United States Department of Agriculture

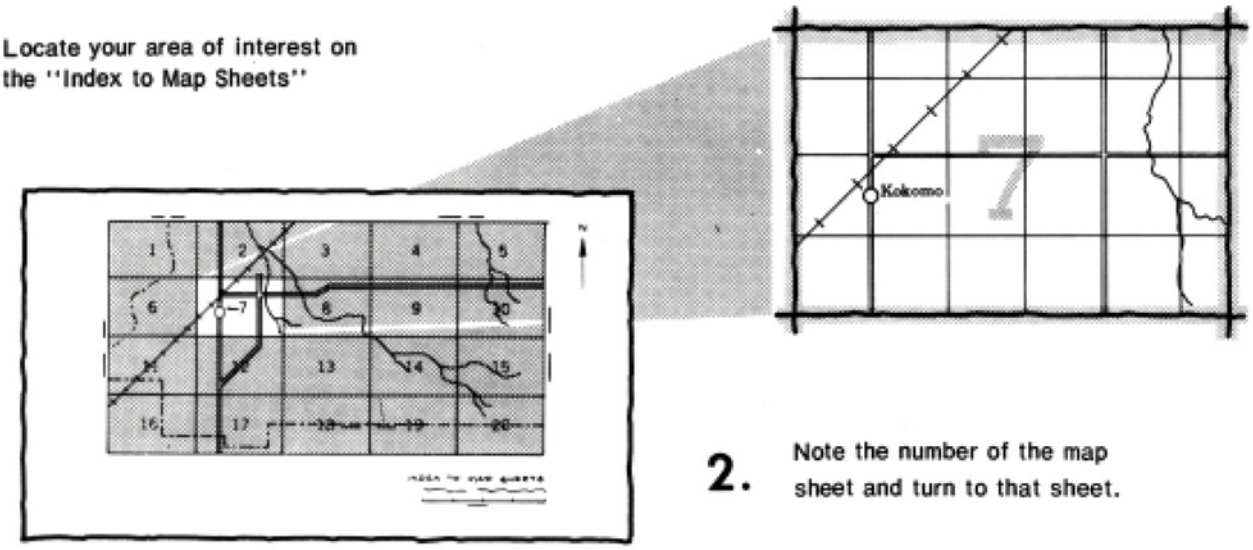
Soil Conservation Service

In cooperation with United States Department of Agriculture, Forest Service, North Carolina Department of Natural Resources and Community Development, North Carolina Agricultural Research Service, North Carolina Agricultural Extension Service, and Carteret County Board of Commissioners

Soil Survey of Carteret County, North Carolina

HOW TO USE

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



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

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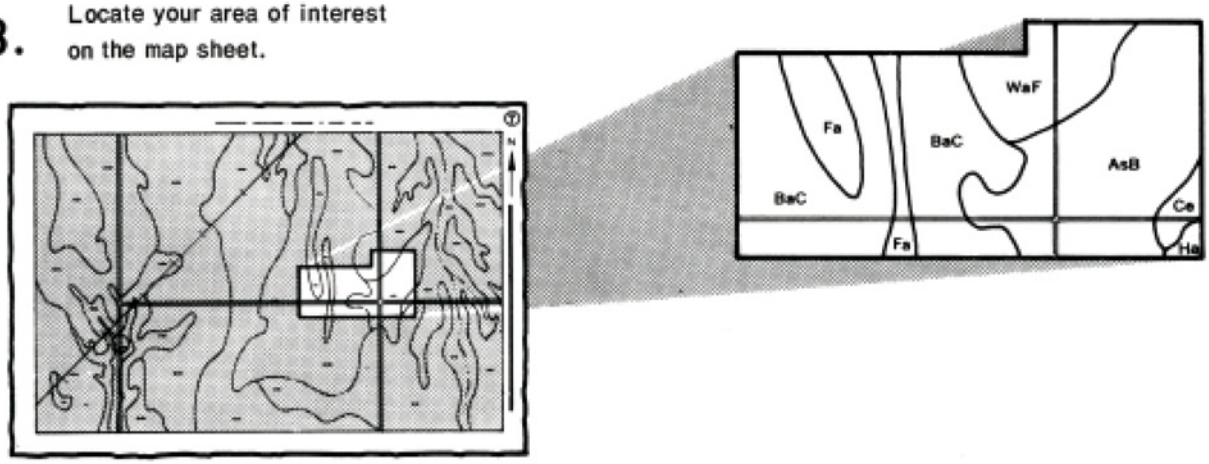

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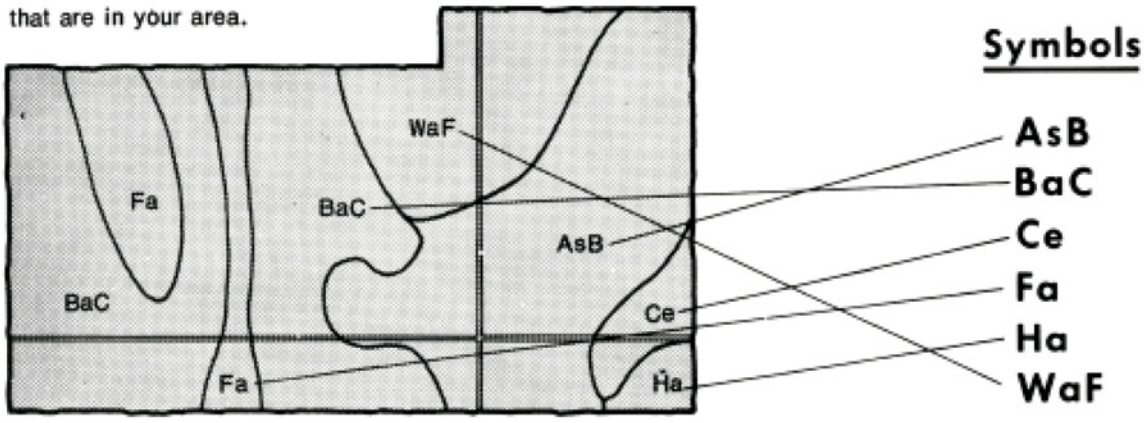
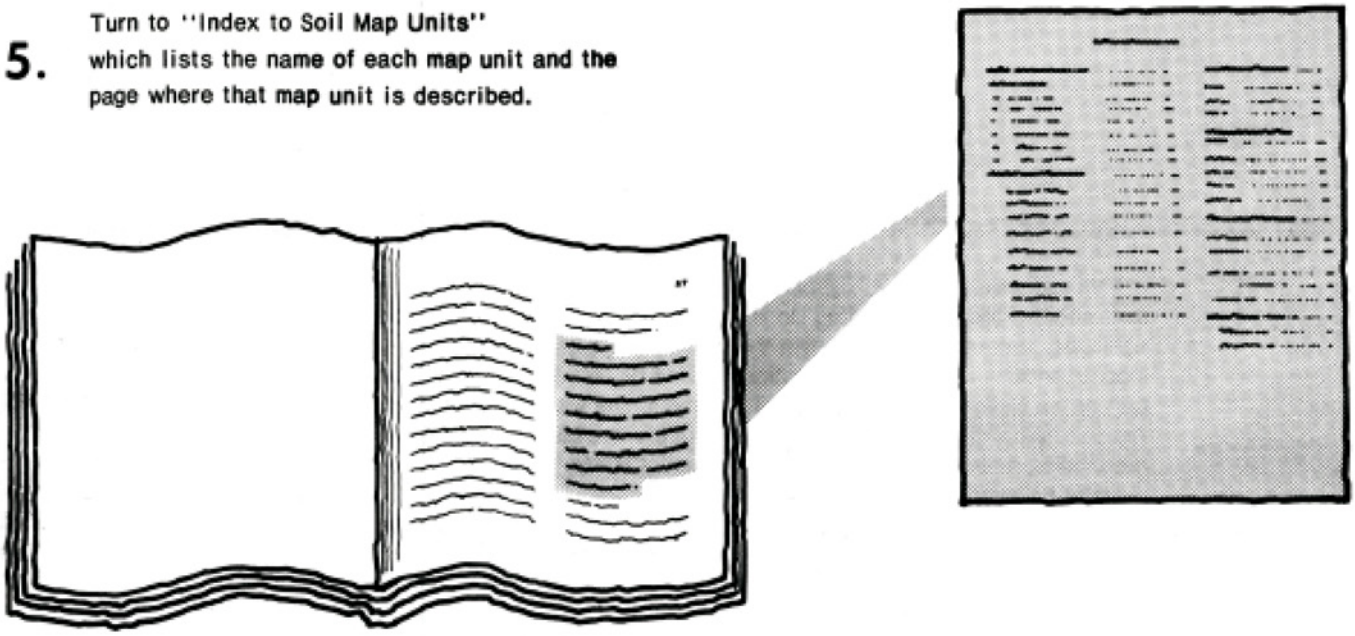
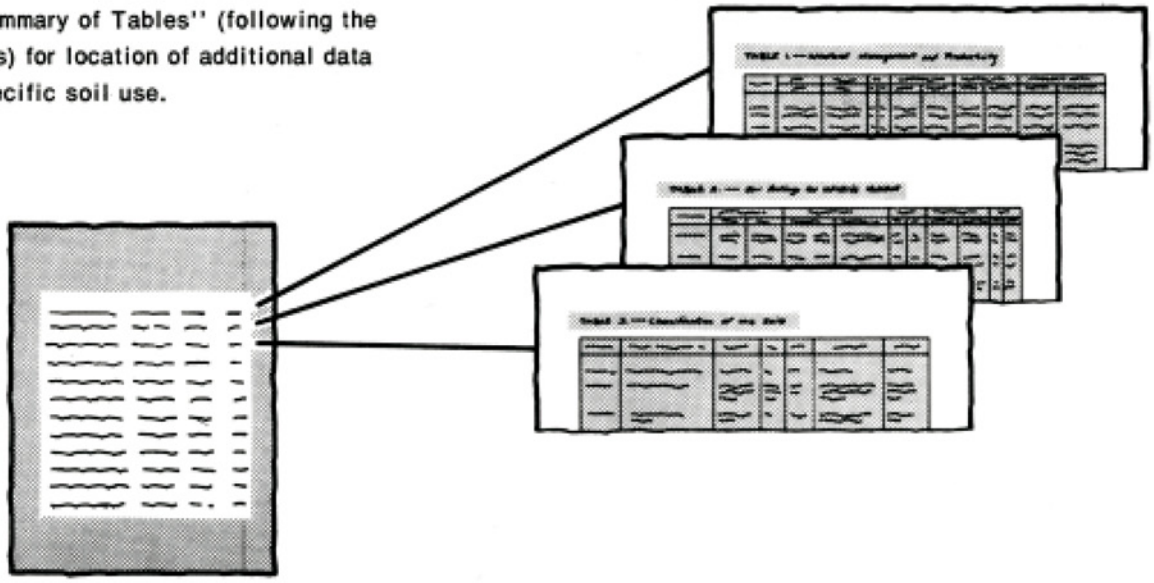


