.	Severe: too sandy, ponding, flooding.	Severe: ponding, too sandy.	Severe: excess salt, ponding, droughty.
Co Corolla	Severe: flooding, too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
CrB Craven	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Slight	Slight.
CrC Craven	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Severe: slope.	Slight	Slight.
Ct Croatan	Severe: flooding, wetness, excess humus.	Severe: wetness, excess humus, too acid.	Severe: excess humus, wetness.	Severe: wetness, excess humus.	Severe: too acid, wetness.
Da Dorovan	Severe: flooding, ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding, flooding.	Severe: ponding, excess humus.	Severe: ponding, flooding, excess humus.
Dc Duckston	Severe: flooding, wetness, too sandy.	Severe: too sandy.	Severe: too sandy, wetness, flooding.	Severe: too sandy.	Severe: droughty, flooding.
FoA Foreston	Slight	Slight	Slight	Slight	Moderate: droughty.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
GoA Goldsboro	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Slight	Slight.
GpB*: Goldsboro	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Slight	Slight.
Urban land.					
Gt Grifton	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
KuB Kureb	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
La Lafitte	Severe: flooding, ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding, flooding.	Severe: ponding, excess humus.	Severe: excess humus, ponding, flooding.
Le Lenoir	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Ln Leon	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
Ly Lynchburg	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
MaC Marvyn	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Md Masontown	Severe: flooding, ponding.	Severe: ponding.	Severe: excess humus, ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
Mk Muckalee	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
Mu Murville	Severe: ponding.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding.
NeE Newhan	Severe: flooding, slope, too sandy.	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Severe: droughty, slope.
NfC Newhan	Severe: flooding, too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Severe: droughty.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
NnE*:					
Newhan	Severe: flooding, slope, too sandy.	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Severe: droughty, slope.
Corolla	Severe: flooding, too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
Urban land.					
NoA Norfolk	Slight	Slight	Slight	Slight	Moderate: droughty.
NoB Norfolk	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
On Onslow	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
Pa Pactolus	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: wetness, droughty, too sandy.
Pn Pantego	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: wetness.
Pt*. Pits					
Ra Rains	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
St Stallings	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
To Torhunta	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Ud*. Udorthents					
Ur*. Urban land					
WaB Wando	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty.
Wo Woodington	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
YaA Yaupon	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Slight	Slight.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Only the soils that are likely to be used as wildlife habitat are listed. Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
AnB--Alpin	Poor	Poor	Fair	Poor	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
AuB--Autryville	Poor	Fair	Good	Good	Good	Fair	Very poor.	Fair	Good	Good.
BaB--Baymeade	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
Bo--Bohicket	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Very poor.	Very poor.	Very poor.	Poor.
Ca--Carteret	---	---	---	---	---	Fair	Good	---	---	Fair.
Co--Corolla	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.
CrB--Craven	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
CrC--Craven	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Ct*--Croatan	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Da--Dorovan	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
Dc--Duckston	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.
FoA--Foreston	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
GoA--Goldsboro	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Gt--Grifton	Poor	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
KuB--Kureb	Very poor.	Poor	Poor	Very poor.	Poor	Very poor.	Very poor.	Poor	Very poor.	Very poor.
La--Lafitte	Very poor.	Very poor.	Very poor.	---	---	Good	Very poor.	Very poor.	---	Good.
Le--Lenoir	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Ln--Leon	Poor	Poor	Fair	Poor	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Ly---- Lynchburg	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
MaC---- Marvyn	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Md---- Masontown	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Mk---- Muckalee	Poor	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
Mu---- Murville	Very poor.	Poor	Poor	Poor	Poor	Good	Fair	Poor	Poor	Fair.
NeE, NfC---- Newhan	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
NoA, NoB---- Norfolk	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
On---- Onslow	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Pa---- Pactolus	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Pn*---- Pantego	Very poor.	Poor	Poor	Poor	Poor	Good	Fair	Poor	Poor	Fair.
Ra---- Rains	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
St*---- Stallings	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
To*---- Torhunta	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
WaB---- Wando	Poor	Poor	Fair	Poor	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Wo*---- Woodington	Poor	Fair	Fair	Fair	Fair	Good	Poor	Fair	Fair	Fair.
YaA---- Yaupon	Poor	Fair	Fair	Fair	Fair	Fair	Very poor.	Fair	Fair	Poor.

* Ratings are for undrained areas.

TABLE 10.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
AnB---- Alpin	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Severe: droughty.
AuB---- Autryville	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Slight	Moderate: droughty.
BaB---- Baymeade	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Slight	Severe: droughty.
BmB*: Baymeade----	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Slight	Severe: droughty.
Urban land.						
Bo---- Bohicket	Severe: ponding.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: low strength, ponding, flooding.	Severe: excess salt, excess sulfur, ponding.
Ca---- Carteret	Severe: cutbanks cave, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: ponding, flooding.	Severe: excess salt, ponding, droughty.
Co---- Corolla	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Moderate: flooding, wetness.	Severe: droughty.
CrB---- Craven	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: low strength.	Slight.
CrC---- Craven	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: low strength.	Slight.
Ct---- Croatan	Severe: excess humus, wetness.	Severe: flooding, wetness, low strength.	Severe: flooding, wetness.	Severe: flooding, wetness, low strength.	Severe: wetness.	Severe: too acid, wetness.
Da---- 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.
Dc---- Duckston	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding.	Severe: droughty, flooding.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
FoA Foreston	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Slight	Moderate: droughty.
GoA Goldsboro	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Slight.
GpB*: Goldsboro	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Slight.
Urban land.						
Gt Grifton	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
KuB Kureb	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Severe: droughty.
La Lafitte	Severe: excess humus, ponding.	Severe: flooding, ponding, low strength.	Severe: flooding, ponding.	Severe: flooding, ponding, low strength.	Severe: low strength, ponding, flooding.	Severe: excess humus, ponding, flooding.
Le Lenoir	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength.	Moderate: wetness.
Ln Leon	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
Ly Lynchburg	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
MaC Marvyn	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
Md Masontown	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.
Mk Muckalee	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.
Mu Murville	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
NeE Newhan	Severe: cutbanks cave, slope.	Severe: flooding, slope.	Severe: flooding, slope.	Severe: flooding, slope.	Severe: slope.	Severe: droughty, slope.
NfC Newhan	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Severe: droughty.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
NnE*:						
Newhan	Severe: cutbanks cave, slope.	Severe: flooding, slope.	Severe: flooding, slope.	Severe: flooding, slope.	Severe: slope.	Severe: droughty, slope.
Corolla	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Moderate: flooding, wetness.	Severe: droughty.
Urban land.						
NoA	Moderate: wetness.	Slight	Moderate: wetness.	Slight	Slight	Moderate: droughty.
Norfolk						
NoB	Moderate: wetness.	Slight	Moderate: wetness.	Moderate: slope.	Slight	Moderate: droughty.
Norfolk						
On	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
Onslow						
Pa	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, droughty, too sandy.
Pactolus						
Pn	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Pantego						
Pt*.						
Pits						
Ra	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Rains						
St	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
Stallings						
To	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Torhunta						
Ud*.						
Udorthents						
Ur*.						
Urban land						
WaB	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Moderate: droughty.
Wando						
Wo	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Woodington						
YaA	Severe: wetness.	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Slight.
Yaupon						