THIS SOIL SURVEY

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



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



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

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the North Carolina Agricultural Research Service, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, handicap, or age.

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 1984. This soil survey was made cooperatively by the Soil Conservation Service, the United States Department of Agriculture, Forest 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 Carteret County Board of Commissioners. It is part of the technical assistance furnished to the Carteret 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. Generally, there are small areas of contrasting soils or conditions within map unit delineations that cannot be shown at the publication scale. The level of information that can be obtained from an enlarged map will be no greater than that obtainable from the published map.

This survey supercedes the soil survey of Carteret County published in 1938. It also includes the Carteret County part of the Soil Survey of the Outer Banks of North Carolina published in 1977 *(23)*.

Cover: A sand fence and plantings of American beachgrass reduce wind erosion on Newhan fine sand, 2 to 30 percent slopes. This soil is on the Outer Banks.

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Foreword

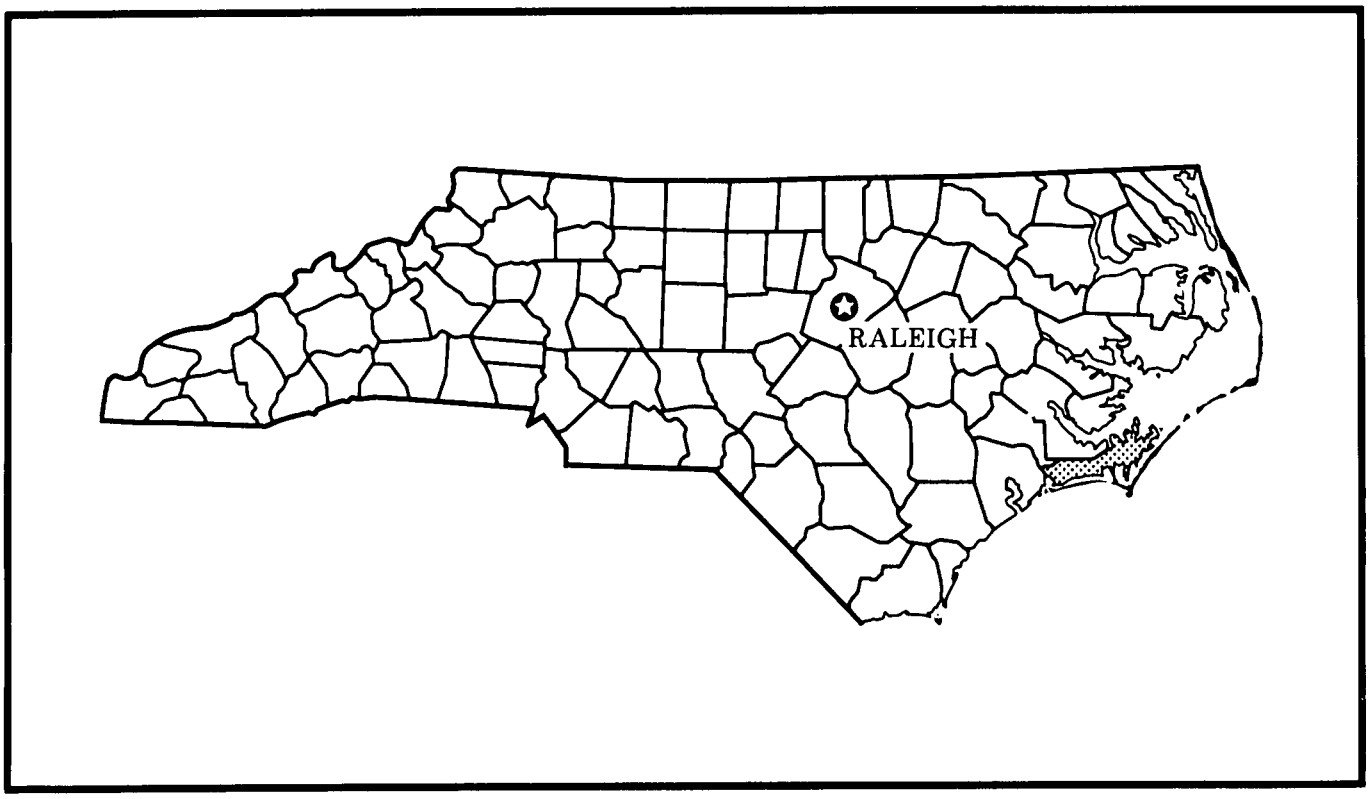
This soil survey contains information that can be used in land-planning programs in Carteret County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact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

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

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the North Carolina Agricultural Extension Service.

Bobbye J. Jones
State Conservationist
Soil Conservation Service



Location of Carteret County in North Carolina.

Soil Survey of Carteret County, North Carolina

By Roy A. Goodwin, Jr., Soil Conservation Service

Soils surveyed by Roy A. Goodwin, Jr., and John A. Gagnon, Jr.,
Soil Conservation Service;
David T. Knight and Steve Clayton, Carteret County; and Gina Boccetti,
North Carolina Department of Natural Resources and Community Development

United States Department of Agriculture, Soil Conservation Service
In cooperation with
United States Department of Agriculture, Forest Service,
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and Carteret County Board of Commissioners

CARTERET COUNTY is in the Lower Coastal Plain of eastern North Carolina. In 1980, the population of the county was 41,092; Beaufort, the county seat, had a population of 3,826; and Morehead City, the largest town, had a population of 4,359.

The county has a land area of 340,480 acres, or 532 square miles. According to data collected by the North Carolina Agricultural Extension Service, in 1981 more than 46,000 acres was used for cropland and pasture; about 53,000 acres was in salt marshes; and more than 17,000 acres was in beaches, dunes, and shrub land on the Outer Banks. Most of the remaining acreage is forested, including 56,569 acres in the Croatan National Forest.

General Nature of the Survey Area

This section gives general information concerning the county. It discusses physiography and drainage, history and development, water supply, and climate.

Physiography and Drainage

Carteret County is drained by the Neuse, Newport, North, South, and White Oak Rivers, and numerous creeks that drain into the sounds and bays. The flow is sluggish in the rivers and creeks. The general slope of the county is to the east and southeast. About 92 percent of the land is nearly level, 6 percent is gently sloping, and 2 percent is sloping to moderately steep.

The five physiographic areas in the county are the uplands of the Talbot Surface, the low marine terrace and stream terraces of the Pamlico Surface, the islands of the Outer Banks, the salt marshes, and the forested flood plains along streams. The Suffolk Scarp enters the county just west of Harlowe and runs generally south toward Morehead City. Elevation at the base of the scarp is about 20 feet. This scarp formed the shoreline of an ancient ocean, the Pamlico Sea. It separates the older, upland soils on the Talbot Surface to the west from the younger, lower soils on the Pamlico Surface to the east. Narrow stream terraces on the Pamlico Surface extend inland along some of the larger creeks and rivers west of Morehead City.

According to U.S. Geological Survey topographic maps, elevation of the uplands of the Talbot Surface ranges from 20 feet to about 40 feet above sea level. The low marine terrace east of the scarp and the stream terraces are generally less than 20 feet in elevation. Elevation on the Outer Banks ranges from sea level to nearly 40 feet. Core Banks is much lower than Shackleford and Bogue Banks. The salt marshes are

less than 2 feet in elevation, and the flood plains are slightly higher.

Large areas of soils that are poorly drained and very poorly drained are in broad, nearly level interstream areas on uplands and low marine terraces. Near the drainageways, soils that are nearly level and somewhat poorly drained grade into soils that are nearly level and gently sloping, moderately well drained and well drained (fig. 1).

Organic soils are in large pocosins in the east central and northwestern parts of the county (fig. 2). The landscape appears flat but has an imperceptible slope from the center outward. In these places, surface runoff is very slow, the underlying material is slowly permeable, and rainfall exceeds evapotranspiration by about 17 inches a year *(7)*. These factors favor the accumulation of layers of organic material.

An undulating landscape of long, gently sloping sand ridges and nearly level depressions is in a large area near Cape Carteret, Newport, and Morehead City, and on Harkers Island, Cedar Island, and Browns Island. Excessively drained and well drained soils are on the highest ridges, and very poorly drained soils are in the lowest depressions. Moderately well drained to poorly drained soils are in intermediate positions.

On the Outer Banks, ocean beaches merge with gently sloping to moderately steep, excessively drained soils on dune ridges. Soils that are moderately well drained to poorly drained are in nearly level to gently sloping troughs between the dunes or in flats on the sound side of the islands (fig. 3).

Very poorly drained soils are in nearly level salt marshes beside rivers, creeks, sounds, and bays (fig. 3). The largest areas are on the sound side of the Outer Banks and in the northeastern part of the county. Very poorly drained soils are also in nearly level flood plains along streams in the western half of the county (fig. 1).

About 64 percent of the soils in Carteret County is very poorly drained, 15 percent is poorly drained, 3 percent is somewhat poorly drained, 7 percent is

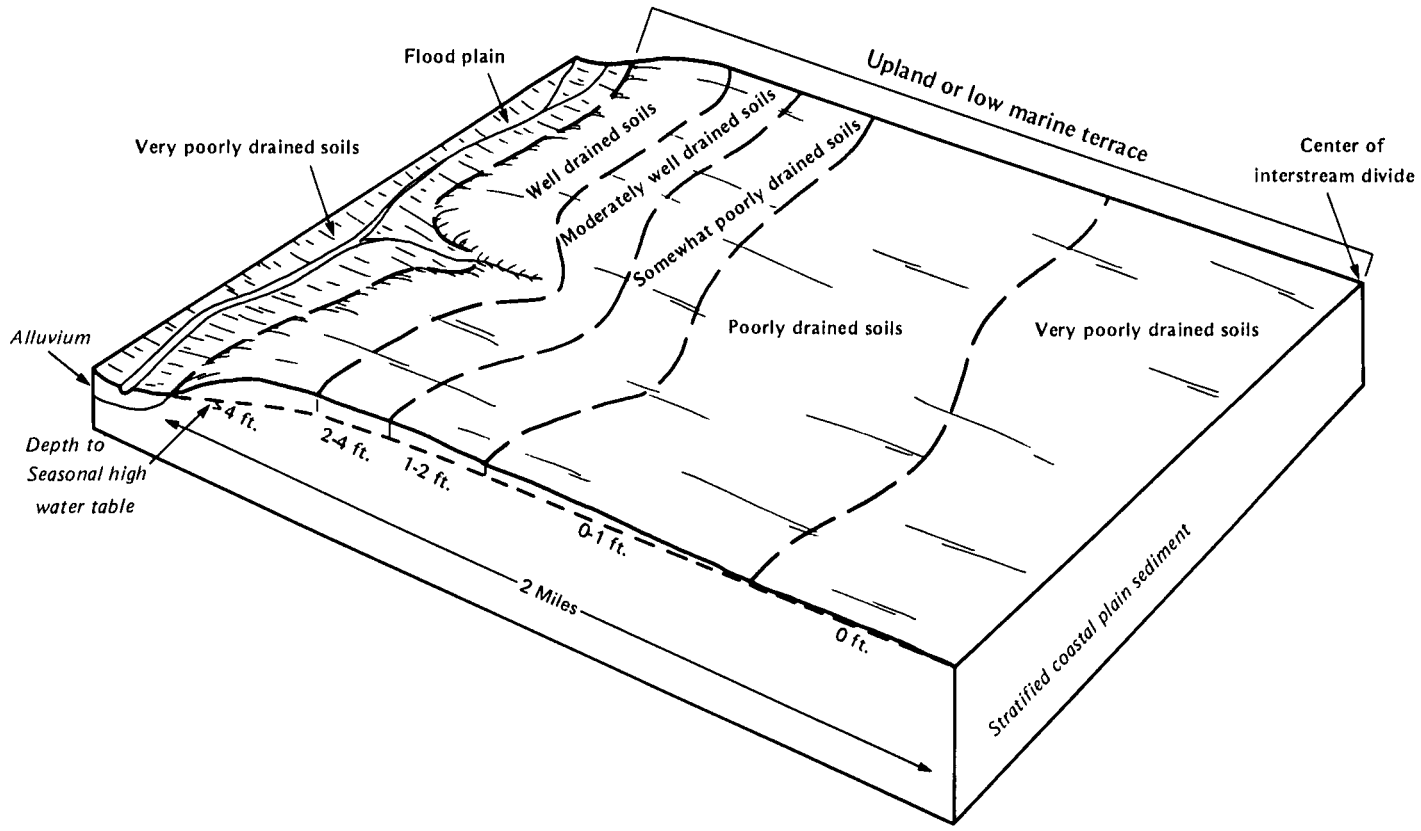

Figure 1.—In nearly level interstream areas on uplands and low marine terraces, the seasonal high water table approaches the surface as distance from the drainageway increases.