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AnB Alpin	Slight	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy, seepage.
AuB Autryville	Moderate: wetness.	Severe: seepage.	Severe: wetness, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
BaB Baymeade	Severe: poor filter.	Severe: seepage.	Severe: seepage, wetness, too sandy.	Severe: seepage.	Poor: too sandy.
BmB*: Baymeade	Severe: poor filter.	Severe: seepage.	Severe: seepage, wetness, too sandy.	Severe: seepage.	Poor: too sandy.
Urban land.					
Bo Bohicket	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding, too clayey.	Severe: flooding, ponding.	Poor: too clayey, hard to pack, ponding.
Ca Carteret	Severe: flooding, ponding, poor filter.	Severe: seepage, flooding, ponding.	Severe: flooding, seepage, ponding.	Severe: flooding, seepage, ponding.	Poor: seepage, too sandy, ponding.
Co Corolla	Severe: wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: wetness, seepage.	Severe: seepage, wetness.	Poor: seepage, too sandy.
CrB, CrC Craven	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.
Ct Croatan	Severe: wetness, percs slowly.	Severe: seepage, flooding, excess humus.	Severe: wetness, too acid.	Severe: seepage, wetness.	Poor: wetness, thin layer.
Da Dorovan	Severe: flooding, ponding.	Severe: flooding, excess humus, ponding.	Severe: flooding, seepage, ponding.	Severe: flooding, ponding.	Poor: ponding, excess humus.
Dc Duckston	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, too sandy.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, wetness.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
FoA Foreston	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness.	Severe: seepage, wetness.	Poor: thin layer.
GoA Goldsboro	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
GpB*: Goldsboro	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
Urban land.					
Gt Grifton	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness.	Severe: seepage, wetness.	Poor: wetness.
KuB Kureb	Severe: poor filter.	Severe: seepage.	Severe: too sandy.	Severe: seepage.	Poor: seepage, too sandy.
La Lafitte	Severe: flooding, ponding.	Severe: seepage, flooding, excess humus.	Severe: flooding, ponding, seepage.	Severe: flooding, seepage, ponding.	Poor: ponding, excess humus.
Le Lenoir	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Ln Leon	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
Ly Lynchburg	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
MaC Marvyn	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: hard to pack, slope.
Md Masontown	Severe: flooding, ponding, poor filter.	Severe: seepage, flooding, ponding.	Severe: flooding, seepage, ponding.	Severe: flooding, seepage, ponding.	Poor: seepage, too sandy, ponding.
Mk Muckalee	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
Mu Murville	Severe: ponding, poor filter.	Severe: seepage, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
NeE Newhan	Severe: poor filter, slope.	Severe: seepage, flooding, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, slope.
NfC Newhan	Severe: poor filter.	Severe: seepage, flooding.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
NnE*: Newhan	Severe: poor filter, slope.	Severe: seepage, flooding, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, slope.
Corolla	Severe: wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: wetness, seepage.	Severe: seepage, wetness.	Poor: seepage, too sandy.
Urban land.					
NoA, NoB Norfolk	Moderate: wetness.	Moderate: seepage.	Severe: wetness.	Slight	Good.
On Onslow	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: seepage, wetness.	Fair: wetness.
Pa Pactolus	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
Pn Pantego	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Pt*. Pits					
Ra Rains	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, seepage.	Poor: wetness.
St Stallings	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: thin layer.
To Torhunta	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: wetness.
Ud*. Udorthents					
Ur*. Urban land					

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
WaB Wando	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
Wo Woodington	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: wetness.
YaA Yaupon	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
AnB Alpin	Good	Probable	Improbable: too sandy.	Poor: too sandy.
AuB Autryville	Good	Improbable: thin layer.	Improbable: too sandy.	Fair: too sandy.
BaB Baymeade	Good	Probable	Improbable: too sandy.	Poor: too sandy.
BmB*: Baymeade	Good	Probable	Improbable: too sandy.	Poor: too sandy.
Urban land.				
Bo Bohicket	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess salt, wetness.
Ca Carteret	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, excess salt, wetness.
Co Corolla	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
CrB, CrC Craven	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Ct Croatan	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness, too acid.
Da Dorovan	Poor: wetness.	Probable	Improbable: too sandy.	Poor: excess humus, wetness.
Dc Duckston	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
FoA Foreston	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
GoA Goldsboro	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
GpB*: Goldsboro	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
GpB*: Urban land.				
Gt---- Grifton	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
KuB---- Kureb	Good----	Probable----	Improbable: too sandy.	Poor: too sandy.
La---- Lafitte	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.
Le---- Lenoir	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Ln---- Leon	Poor: wetness.	Probable----	Improbable: too sandy.	Poor: too sandy, wetness.
Ly---- Lynchburg	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
MaC---- Marvyn	Good----	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy, small stones, thin layer.
Md---- Masontown	Poor: wetness.	Probable----	Improbable: too sandy.	Poor: wetness.
Mk---- Muckalee	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Mu---- Murville	Poor: wetness	Probable----	Improbable: too sandy.	Poor: too sandy, wetness.
NeE---- Newhan	Fair: slope.	Probable----	Improbable: too sandy.	Poor: too sandy, slope.
NfC---- Newhan	Good----	Probable----	Improbable: too sandy.	Poor: too sandy.
NnE*: Newhan----	Fair: slope.	Probable----	Improbable: too sandy.	Poor: too sandy, slope.
Corolla----	Fair: wetness.	Probable----	Improbable: too sandy.	Poor: too sandy.
Urban land.				
NoA, NoB---- Norfolk	Good----	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
On Onslow	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
Pa Pactolus	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
Pn Pantego	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Pt*. Pits				
Ra Rains	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
St Stallings	Fair: wetness.	Probable	Improbable: too sandy.	Fair: too sandy.
To Torhunta	Poor: wetness.	Probable	Improbable: too sandy.	Poor: wetness.
Ud*. Udorthents				
Ur*. Urban land				
WaB Wando	Good	Probable	Improbable: too sandy.	Poor: too sandy.
Wo Woodington	Poor: wetness.	Probable	Improbable: too sandy.	Poor: wetness.
YaA Yaupon	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Grassed waterways
AnB---------- Alpin	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, soil blowing.	Droughty.
AuB---------- Autryville	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Deep to water	Droughty, fast intake.	Droughty.
BaB---------- Baymeade	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Deep to water	Droughty, fast intake, rooting depth.	Droughty, rooting depth.
BmB*: Baymeade---------	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Deep to water	Droughty, fast intake, rooting depth.	Droughty, rooting depth.
Urban land.						
Bo---------- Bohicket	Slight---------	Severe: hard to pack, ponding, excess salt.	Severe: slow refill, salty water.	Ponding, percs slowly, flooding.	Ponding--------	Wetness, excess salt.
Ca---------- Carteret	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: salty water, cutbanks cave.	Ponding, flooding, cutbanks cave.	Ponding, droughty, fast intake.	Wetness, excess salt, droughty.
Co---------- Corolla	Severe: seepage.	Severe: seepage, wetness, piping.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Droughty.
CrB---------- Craven	Moderate: seepage.	Moderate: hard to pack, wetness.	Severe: slow refill.	Percs slowly---	Wetness, percs slowly.	Erodes easily, percs slowly.
CrC---------- Craven	Moderate: seepage, slope.	Moderate: hard to pack, wetness.	Severe: slow refill.	Percs slowly, slope.	Wetness, percs slowly, slope.	Erodes easily, percs slowly.
Ct---------- Croatan	Severe: seepage.	Severe: piping, wetness.	Severe: slow refill.	Percs slowly, subsides.	Wetness, percs slowly.	Wetness, percs slowly.
Da---------- Dorovan	Moderate: seepage.	Severe: excess humus, ponding.	Severe: cutbanks cave.	Ponding, flooding, subsides.	Ponding, flooding.	Wetness.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Grassed waterways
Dc---------- Duckston	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Flooding, cutbanks cave.	Wetness, droughty, fast intake.	Wetness, droughty.
FoA---------- Foreston	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Favorable------	Wetness, droughty, fast intake.	Droughty.
GoA---------- Goldsboro	Moderate: seepage.	Moderate: piping, wetness.	Moderate: slow refill.	Favorable------	Wetness--------	Favorable.
GpB*: Goldsboro--------	Moderate: seepage.	Moderate: piping, wetness.	Moderate: slow refill.	Favorable------	Wetness--------	Favorable.
Urban land.						
Gt---------- Grifton	Moderate: seepage.	Severe: wetness.	Moderate: slow refill.	Favorable------	Wetness--------	Wetness.
KuB---------- Kureb	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, slope.	Droughty.
La---------- Lafitte	Severe: seepage.	Severe: excess humus, ponding.	Slight---------	Ponding, flooding, subsides.	Ponding, flooding, excess salt.	Wetness, excess salt.
Le---------- Lenoir	Slight---------	Severe: wetness.	Severe: slow refill.	Percs slowly---	Wetness, percs slowly, erodes easily.	Wetness, erodes easily, percs slowly.
Ln---------- Leon	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.
Ly---------- Lynchburg	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Favorable------	Wetness--------	Wetness.
MaC---------- Marvyn	Severe: slope.	Severe: piping, hard to pack.	Severe: no water.	Deep to water	Fast intake, slope.	Slope.
Md---------- Masontown	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, flooding, cutbanks cave.	Ponding, flooding.	Wetness.
Mk---------- Muckalee	Moderate: seepage.	Severe: piping, wetness.	Severe: cutbanks cave.	Flooding, cutbanks cave.	Wetness, droughty, flooding.	Wetness, droughty.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Grassed waterways
Mu Murville	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, cutbanks cave.	Ponding, droughty, fast intake.	Wetness, droughty.
NeE Newhan	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, slope.	Slope, droughty.
NfC Newhan	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, slope.	Droughty.
NnE*:						
Newhan	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, slope.	Slope, droughty.
Corolla	Severe: seepage.	Severe: seepage, wetness, piping.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Droughty.
Urban land.						
NoA Norfolk	Moderate: seepage.	Moderate: piping.	Moderate: deep to water.	Deep to water	Fast intake	Favorable.
NoB Norfolk	Moderate: seepage, slope.	Moderate: piping.	Moderate: deep to water.	Deep to water	Slope	Favorable.
On Onslow	Moderate: seepage.	Severe: piping, wetness.	Severe: cutbanks cave.	Favorable	Wetness, fast intake.	Favorable.
Pa Pactolus	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Droughty.
Pn Pantego	Moderate: seepage.	Severe: wetness.	Moderate: slow refill.	Favorable	Wetness	Wetness.
Pt*. Pits						
Ra Rains	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Favorable	Wetness	Wetness.
St Stallings	Severe: seepage.	Severe: piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, fast intake.	Wetness.
To Torhunta	Severe: seepage.	Severe: piping, wetness.	Severe: cutbanks cave.	Favorable	Wetness	Wetness.
Ud*. Udorthents						