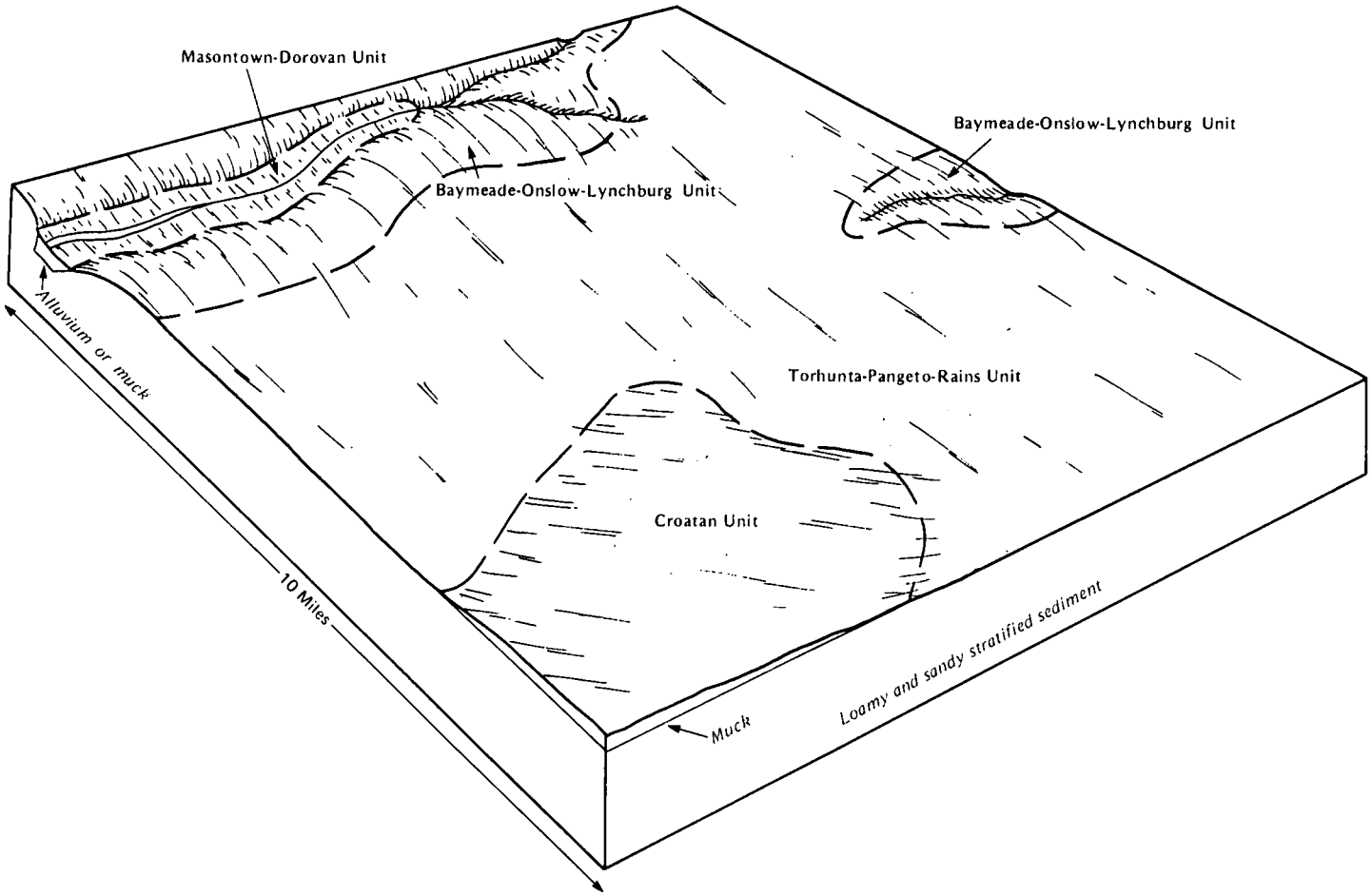

Figure 2.—Very poorly drained soils high in organic matter are on narrow flood plains. Well drained soils low in organic matter are near drainageways.

moderately well drained, 3 percent is well drained, and 5 percent is excessively drained. Miscellaneous areas make up 2 percent of the county, and the remaining 1 percent is small areas of water.

History and Development

Carteret County was formed in 1722 from a part of Craven County and was named in honor of Sir John Carteret, the Earl of Granville. Beaufort, the county seat, was the first permanent settlement in the county and is the third oldest town in North Carolina. When the first European settlers arrived between 1700 and 1710, the area was inhabited by the Coree Indians *(13)*.

The first settlers were French Huguenots, who were soon followed by English, Scotch, Irish, Germans, and Swedes. They settled in fishing villages along the coast and made their living from the rich water resources of the county. A thriving fishing industry developed and shipbuilding was an important enterprise; thus Beaufort became an important harbor and trade center *(13)*.

Today, Carteret County leads North Carolina in commercial and sport fishing. In 1978, the county produced about 35 percent of North Carolina's fin fish and shellfish, according to the North Carolina Division of Marine Fisheries. The state port at Morehead City has allowed the county to remain an important center of commerce.

Forest products have been an important part of the county's economy since the colonial period. Tar, pitch, turpentine, and lumber were important early products. Newport was the center of the naval stores industry in the 1800's. In 1979, the North Carolina Forest Service reported that 5,680,000 board feet of logs for lumber, veneer, and plywood were harvested. Pulpwood

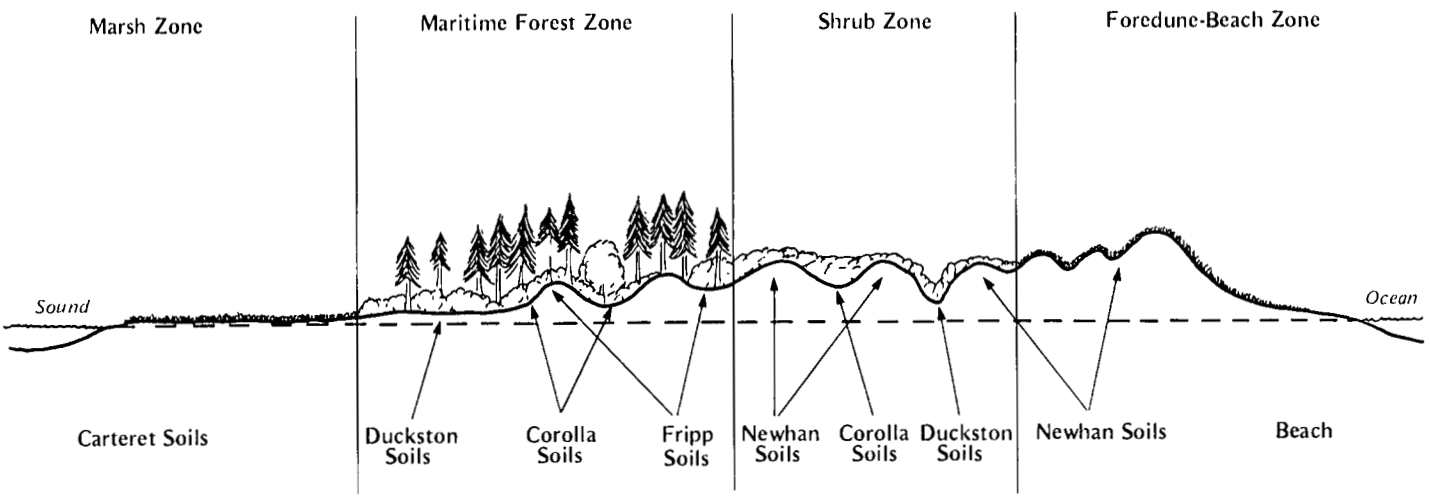

Figure 3.—Vegetation zones on the Outer Banks reflect the amount of exposure to salt spray. As distance from the ocean increases, sparse beach grasses merge with dense shrub vegetation. Maritime forests grow only in protected areas, mainly on Bogue Banks. Salt marshes are on the sound side of the islands.

production was 34,180 cords, most of which was processed at a mill in nearby Craven County.

The early agriculture consisted of the production of corn, wheat, rice, oats, potatoes, cotton, and livestock, including cattle, sheep, and hogs. A large number of wild ponies were on the Outer Banks. In 1934, the leading crops were corn, hay, sweet potatoes, Irish potatoes, peanuts, soybeans, and tobacco. Cotton acreage had decreased mainly because of the boll weevil. Recently, in the eastern part of the county, a large acreage of poorly drained and very poorly drained soils has been cleared, drained, and put into cropland and pasture; thus more than doubling the acreage farmed in the county. Today, the main crops are soybeans, corn, Irish potatoes, and tobacco.

Tourism and water-based recreation have developed into a major local industry. The ocean beaches and extensive water areas for fishing, boating, and water sports attract large numbers of visitors to Carteret County each year.

Water Supply

Ground water is plentiful throughout the county. It is near the surface in most places, particularly during the winter and early in spring.

Thousands of feet of sedimentary deposits underlie the area. The upper part of these deposits contains aquifers that supply water for domestic use. The surficial aquifer ranges from near the surface to a maximum depth of about 75 feet. It is thickest east of Morehead City. Early in the development of the county, the main source of domestic water was from shallow wells in this aquifer. The use of shallow wells has decreased considerably because of the small yield in some places, the high content of dissolved iron in the water, and the risk of contamination. The underlying limestone of the Yorktown or Castle Hayne Formations, or both, is a more productive artesian aquifer and is the main source of water supply in the county today. The water is generally hard but is low in iron. Water from wells near the coast and especially on the Outer Banks may be salty, but layers of fresh water generally are at lower depths *(8)*.

Climate

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

Carteret County is hot and humid in summer, but the coast is frequently cooled by sea breezes. Winter is cool with occasional, brief cold spells. Rain occurs throughout the year and is fairly heavy at times. Average annual precipitation is adequate for all crops.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Morehead City in the period 1951 to 1977. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 47 degrees F, and the average daily minimum temperature is 38 degrees. The lowest temperature on record, which occurred at Morehead City on January 17, 1977, is 9

degrees. In summer the average temperature is 78 degrees, and the average daily maximum temperature is 85 degrees. The highest recorded temperature, which occurred at Morehead City on June 26, 1952, is 107 degrees.

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

The total annual precipitation is 52.5 inches. Of this, 30 inches, or 57 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 25 inches. The heaviest 1-day rainfall during the period of record was 8.5 inches at Morehead City on June 11, 1966. Thunderstorms occur on about 45 days each year, and most occur in summer.

The average seasonal snowfall is 1 inch. The greatest snow depth at any one time during the period of record was 2 inches. There is seldom a day with at least 1 inch of snow on the ground.

The average relative humidity in midafternoon is about 65 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 60 percent of the time possible in summer and 50 percent in winter. The prevailing wind is from the southwest. Average windspeed is highest, 12 miles per hour, in winter and spring.

Hurricanes occasionally cross the area and cause severe flooding and damage in low-lying areas near the ocean, sounds, bays, rivers, and creeks. Since 1900, 56 hurricanes have passed across or close by the North Carolina coast, and 12 of these were destructive in Carteret County. The most recent were Hazel in 1954, and Connie, Diane, and Ione in 1955. Flood elevations from these storms range from 4.3 to 6.6 feet above mean sea level at Beaufort, 4.3 to 6.0 feet at Morehead City, and 2.6 to 4.0 feet at Davis *(17)*. Also, records show that Hurricane Donna caused a tide of 10.6 feet at Atlantic Beach in 1960 *(18)*.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the elevation and kinds of sediment. 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 biologic activity.

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

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

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpreted the data from these analyses and tests as well as the field-observed characteristics and the soil properties in terms of expected behavior of the soils under different uses. Interpretations for all of the soils were field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions,

and new interpretations sometimes are developed to meet local needs. Data were assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management were assembled from farm records and from field or plot experiments on the same kinds of soil.

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

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

Map Unit Composition

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

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

Very Poorly Drained and Poorly Drained, Mineral Soils; on Uplands and Terraces

The two map units of this group make up about 30 percent of Carteret County. The principal uses are woodland and cropland. A seasonal high water table is a major limitation for these uses except in drained areas.

1. Deloss-Tomotley-Arapahoe

Nearly level, very poorly drained and poorly drained, loamy soils; on low marine and stream terraces

These soils are on the Pamlico Surface in the central and eastern parts of Carteret County (fig. 4). The areas are broad and irregular in shape.

This map unit makes up about 22 percent of the county. It is about 50 percent Deloss soils, 28 percent Tomotley soils, 19 percent Arapahoe soils, and 3 percent soils of minor extent.

Deloss soils are very poorly drained. They are in the middle of broad interstream flats and in depressions. The surface layer is fine sandy loam, and the subsoil is sandy clay loam.

Tomotley soils are poorly drained. They are in slightly higher areas on the landscape or closer to drainageways than the other major soils. The surface layer is fine sandy loam, and the subsoil is sandy clay loam.

Arapahoe soils are very poorly drained. They are in the middle of broad interstream flats and in depressions. The surface layer and the subsoil are fine sandy loam.

The minor soils are Altavista and Augusta soils near shallow drainageways and Roanoke and Wasda soils on flats and in depressions.

The major soils in this map unit are used mainly as woodland, but an extensive acreage is used for corn, soybeans, potatoes, wheat, and pasture. A seasonal high water table, rare flooding, and ponding in depressions are the major limitations.

2. Torhunta-Pantego-Rains

Nearly level, very poorly drained and poorly drained, loamy soils; on uplands

These soils are on interstream flats (fig. 2) and in depressions on the Talbot Surface. Extensive areas of this map unit are in the Croatan National Forest in the western part of Carteret County. The areas are broad and irregular in shape.

This map unit makes up about 8 percent of the county. It is about 50 percent Torhunta soils, 27 percent Pantego soils, 18 percent Rains soils, and 5 percent soils of minor extent.

Torhunta soils are very poorly drained. They are in the middle of broad interstream flats and in depressions. The surface layer is mucky fine sandy loam, and the subsoil is fine sandy loam.

Pantego soils are very poorly drained. They are also in the middle of broad interstream flats and in depressions. The surface layer is fine sandy loam, and the subsoil is sandy clay loam.

Rains soils are poorly drained. They are in slightly higher areas on the landscape or closer to drainageways than the other major soils. The surface layer is fine sandy loam, and the subsoil is sandy clay loam.

The minor soils are Lynchburg soils near shallow drainageways, Leon soils on low ridges, and Croatan soils in depressions.

The soils in this map unit are used mainly as woodland, but in some areas, they are used for crops such as corn and soybeans. A seasonal high water table is the main limitation.