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Grassed waterways
Ur*. Urban land						
WaB---------- Wando	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, soil blowing.	Droughty.
Wo---------- Woodington	Severe: seepage.	Severe: piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, fast intake.	Wetness.
YaA---------- Yaupon	Slight---------	Moderate: hard to pack, wetness.	Severe: slow refill.	Percs slowly---	Wetness, percs slowly.	Percs slowly.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	> 3 inches	4	10	40	200		
	In				Pct					Pct	
AnB---------- Alpin	0-13	Fine sand--------	SP-SM, SM	A-3, A-2-4	0	95-100	90-100	60-100	5-20	---	NP
	13-48	Fine sand, sand	SP-SM	A-3, A-2-4	0	95-100	90-100	60-100	5-20	---	NP
	48-80	Fine sand, sand	SP-SM, SM	A-2-4	0	95-100	90-100	60-100	11-20	---	NP
AuB---------- Autryville	0-24	Loamy fine sand	SP-SM, SM	A-2, A-3	0	100	100	50-100	5-20	---	NP
	24-38	Sandy loam, sandy clay loam, fine sandy loam.	SM	A-2	0	100	100	50-100	15-30	<25	NP-3
	38-53	Sand, loamy sand, loamy fine sand.	SP-SM, SM	A-2, A-3	0	100	100	50-100	5-20	---	NP
	53-99	Sandy loam, sandy clay loam, fine sandy loam.	SM, SC, SM-SC	A-2, A-4	0	100	100	60-100	20-49	<30	NP-10
BaB---------- Baymeade	0-30	Fine sand--------	SM, SP-SM	A-2, A-3	0	100	100	51-100	5-20	---	NP
	30-56	Fine sandy loam, sandy clay loam, sandy loam.	SC, SM, SM-SC	A-2, A-4	0	100	100	60-100	23-49	<25	NP-10
	56-80	Loamy fine sand, sand, loamy sand.	SM, SP-SM	A-2, A-3	0	100	100	51-100	5-30	---	NP
BmB*:											
Baymeade--------	0-30	Fine sand--------	SM, SP-SM	A-2, A-3	0	100	100	51-100	5-20	---	NP
	30-56	Fine sandy loam, sandy clay loam, sandy loam.	SC, SM, SM-SC	A-2, A-4	0	100	100	60-90	30-49	<25	NP-10
	56-80	Loamy fine sand, sand, loamy sand.	SM, SP-SM	A-2, A-3	0	100	100	51-75	5-30	---	NP
Urban land.											
Bo---------- Bohicket	0-8	Silty clay loam	CH, MH	A-7	0	100	99-100	90-100	80-100	60-100	15-60
	8-38	Silty clay, clay, sandy clay.	CH, MH	A-7	0	100	99-100	80-100	70-95	50-100	16-60
	38-60	Variable---------	---	---	---	---	---	---	---	---	---
Ca---------- Carteret	0-65	Fine sand--------	SP, SP-SM	A-3	0-3	95-100	90-100	60-90	4-10	---	NP
Co---------- Corolla	0-72	Fine sand--------	SW, SP-SM, SP	A-2, A-3	0	80-100	75-100	60-95	1-12	---	NP
CrB, CrC--------- Craven	0-8	Fine sandy loam	ML, CL-ML, SM, SM-SC	A-4	0	100	100	75-100	45-90	<35	NP-7
	8-48	Clay, silty clay, silty clay loam.	CH	A-7	0	100	100	90-100	65-98	51-70	24-43
	48-80	Sandy clay loam, sandy loam, loamy sand.	SM, SM-SC, SC	A-2, A-4, A-6	0	100	95-100	50-100	15-49	<35	NP-15

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	> 3 inches	4	10	40	200		
	In				Pct					Pct	
Ct	0-34	Muck	PT	---	---	---	---	---	---	---	---
Croatan	34-40	Sandy loam, fine sandy loam, mucky sandy loam.	SM, SC, SM-SC	A-2, A-4	0	100	100	60-85	25-49	<30	NP-10
	40-70	Loam, clay loam, sandy clay loam.	CL, SM, ML, SC	A-4, A-6	0	100	100	75-100	36-95	<36	NP-15
	70-80	Variable	---	---	---	---	---	---	---	---	---
Da	0-4	Muck	PT	---	0	---	---	---	---	---	---
Dorovan	4-80	Muck	PT	---	0	---	---	---	---	---	---
	80-99	Sand, loamy sand, loam.	SP-SM, SM-SC, SM	A-1, A-3, A-4, A-2-4	0	100	100	5-70	5-49	<20	NP-7
Dc	0-60	Fine sand	SP-SM, SP	A-2, A-3	0	100	95-100	60-75	3-12	---	NP
Duckston											
FoA	0-8	Loamy fine sand	SM	A-2, A-4	0	100	100	60-100	15-36	---	NP
Foreston	8-70	Sandy loam, fine sandy loam.	SM, SM-SC	A-2, A-4	0	100	100	70-100	18-40	<25	NP-5
	70-80	Loamy fine sand, loamy sand, fine sand.	SP-SM, SM	A-2, A-3	0	100	100	50-100	6-25	---	NP
GoA	0-13	Fine sandy loam	SM, SM-SC, SC	A-2, A-4, A-6	0	95-100	95-100	50-100	15-45	<25	NP-14
Goldsboro	13-80	Sandy clay loam, sandy loam.	SM-SC, SC, CL-ML, CL	A-2, A-4, A-6	0	98-100	95-100	60-100	25-55	16-37	4-18
GpB*:											
Goldsboro	0-13	Fine sandy loam	SM, SM-SC, SC	A-2, A-4, A-6	0	95-100	95-100	50-100	15-45	<25	NP-14
	13-80	Sandy clay loam, sandy loam.	SM-SC, SC, CL-ML, CL	A-2, A-4, A-6	0	98-100	95-100	60-100	25-55	16-37	4-18
Urban land.											
Gt	0-9	Fine sandy loam	SM, SM-SC	A-2, A-4	0	100	95-100	60-100	20-45	<30	NP-7
Grifton	9-45	Sandy loam, sandy clay loam, clay loam.	SC, CL	A-4, A-6	0	98-100	95-100	60-100	31-60	20-35	8-15
	45-58	Loamy sand, sandy loam.	SM, SM-SC	A-2, A-4	0	100	95-100	60-100	12-45	<30	NP-7
	58-80	Variable	---	---	---	---	---	---	---	---	---
KuB	0-80	Fine sand	SP, SP-SM	A-3	0	100	100	60-100	0-7	---	NP
Kureb											
La	0-99	Muck	PT	A-8	0	---	---	---	---	---	---
Lafitte											
Le	0-7	Loam	ML, CL, CL-ML	A-4, A-5, A-6	0	100	100	85-100	60-85	20-45	4-10
Lenoir	7-80	Clay, silty clay, clay loam.	CL, CH	A-6, A-7	0	100	100	85-100	55-95	30-60	11-35