Very Poorly Drained, Organic and Mineral Soils; in Salt Marshes

The map unit of this group makes up about 16 percent of Carteret County. It consists of continuously wet soils in marshes. Frequent flooding, extreme wetness, and

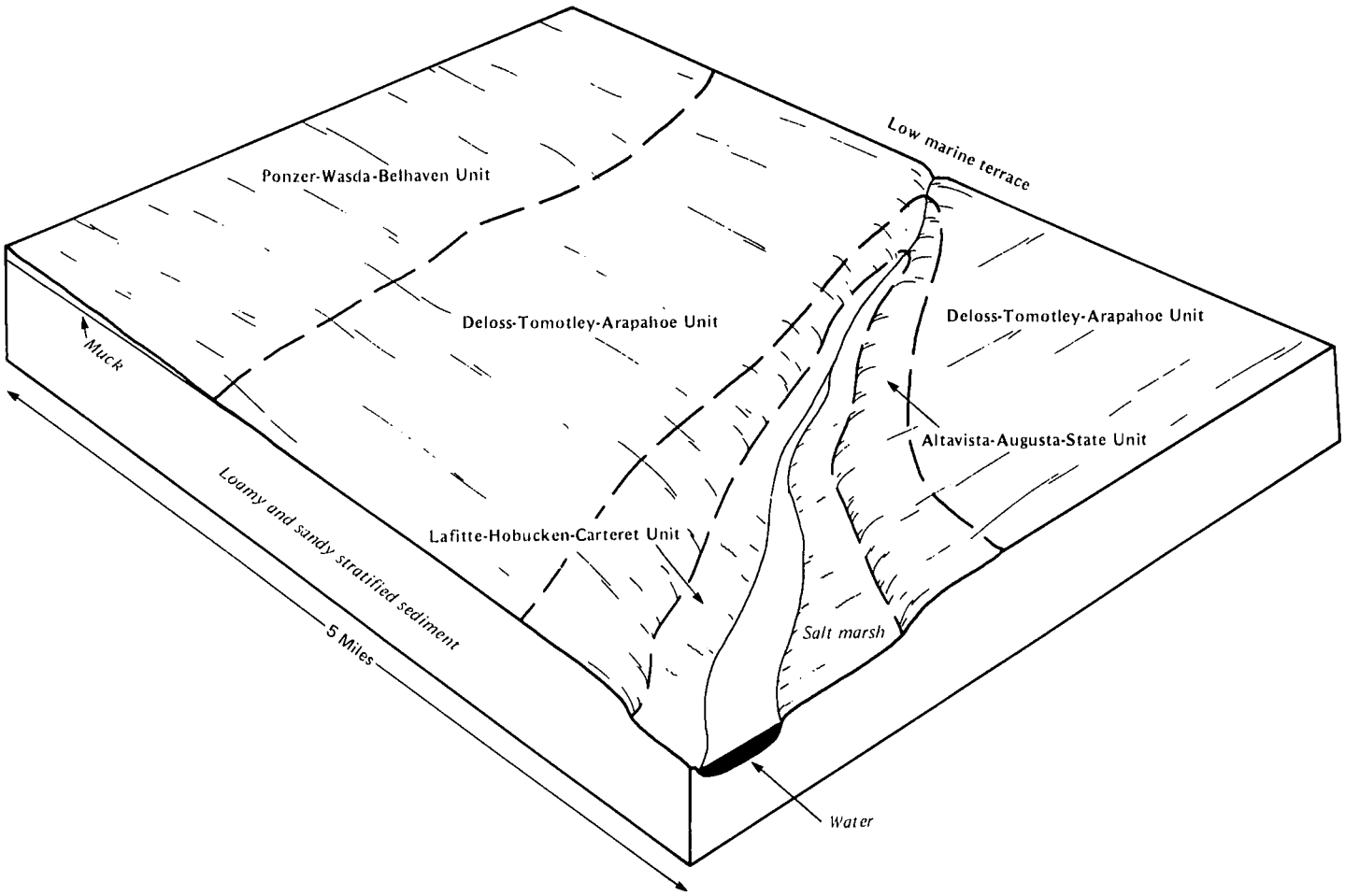

Figure 4.—In east-central Carteret County, the drainage and organic matter content of soils on the Pamlico Surface are influenced by position on the landscape.

exposure to salt limit the use of these soils to wildlife habitat.

3. Lafitte-Hobucken-Carteret

Nearly level, very poorly drained, mucky and sandy soils; in marshes flooded frequently with salt water

These soils are in areas of marsh adjacent to sounds, bays, rivers (fig. 4), and creeks throughout Carteret County. The areas are narrow to broad, and irregular in shape.

This map unit makes up about 16 percent of the county. It is about 49 percent Lafitte soils, 27 percent Hobucken soils, 14 percent Carteret soils, and 10 percent soils of minor extent.

Lafitte soils are mainly in the northeastern part of the county near Pamlico Sound. They typically consist of well decomposed muck to a depth of about 60 inches. The underlying material is sandy clay loam.

Hobucken soils are mostly along streams extending inland from sounds and bays from Sealevel to Newport. The surface layer is muck in the upper part and mucky fine sandy loam in the lower part. The underlying material is loamy sand, sandy loam, and sandy clay loam.

Carteret soils are on the sound side of the Outer Banks and on smaller islands. The surface layer is loamy sand, and the underlying material is loamy sand and sand.

The minor soils are Arapahoe, Corolla, Deloss, Dorovan, Duckston, and Masontown soils, and areas of Beaches, storm tidal. Arapahoe and Deloss soils are on low marine terraces; Dorovan and Masontown soils are

on flood plains; and Corolla and Duckston soils and Beaches, storm tidal, are mainly on the Outer Banks.

These soils are in native vegetation adapted to wetness, flooding, and exposure to salt. They provide primary habitat for many wetland animals and waterfowl, and they contribute nutrients benefiting fish and shellfish to the estuaries. These soils are not used for purposes other than wildlife management because of extreme wetness, frequent flooding, and exposure to salt.

Excessively Drained to Very Poorly Drained, Mineral Soils; on Uplands and Terraces

The two map units of this group make up about 16 percent of Carteret County. They are on uplands and low marine terraces. Natural drainage ranges from excessively drained soils on the highest ridges to very poorly drained soils in the wettest depressions. The principal use is woodland, although a small acreage is in cropland. The major limitations are a seasonal high water table in the wet depressions, and droughtiness on the ridges.

4. Leon-Murville-Mandarin

Nearly level to gently sloping, poorly drained, very poorly drained, and somewhat poorly drained, sandy soils that have a subsoil in which organic matter has accumulated; on uplands and low marine terraces

These soils are on ridges and in depressions on the Pamlico and Talbot Surfaces (fig. 5). The largest area of this map unit is in Croatan National Forest in the western part of Carteret County. Smaller areas are around Beaufort, Harkers Island, and Cedar Island. The areas are broad and irregular in shape.

This map unit makes up about 13 percent of the county. It is about 44 percent Leon soils, 36 percent Murville soils, 10 percent Mandarin soils, and 10 percent soils of minor extent.

Leon soils are nearly level to gently sloping and poorly drained. They are on the lower parts of ridges. The surface layer is sand, and the subsoil is weakly cemented sand.

Murville soils are nearly level and very poorly drained. They are in depressions. The surface layer is mucky sand, and the subsoil is weakly cemented sand.

Mandarin soils are nearly level to gently sloping and somewhat poorly drained. They are on the higher parts of ridges. The surface layer is sand, and the subsoil is weakly cemented sand.

The minor soils are Baymeade and Kureb soils on ridges; Croatan, Ponzer, and Torhunta soils in depressions; and Masontown and Dorovan soils on flood plains.

Nearly all of the acreage of this map unit is used as woodland. The major limitations for nearly all uses are a seasonal high water table, frequent ponding in depressions, and droughtiness on the ridges.

5. Wando-Seabrook-Kureb

Nearly level to gently sloping, well drained, moderately well drained, and excessively drained, sandy soils; on uplands and terraces

These soils are on ridges (fig. 5) on the Pamlico and Talbot Surfaces next to Bogue Sound from Morehead City to Cape Carteret. The area is long and variable in width.

This map unit makes up about 3 percent of the county. It is about 48 percent Wando soils, 18 percent Seabrook soils, 16 percent Kureb soils, and 18 percent soils of minor extent.

Wando soils are well drained. They are on the higher parts of ridges. The surface layer and the underlying material are fine sand.

Seabrook soils are moderately well drained. They are on the lower parts of ridges. The surface layer is fine sand, and the underlying material is fine sand and sand.

Kureb soils are excessively drained. They are on the highest parts of ridges. The surface layer and the underlying material are sand.

The minor soils are Leon and Arapahoe soils in depressions, Mandarin soils on the lower parts of ridges, and Carteret soils in small areas of marsh.

Nearly all of the acreage of this map unit is used as woodland. A small acreage is used as cropland. Droughtiness, leaching of plant nutrients, and wind erosion are the major limitations. A seasonal high water table is an additional limitation for some urban uses on Seabrook soils. Also, low-lying areas are subject to rare flooding.