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Ln Leon	0-17	Fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	2-12	---	NP
	17-51	Sand, fine sand, loamy sand.	SM, SP-SM, SP	A-3, A-2-4	0	100	100	80-100	3-20	---	NP
	51-95	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	2-12	---	NP
Ly Lynchburg	0-13	Fine sandy loam	SM, ML, SM-SC, CL-ML	A-2, A-4	0	92-100	90-100	75-100	25-55	<30	NP-7
	13-80	Sandy clay loam, sandy loam, clay loam.	SM-SC, SC, CL, CL-ML	A-2, A-4, A-6	0	92-100	90-100	70-100	25-67	16-40	4-18
MaC Marvyn	0-12	Loamy fine sand	SM	A-2	0	95-100	90-100	50-100	13-30	---	NP
	12-52	Sandy clay loam, sandy loam.	ML, SM, SC, CL	A-4, A-2, A-6, A-7	0	95-100	90-100	60-95	30-55	24-45	3-30
	52-75	Loamy sand, sandy loam, sandy clay loam.	SM, ML, SC, CL	A-1, A-2, A-4	0	95-100	90-100	45-95	20-55	<40	NP-10
Md Masontown	0-28	Mucky loam	OL	A-4	0	100	95-100	90-100	60-75	---	NP
	28-65	Loamy sand, sand, sandy loam.	SM, SP-SM	A-2, A-3, A-5	0	100	95-100	50-75	5-40	---	NP
Mk Muckalee	0-40	Loam	ML, SC, SM SM-SC	A-2, A-4	0	95-100	90-100	50-95	30-60	<30	NP-10
	40-75	Sandy loam, loamy sand.	SM	A-2, A-4	0	95-100	80-100	60-90	20-40	<20	NP-4
Mu Murville	0-5	Fine sand	SP-SM, SM	A-2, A-3	0	100	100	85-100	5-30	---	NP
	5-55	Fine sand, sand, loamy fine sand.	SM, SP-SM	A-2, A-3	0	100	100	85-100	5-20	---	NP
	55-75	Variable	---	---	---	---	---	---	---	---	---
NeE, NfC Newhan	0-80	Fine sand	SP, SP-SM	A-3	0	95-100	95-100	60-75	0-5	---	NP
NnE*:											
Newhan	0-80	Fine sand	SP, SP-SM	A-3	0	95-100	95-100	60-75	0-5	---	NP
Corolla	0-72	Fine sand	SW, SP-SM, SP	A-2, A-3	0	80-100	75-100	60-95	1-12	---	NP
Urban land.											
NoA, NoB Norfolk	0-10	Loamy fine sand	SM	A-2	0	95-100	92-100	50-95	13-30	<20	NP
	10-47	Sandy loam, sandy clay loam, clay loam.	SC, SM-SC, CL, CL-ML	A-2, A-4, A-6	0	95-100	91-100	70-96	30-63	20-38	4-15
	47-80	Sandy clay loam, clay loam, sandy clay.	SC, SM-SC, CL, CL-ML	A-4, A-6, A-7-6	0	100	98-100	65-98	36-72	20-52	4-23
On Onslow	0-10	Loamy fine sand	SM, SP-SM	A-2, A-3, A-4	0	100	95-100	60-100	5-38	---	NP
	10-68	Sandy clay loam, sandy loam, clay loam.	SM, CL, SC, ML	A-2, A-4, A-6	0	100	95-100	60-100	30-55	<36	NP-17
	68-80	Variable	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	> 3 inches	4	10	40	200		
	In				Pct					Pct	
Pa Pactolus	0-72	Fine sand	SM, SP-SM	A-2, A-3	0	100	100	51-100	5-30	---	NP
Pn Pantego	0-14	Mucky loam	OL, SM, ML, SM-SC	A-2, A-4	0	100	95-100	60-95	25-75	<35	NP-10
	14-45	Sandy clay loam, sandy loam, clay loam.	SC, CL, SM-SC, CL-ML	A-4, A-6, A-2	0	100	95-100	80-100	30-80	20-40	4-16
	45-80	Clay loam, sandy clay, sandy clay loam.	CL, SC	A-6, A-7	0	100	95-100	90-100	36-80	25-49	11-24
Pt*. Pits											
Ra Rains	0-12	Fine sandy loam	SM, ML	A-2, A-4	0	100	95-100	50-85	25-56	<35	NP-10
	12-45	Sandy clay loam, clay loam.	SC, SM-SC, CL, CL-ML	A-2, A-4, A-6	0	100	95-100	55-98	30-70	18-40	4-20
	45-80	Sandy loam, sandy clay loam, sandy clay.	SM, SC, ML, CL	A-2, A-4, A-6	0	100	95-100	60-95	30-60	16-40	3-18
St Stallings	0-12	Loamy fine sand	SM	A-2	0	100	95-100	51-100	15-35	---	NP
	12-80	Sandy loam, fine sandy loam.	SM	A-2, A-4	0	100	95-100	51-100	20-50	<25	NP-3
To Torhunta	0-14	Fine sandy loam	SM	A-2, A-4	0	100	95-100	70-96	20-49	<25	NP-4
	14-47	Sandy loam, fine sandy loam.	SM, SM-SC	A-2, A-4	0	100	95-100	70-92	20-40	<25	NP-7
	47-80	Loamy sand, sand, sandy loam.	SM, SP-SM, SM-SC	A-2, A-3	0	100	95-100	65-92	5-35	<25	NP-4
Ud*. Udorthents											
Ur*. Urban land											
WaB Wando	0-6	Fine sand	SP-SM, SM, SP	A-2, A-3	0	96-100	95-100	60-98	4-25	---	NP
	6-85	Sand, fine sand	SP, SP-SM, SM	A-2, A-3	0	98-100	98-100	51-98	2-20	---	NP
Wo Woodington	0-12	Loamy fine sand	SM	A-2	0	100	95-100	50-100	15-49	---	NP
	12-80	Sandy loam, fine sandy loam.	SM	A-2, A-4	0	100	95-100	50-100	20-50	<25	NP-3
YaA Yaupon	0-3	Fine sandy loam	SM	A-2, A-4	0	100	90-100	85-100	13-41	---	NP
	3-85	Silty clay, clay, sandy clay.	CL, CH	A-7	0	100	90-100	85-100	51-90	40-60	15-30

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
AnB	0-13	1-12	1.35-1.55	2.0-6.0	0.05-0.10	4.5-6.5	Low	0.10	5	0-2
Alpin	13-48	1-7	1.40-1.55	6.0-20.0	0.03-0.09	4.5-6.5	Low	0.10		
	48-80	5-8	1.45-1.65	2.0-6.0	0.06-0.09	4.5-6.5	Low	0.10		
AuB	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		
	38-53	2-8	1.60-1.70	>6.0	0.03-0.08	4.5-5.5	Low	0.10		
	53-99	10-35	1.40-1.60	0.6-2.0	0.10-0.15	4.5-5.5	Low	0.17		
BaB	0-30	0-8	1.60-1.75	6.0-20	0.02-0.06	4.5-6.5	Low	0.10	5	.5-1
Baymeade	30-56	8-26	1.45-1.60	2.0-6.0	0.10-0.14	4.5-6.5	Low	0.10		
	56-80	0-12	1.60-1.75	6.0-20	0.02-0.10	4.5-6.5	Low	0.10		
BmB*:										
Baymeade	0-30	0-8	1.60-1.75	6.0-20	0.02-0.06	4.5-6.5	Low	0.10	5	.5-1
	30-56	8-26	1.45-1.60	2.0-6.0	0.10-0.14	4.5-6.5	Low	0.10		
	56-80	0-12	1.60-1.75	6.0-20	0.02-0.10	4.5-6.5	Low	0.10		
Urban land.										
Bo	0-8	30-60	1.20-1.40	0.06-0.2	0.02-0.06	6.1-8.4	High	0.28	5	5-25
Bohicket	8-38	35-60	1.30-1.60	<0.06	0.02-0.06	6.1-8.4	High	0.24		
	38-60	---	---	---	---	---	---	---		
Ca	0-65	5-12	1.45-1.60	>6.0	0.02-0.10	5.6-8.4	Low	0.15	5	.5-2
Carteret										
Co	0-72	0-3	1.60-1.70	>20	0.01-0.03	5.6-7.8	Low	0.10	5	<.5
Corolla										
CrB, CrC	0-8	6-20	1.30-1.55	0.6-2.0	0.12-0.18	3.6-6.5	Low	0.37	5	.5-2
Craven	8-48	35-60	1.30-1.45	0.06-0.2	0.12-0.15	3.6-5.5	Moderate	0.32		
	48-80	5-35	1.35-1.60	0.2-6.0	0.08-0.14	3.6-5.5	Low	0.32		
Ct	0-34	0.-0.	0.40-0.65	0.06-6.0	0.35-0.45	<4.5	Low	---	---	25-60
Croatan	34-40	8-20	1.40-1.60	0.2-6.0	0.10-0.15	3.6-6.5	Low	---		
	40-70	10-35	1.40-1.60	0.2-2.0	0.12-0.20	3.6-6.5	Low	---		
	70-80	---	---	---	---	---	---	---		
Da	0-4	---	0.25-0.40	0.6-2.0	0.25-0.50	3.6-4.4	---	---	---	---
Dorovan	4-80	---	0.35-0.55	0.6-2.0	0.25-0.50	3.6-4.4	---	---		
	80-99	5-20	1.40-1.65	6.0-20	0.05-0.08	4.5-5.5	Low	---		
Dc	0-60	0-4	1.60-1.70	>20	0.02-0.05	3.6-8.4	Low	0.10	5	.5-1
Duckston										
FoA	0-8	5-12	1.20-1.40	6.0-20	0.05-0.10	4.5-6.5	Low	0.15	5	.5-2
Foreston	8-70	10-18	1.20-1.40	2.0-6.0	0.09-0.13	4.5-5.5	Low	0.10		
	70-80	4-12	1.30-1.60	6.0-20	0.03-0.10	4.5-5.5	Low	0.10		
GoA	0-13	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	13-80	18-30	1.30-1.50	0.6-2.0	0.11-0.15	4.5-5.5	Low	0.24		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
GpB*:										
Goldsboro	0-13	5-15	1.40-1.60	2.0-6.0	0.08-0.12	4.5-6.0	Low	0.20	5	.5-2
	13-80	18-30	1.30-1.50	0.6-2.0	0.11-0.15	4.5-5.5	Low	0.24		
Urban land.										
Gt	0-9	7-18	1.45-1.65	2.0-6.0	0.10-0.14	4.5-7.3	Low	0.20	5	2-4
Grifton	9-45	18-35	1.35-1.45	0.6-2.0	0.12-0.17	4.5-7.3	Low	0.24		
	45-58	2-18	1.45-1.70	2.0-20.0	0.07-0.14	5.6-8.4	Low	0.20		
	58-80	---	---	---	---	---	---	---		
KuB	0-80	0-3	1.60-1.80	6.0-20	<0.05	4.5-7.3	Low	0.10	5	<2
Kureb										
La	0-99	---	0.05-0.25	2.0-6.0	0.18-0.45	6.1-8.4	Low	---	---	30-70
Lafitte										
Le	0-7	6-20	1.30-1.50	0.6-2.0	0.14-0.18	3.6-5.5	Low	0.37	5	2-4
Lenoir	7-80	35-60	1.20-1.35	0.06-0.2	0.13-0.15	3.6-5.5	Moderate	0.32		
Ln	0-17	1-6	1.40-1.65	6.0-20	0.02-0.05	3.6-5.5	Low	0.10	5	.5-4
Leon	17-51	2-8	1.50-1.70	0.6-6.0	0.05-0.10	3.6-5.5	Low	0.15		
	51-95	1-6	1.40-1.65	0.6-6.0	0.02-0.05	3.6-5.5	Low	0.10		
Ly	0-13	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	13-80	18-35	1.30-1.50	0.6-2.0	0.12-0.16	3.6-5.5	Low	0.20		
MaC	0-12	2-12	1.35-1.70	2.0-6.0	0.06-0.11	4.5-6.0	Low	0.17	4	<2
Marvyn	12-52	18-35	1.30-1.60	0.6-2.0	0.12-0.17	4.5-6.0	Low	0.32		
	52-75	10-30	1.40-1.60	0.2-2.0	0.07-0.14	4.5-6.0	Low	0.32		
Md	0-28	10-18	1.00-1.30	2.0-6.0	0.20-0.26	5.6-7.8	Low	0.10	5	8-20
Masontown	28-65	2-18	1.40-1.60	2.0-20	0.02-0.12	5.6-7.8	Low	0.10		
Mk	0-40	10-25	---	0.6-2.0	0.09-0.15	5.1-7.3	Low	0.20	5	---
Muckalee	40-75	5-20	---	0.6-2.0	0.08-0.12	5.6-8.4	Low	0.20		
Mu	0-5	2-8	1.45-1.60	6.0-20	0.05-0.09	3.6-5.5	Low	0.10	5	2-9
Murville	5-55	2-8	1.60-1.75	2.0-6.0	0.05-0.09	3.6-5.5	Low	0.10		
	55-75	---	---	---	---	---	---	---		
NeE, NfC	0-80	---	1.60-1.75	>20	<0.05	3.6-7.8	Low	0.10	5	---
Newhan										
NnE*:										
Newhan	0-80	---	1.60-1.75	>20	<0.05	3.6-7.8	Low	0.10	5	---
Corolla	0-72	0-3	1.60-1.70	>20	0.01-0.03	5.6-7.8	Low	0.10	5	<.5
Urban land.										
NoA, NoB	0-10	2-8	1.55-1.75	6.0-20	0.06-0.11	4.5-6.0	Low	0.20	5	.5-2
Norfolk	10-47	18-35	1.30-1.45	0.6-2.0	0.10-0.20	4.5-5.5	Low	0.24		
	47-80	20-43	1.10-1.40	0.06-2.0	0.10-0.15	4.5-5.5	Low	0.24		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
On	0-10	2-8	1.60-1.75	>6.0	0.07-0.11	3.6-5.5	Low	0.17	4	.5-2