Very Poorly Drained, Organic Soils and Mineral Soils That Have A Mucky Surface Layer; on Uplands and Terraces

The two map units of this group make up about 18 percent of Carteret County. The water table is at or near the surface most of the time. In undrained areas, the soils are used mainly as wildlife habitat. In drained areas, these soils are used as cropland. The main limitations are a high water table, ponding, low strength, subsidence, and the danger of fire in the organic matter during dry periods.

6. Ponzer-Wasda-Belhaven

Nearly level, very poorly drained, mucky soils; on low marine terraces

These soils are on large interstream flats and in depressions on the Pamlico Surface in the eastern part of Carteret County (fig. 4). Most of the acreage of this map unit is in a large area at the head of the South River known as the Open Grounds. The areas are broad and irregular in shape.

This map unit makes up about 12 percent of the county. It is about 39 percent Ponzer soils, 31 percent

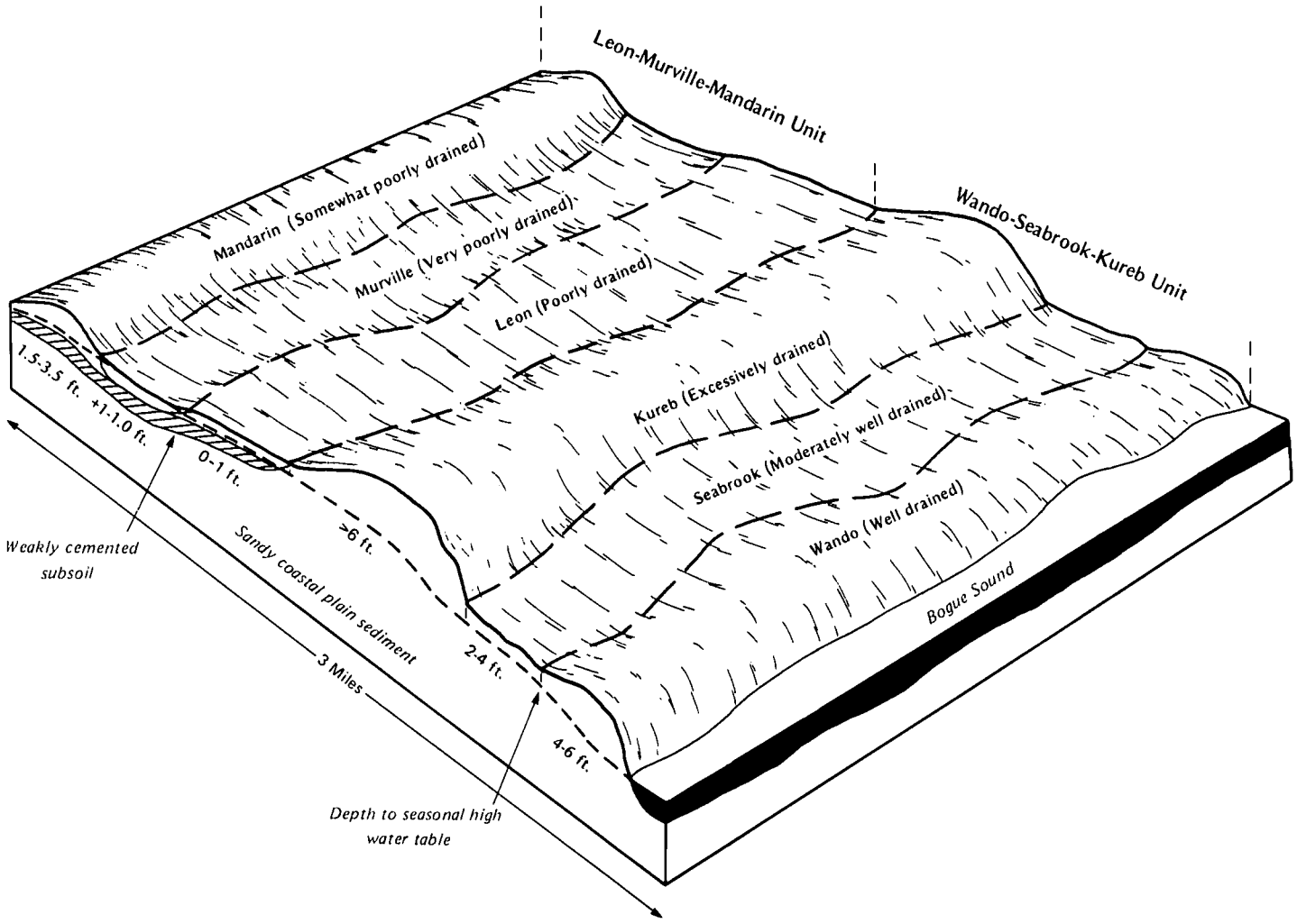

Figure 5.—Landscape position and seasonal high water table relationships are illustrated in uplands where the soils are sandy.

Wasda soils, 20 percent Belhaven soils, and 10 percent soils of minor extent.

Ponzer soils are generally between areas of Belhaven and Wasda soils. The surface layer is muck to a depth of 26 inches. The underlying material is mucky fine sandy loam and sandy clay loam.

Wasda soils are near the edge of the mapped areas. The surface layer is muck to a depth of 15 inches, and the subsoil is clay loam.

Belhaven soils are in the middle of the broad flats and depressions. They typically consist of muck to a depth of 26 inches, and the underlying material is sandy loam, sandy clay loam, and sand.

The minor soils are Dare soils in the middle of the interstream areas and Arapahoe and Deloss soils near the edges.

About half of the acreage of this map unit is in native vegetation adapted to extreme wetness. An extensive acreage in the Open Grounds area has been drained and is used for crops such as corn and soybeans. A high water table, frequent ponding, and the danger of fire in the organic matter during dry periods are major limitations to the use of these soils. Undrained areas are used as habitat for deer and wetland wildlife.

7. Croatan

Nearly level, very poorly drained, mucky soils; on uplands

This soil is on large interstream flats (fig. 2) on the Talbot Surface in the northwestern part of Carteret County. The areas are broad and irregular in shape.

This map unit makes up about 6 percent of the county. It is about 93 percent Croatan soils and 7 percent soils of minor extent.

The Croatan soils typically consist of muck to a depth of 38 inches. The underlying material is mucky fine sandy loam and fine sandy loam.

The minor soils are the Murville, Pantego, and Torhunta soils near the edges of the mapped areas and the Dare soils in the center of the mapped areas.

All of the acreage of this map unit is in native vegetation adapted to extreme wetness. These remote areas are used as habitat for deer, black bear, and wetland wildlife. A high water table, frequent ponding, low strength, and the danger of fire in the organic matter during dry periods are major limitations to the use of these soils.

Well Drained to Somewhat Poorly Drained, Mineral Soils; on Uplands and Terraces

The two map units of this group make up about 13 percent of Carteret County. They consist of well drained to somewhat poorly drained soils on uplands, low marine terraces, and stream terraces. The principal uses are as woodland and cropland. Seasonal wetness is the main limitation.

8. Baymeade-Onslow-Lynchburg

Nearly level to gently sloping, well drained to somewhat poorly drained, sandy and loamy soils; on uplands

These soils are in nearly level and gently sloping areas on the Talbot Surface near drainageways (fig. 2) in the western part of Carteret County. The areas parallel the drainageways and are long and variable in width.

This map unit makes up about 7 percent of the county. It is about 22 percent Baymeade soils, 19 percent Onslow soils, 13 percent Lynchburg soils, and 46 percent soils of minor extent.

Baymeade soils are nearly level to gently sloping and well drained. They are in areas beside drainageways. The surface layer is fine sand, and the subsoil is fine sandy loam.

Onslow soils are nearly level and moderately well drained. They are in areas commonly between the Baymeade soils and the Lynchburg soils. The surface layer is loamy sand, and the subsoil is sandy clay loam.

Lynchburg soils are nearly level and somewhat poorly drained. They are in areas generally farther from drainageways than the other major soils. The surface layer is fine sandy loam, and the subsoil is sandy clay loam.