Onslow	10-68	15-35	1.30-1.50	0.6-2.0	0.12-0.17	3.6-5.5	Low	0.24		
	68-80	---	---	---	---	---				
Pa	0-72	2-12	1.60-1.75	6.0-20	0.05-0.10	4.5-6.0	Low	0.10	5	.5-2
Pactolus										
Pn	0-14	5-15	1.20-1.40	0.6-2.0	0.20-0.30	3.6-5.5	Low	0.10	5	10-15
Pantego	14-45	18-35	1.30-1.40	0.6-2.0	0.12-0.20	3.6-5.5	Low	0.28		
	45-80	18-40	1.25-1.40	0.6-2.0	0.15-0.20	3.6-5.5	Low	0.28		
Pt*.										
Pits										
Ra	0-12	5-20	1.30-1.60	2.0-6.0	0.10-0.14	4.5-6.5	Low	0.20	5	1-6
Rains	12-45	18-35	1.30-1.50	0.6-2.0	0.11-0.15	4.5-5.5	Low	0.24		
	45-80	15-45	1.30-1.60	0.6-2.0	0.10-0.15	4.5-5.5	Low	0.28		
St	0-12	2-10	1.5-1.6	6.0-20	0.06-0.11	3.6-5.5	Low	0.10	5	1-4
Stallings	12-80	5-18	1.4-1.6	2.0-6.0	0.10-0.15	3.6-5.5	Low	0.17		
To	0-14	5-18	1.35-1.65	2.0-6.0	0.10-0.15	3.6-5.5	Low	0.15	5	3-10
Torhunta	14-47	5-18	1.35-1.60	2.0-6.0	0.10-0.15	3.6-5.5	Low	0.15		
	47-80	2-18	1.45-1.65	6.0-20	<0.05	3.6-6.5	Low	0.10		
Ud*.										
Udorthents										
Ur*.										
Urban land										
WaB	0-6	2-15	1.30-1.60	6.0-20	0.05-0.08	5.1-7.3	Low	0.10	5	<1
Wando	6-85	1-10	1.30-1.60	6.0-20	0.03-0.07	4.5-7.3	Low	0.10		
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	12-80	5-18	1.45-1.65	2.0-6.0	0.10-0.15	3.6-5.5	Low	0.20		
YaA	0-3	5-20	1.40-1.60	2.0-6.0	0.10-0.15	4.5-6.5	Low	0.24	2	<1
Yaupon	3-85	35-60	1.30-1.50	<0.06	0.12-0.18	4.5-8.4	High	0.32		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," "very brief", and "apparent" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydrologic group	Flooding			High water table			Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Uncoated steel	Concrete
					Ft				
AnB---------- Alpin	A	None--------	---	---	>6.0	---	---	Low-------	High.
AuB---------- Autryville	A	None--------	---	---	4.0-6.0	Apparent	Jan-Apr	Low-------	High.
BaB---------- Baymeade	A	None--------	---	---	4.0-5.0	Apparent	Dec-Apr	Low-------	Moderate.
BmB*:									
Baymeade----------	A	None--------	---	---	4.0-5.0	Apparent	Dec-Apr	Low-------	Moderate.
Urban land.									
Bo---------- Bohicket	D	Frequent----	Very brief	Jan-Dec	+3-0	Apparent	Jan-Dec	High------	High.
Ca---------- Carteret	D	Frequent----	Very brief	Jan-Dec	+3-1.0	Apparent	Jan-Dec	High------	High.
Co---------- Corolla	D	Rare--------	---	---	1.5-3.0	Apparent	Nov-May	Low-------	Low.
CrB, CrC---------- Craven	C	None--------	---	---	2.0-3.0	Apparent	Dec-Apr	High------	High.
Ct---------- Croatan	D	Rare--------	---	---	0-1.0	Apparent	Dec-May	High------	High.
Da---------- Dorovan	D	Frequent----	Very long	Jan-Dec	+1-0.5	Apparent	Jan-Dec	High------	High.
Dc---------- Duckston	A/D	Frequent----	Brief------	Jan-Dec	1.0-2.0	Apparent	Jan-Dec	Low-------	Low.
FoA---------- Foreston	C	None--------	---	---	2.5-3.5	Apparent	Dec-Apr	Moderate	High.
GoA---------- Goldsboro	B	None--------	---	---	2.0-3.0	Apparent	Dec-Apr	Moderate	High.
GpB*:									
Goldsboro--------	B	None--------	---	---	2.0-3.0	Apparent	Dec-Apr	Moderate	High.
Urban land.									
Gt---------- Grifton	D	None--------	---	---	0.5-1.0	Apparent	Dec-May	High------	Low.
KuB---------- Kureb	A	None--------	---	---	>6.0	---	---	Low-------	Low.
La---------- Lafitte	D	Frequent----	Brief to very long.	Jan-Dec	+1-0.5	Apparent	Jan-Dec	High------	Moderate.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Uncoated steel	Concrete
					Ft				
Le Lenoir	D	None	---	---	1.0-2.5	Apparent	Dec-May	High	High.
Ln Leon	B/D	None	---	---	0-1.0	Apparent	Jun-Feb	High	High.
Ly Lynchburg	C	None	---	---	0.5-1.5	Apparent	Nov-Apr	High	High.
MaC Marvyn	B	None	---	---	>6.0	---	---	Moderate	High.
Md Masontown	D	Frequent	Long	Nov-Apr	+1-0.5	Apparent	Nov-Apr	Moderate	Moderate.
Mk Muckalee	D	Frequent	Brief	Nov-Apr	0.5-1.5	Apparent	Dec-Mar	High	Moderate.
Mu Murville	A/D	None	---	---	+1-1.0	Apparent	Nov-May	High	Moderate.
NeE, NfC Newhan	A	Rare	---	---	>6.0	---	---	High	Low.
NnE*: Newhan	A	Rare	---	---	>6.0	---	---	High	Low.
Corolla	D	Rare	---	---	1.5-3.0	Apparent	Nov-May	Low	Low.
Urban land.									
NoA, NoB Norfolk	B	None	---	---	4.0-6.0	Apparent	Jan-Mar	Moderate	High.
On Onslow	B	None	---	---	1.5-3.0	Apparent	Dec-Apr	High	High.
Pa Pactolus	A	None	---	---	1.5-3.0	Apparent	Dec-Apr	Low	High.
Pn Pantego	B/D	None	---	---	0-1.5	Apparent	Dec-May	High	High.
Pt*. Pits									
Ra Rains	B/D	None	---	---	0-1.0	Apparent	Nov-Apr	High	High.
St Stallings	C	None	---	---	1.0-2.5	Apparent	Dec-Apr	High	High.
To Torhunta	C	None	---	---	0.5-1.5	Apparent	Dec-May	High	High.
Ud*. Udorthents									

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Uncoated steel	Concrete
					Ft				
Ur*. Urban land									
WaB---------- Wando	A	None--------	---	---	>6.0	---	---	Low------	Moderate.
Wo---------- Woodington	B/D	None--------	---	---	0.5-1.0	Apparent	Dec-May	High-----	High.
YaA---------- Yaupon	D	None--------	---	---	2.0-4.0	Apparent	Dec-Mar	High-----	Moderate.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--ENGINEERING INDEX TEST DATA

(Dashes indicate that data were not available. LL means liquid limit; PI, plasticity index; MD, maximum dry density; OM, optimum moisture; and NP, nonplastic)

Soil name, report number, horizon, and depth in inches*	Classification		Grain-size distribution							LL	PI	Moisture density	
			Percentage passing sieve--				Percentage smaller than--						
	AASHTO	Unified	No. 4	No. 10	No. 40	No. 200	.02 mm	.005 mm	.002 mm			MD	OM
										Pct		Lb/cu ft	Pct
Baymeade fine sand: (S79NC133-1)													
E---------- 2 to 9	A-3(0)	SP-SM	100	100	99	9	5	2	1	---	NP	---	---
Bt---------- 30 to 40	A-2-4(0)	SM	100	100	100	23	19	17	15	---	NP	116.0	12.9
Cg---------- 56 to 80	A-3(0)	SP-SM	100	100	100	7	5	4	3	---	NP	---	---
Foreston loamy fine sand: (S79NC133-2)													
A---------- 0 to 6	A-4(0)	SM	100	100	100	36	15	6	3	---	NP	100.0	17.3
Bt1---------- 12 to 21	A-4(0)	SM-SC	100	100	100	38	22	14	11	22	5	118.2	12.1
BCg---------- 58 to 70	A-2-4(0)	SM	100	100	100	29	23	19	16	23	3	117.1	13.4
Marvyn loamy fine sand: (S79NC133-3)													
Ap---------- 0 to 4	A-2-4(0)	SM	100	100	97	16	10	6	4	---	NP	109.6	11.8
Bt---------- 12 to 26	A-6(3)	SC	100	100	95	44	39	30	24	29	16	119.6	12.5
Cg---------- 45 to 75	A-4(0)	SM-SC	98	98	95	37	22	16	14	22	4	121.3	11.0
Onslow loamy fine sand: (S79NC133-4)													
A, E---------- 0 to 8	A-2-4(0)	SM	100	100	100	32	12	4	2	---	NP	104.1	14.3
Bt1---------- 21 to 30	A-6(6)	CL	100	100	100	53	40	32	28	36	17	110.4	16.2
BCg---------- 53 to 68	A-4(1)	SC	100	100	100	40	28	21	20	30	10	114.1	14.2
Pactolus fine sand: (S79NC133-5)													
A---------- 0 to 6	A-3(0)	SP-SM	100	100	99	6	3	2	1	---	NP	---	---
C2---------- 18 to 30	A-3(0)	SP-SM	100	100	100	5	3	2	2	---	NP	---	---
Torhunta fine sandy loam: (S79NC133-6)													
A1---------- 0 to 9	A-4(1)	SM	100	100	96	41	22	6	3	---	NP	80.6	27.7
Bg---------- 22 to 47	A-4(0)	SM	100	99	91	36	22	16	13	19	4	123.4	9.9
Cg1---------- 47 to 72	A-2-4(0)	SC-SM	100	99	92	34	25	17	15	21	5	122.9	11.0
Wando fine sand: (S79NC133-7)													
A---------- 0 to 6	A-3(0)	SP	100	100	96	4	2	1	1	---	NP	---	---
C2---------- 16 to 31	A-3(0)	SP-SM	100	100	97	5	3	2	1	---	NP	---	---

* The locations of the sampled pedons are the same as those given for the typical pedons in the section "Soil Series and Their Morphology."

TABLE 18.--CLASSIFICATION OF THE SOILS

(An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series)

Soil name	Family or higher taxonomic class
Alpin	Thermic, coated Typic Quartzipsamments
Autryville	Loamy, siliceous, thermic Arenic Paleudults
Baymeade	Loamy, siliceous, thermic Arenic Hapludults
Bohicket	Fine, mixed, nonacid, thermic Typic Sulfaquents
Carteret	Mixed, thermic Typic Psammaquents
Corolla	Thermic, uncoated Aquic Quartzipsamments
Craven	Clayey, mixed, thermic Aquic Hapludults
Croatan	Loamy, siliceous, dysic, thermic Terric Medisaprists
*Dorovan	Dysic, thermic Typic Medisaprists
Duckston	Siliceous, thermic Typic Psammaquents
Foreston	Coarse-loamy, siliceous, thermic Aquic Paleudults
Goldsboro	Fine-loamy, siliceous, thermic Aquic Paleudults
Grifton	Fine-loamy, siliceous, thermic Typic Ochraqualfs
Kureb	Thermic, uncoated Spodic Quartzipsamments
Lafitte	Euic, thermic Typic Medisaprists
Lenoir	Clayey, mixed, thermic Aeric Paleaquults
Leon	Sandy, siliceous, thermic Aeric Haplaquods
Lynchburg	Fine-loamy, siliceous, thermic Aeric Paleaquults
Marvyn	Fine-loamy, siliceous, thermic Typic Hapludults
Masontown	Coarse-loamy, siliceous, nonacid, thermic Cumulic Humaquepts
Muckalee	Coarse-loamy, siliceous, nonacid, thermic Typic Fluvaquents
Murville	Sandy, siliceous, thermic Typic Haplaquods
Newhan	Thermic, uncoated Typic Quartzipsamments
Norfolk	Fine-loamy, siliceous, thermic Typic Paleudults
Onslow	Fine-loamy, siliceous, thermic Spodic Paleudults
Pactolus	Thermic, coated Aquic Quartzipsamments
Pantego	Fine-loamy, siliceous, thermic Umbric Paleaquults
Rains	Fine-loamy, siliceous, thermic Typic Paleaquults
Stallings	Coarse-loamy, siliceous, thermic Aeric Paleaquults
Torhunta	Coarse-loamy, siliceous, acid, thermic Typic Humaquepts
Wando	Siliceous, thermic Typic Udipsamments
Woodington	Coarse-loamy, siliceous, thermic Typic Paleaquults
Yaupon	Clayey, mixed, nonacid, thermic Aquic Udorthents

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