The minor soils are nearly level to gently sloping Autryville, Norfolk, Masontown, Hobucken, Goldsburg, and Rains soils. The Autryville and Norfolk soils are in areas beside drainageways, and the Masontown soils are on narrow flood plains. The Hobucken soils are in small areas of marsh, the Goldsboro soils are in nearly level areas near drainageways, and the Rains soils are in depressions.

About a third of the acreage of this map unit is used for row crops. The rest is mainly used as woodland. A seasonal high water table is the main limitation for all uses of Onslow and Lynchburg soils except forestry. Droughtiness and leaching of plant nutrients are the major limitations for Baymeade soils in cultivated areas.

9. Altavista-Augusta-State

Nearly level, well drained to somewhat poorly drained, sandy soils; on low marine and stream terraces

These soils are on the Pamlico Surface in long areas of variable width that parallel nearby rivers (fig. 4), creeks, sounds, and bays in the central part of Carteret County.

This map unit makes up about 6 percent of the county. It is about 42 percent Altavista soils, 21 percent Augusta soils, 10 percent State soils, and 27 percent soils of minor extent.

Altavista soils are moderately well drained. They are commonly between the State soils and the Augusta soils. The surface layer is loamy fine sand, and the subsoil is sandy clay loam.

Augusta soils are somewhat poorly drained. They are generally farther from drainageways than the other major soils. The surface layer is loamy fine sand, and the subsoil is sandy clay loam.

State soils are well drained. They are beside the drainageways. The surface layer is loamy fine sand, and the subsoil is sandy clay loam.

The minor soils of this map unit are the Conetoe, Arapahoe, Deloss, Tomotley, Masontown, and Hobucken soils. Conetoe soils are beside drainageways, and the Arapahoe, Deloss, and Tomotley soils are in depressions. Masontown soils are on narrow flood plains, and Hobucken soils are in narrow areas of marsh.

About two-thirds of the acreage of this map unit is used as woodland. The rest is mainly used for row crops. A seasonal high water table is the main limitation for all uses of Augusta and Altavista soils except forestry. Also, low-lying areas of the soils in this map unit are subject to rare flooding.

Excessively Drained and Moderately Well Drained to Somewhat Poorly Drained Mineral Soils and Beaches; on the Outer Banks

The map unit in this group makes up about 5 percent of Carteret County. It consists of excessively drained and moderately well drained to somewhat poorly drained soils and Beaches of the Outer Banks. Principal uses include recreation, urban development, and coastal

wildlife habitat. Droughtiness, wind erosion, salt spray, wetness, and flooding in low areas limit the use of soils in this group.

10. Newhan-Corolla-Beaches

Nearly level to steep, excessively drained and moderately well drained to somewhat poorly drained, sandy soils and Beaches; on the Outer Banks

These soils are on the Outer Banks between the Atlantic Ocean and the Bogue, Core, and Pamlico Sounds. These areas are long and variable in width.

This map unit makes up about 5 percent of the county. It is about 33 percent Newhan soils, 15 percent Corolla soils, 19 percent Beaches, and 33 percent soils of minor extent.

Newhan soils are gently sloping to moderately steep and excessively drained. They are on dune ridges (fig. 3). The surface layer is fine sand, and the underlying material is fine sand and sand.

Corolla soils are nearly level to gently sloping and moderately well drained to somewhat poorly drained. They are in lower areas between the dune ridges (fig. 3). The surface layer is fine sand, and the underlying material is fine sand and sand.

Beaches are nearly level to gently sloping. They consist of layers of sand and shell.

The minor soils are Fripp soils on forested ridges, Duckston soils in depressions, and Carteret soils in small areas of marsh.

Newhan and Corolla soils are in native vegetation or urban use. The Beaches are used for wildlife and recreation. Newman soils are limited by extreme droughtiness, wind erosion, salt spray, and leaching of plant nutrients. Corolla soils are limited by a seasonal high water table, droughtiness, leaching of plant nutrients, salt spray, and rare flooding with salt water.

Very Poorly Drained, Mineral Soils and Organic Soils; on Flood Plains

The map unit in this group makes up about 2 percent of Carteret County. Use of these soils is limited to woodland and wildlife habitat. Frequent flooding and a high water table throughout the year are the major limitations to use and management.

11. Masontown-Dorovan

Nearly level, very poorly drained, sandy and mucky soils that are flooded frequently; on flood plains

These soils are in long, narrow areas along major streams (fig. 2) in the western part of Carteret County.

This map unit makes up about 2 percent of the county. It is about 62 percent Masontown soils, 28 percent Dorovan soils, and 10 percent soils of minor extent.

Masontown soils have a surface layer of mucky loam. The underlying material is fine sandy loam, loamy sand, and sand.

Dorovan soils typically consist of muck to a depth of 80 inches.

The minor soils are Hobucken and Lafitte soils in marshes and Arapahoe, Deloss, and Tomotley soils on stream terraces.

The major soils are used as bottom land hardwood forests. The main limitations are a high water table throughout the year and the hazard of frequent flooding. Low strength is a major limitation in areas of Dorovan soils. These limitations restrict these soils to use for forestry and as wetland wildlife habitat.

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. Key physical and chemical properties are mentioned in the mapping units. Additional properties information is provided in tables 13, 14, 15, and 16.

Important or commonly occurring plants are listed by their recognized common plant names *(9, 12)* in each mapping unit. Local plant names are given in parentheses following the common names if they differ. An alphabetical list of these plants and their scientific names is given in table 4.

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

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

Some map units are made up of two or more major soils or of a soil and a miscellaneous land area. These map units are called soil complexes.

A *soil complex* consists of two or more soils or of a soil and a miscellaneous land area in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Newhan-Corolla complex, 0 to 30 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. Beaches, coastal, is an example. Miscellaneous areas are shown on the soil maps.

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.

AaA—Altavista loamy fine sand, 0 to 2 percent slopes. This soil is moderately well drained. It is in slightly convex areas on stream and low marine terraces near rivers, creeks, sounds, and bays mainly in the north-central and south-central parts of the county. Mapped areas are irregular in shape and range from 5 to 300 acres.

Typically, the surface layer is dark grayish brown loamy fine sand 8 inches thick. The subsurface layer is light yellowish brown loamy fine sand to a depth of 14 inches. The subsoil extends to a depth of 55 inches. It is yellowish brown sandy clay loam in the upper part. In the middle part, it is brownish yellow sandy clay loam that has light brownish gray mottles, and in the lower part, it is light yellowish brown fine sandy loam that has light gray mottles. The underlying material to a depth of 72 inches is light yellowish brown fine sandy loam that has gray mottles.

Permeability of the subsoil is moderate, and the available water capacity is moderate. The soil ranges from very strongly acid to medium acid unless lime has been added. The seasonal high water table is 1.5 to 2.5 feet below the surface. This soil is subject to rare flooding in low-lying areas.

Included with this soil in mapping are small areas of Augusta, State, and Seabrook soils. The somewhat

poorly drained Augusta soils are in depressions. The well drained State soils and the moderately well drained Seabrook soils are slightly higher on the landscape than Altavista soil. Some areas of wet soils in depressions and some areas of sandy soils in higher positions are shown on the map with a special symbol. These areas are smaller than 4 acres. The included soils make up about 10 to 15 percent of this map unit.

About half of the acreage of this Altavista soil is in cropland. A small acreage is in pasture, and the rest is mainly in woodland.

The major crops are corn, tobacco, and soybeans. Cabbage is grown in a few areas. Wetness is the main limitation. Drainage systems, including tile and open ditches, may be needed, especially in areas where tobacco is grown. Common pasture forages include tall fescue, Ladino clover, and coastal bermudagrass.

In woodland areas, loblolly pine, longleaf pine, southern red oak, water oak, yellow-poplar, sweetgum, red maple, white oak, and blackgum are dominant. Common understory plants are flowering dogwood, redbay, sweetleaf, sourwood, sweetbay, bitter gallberry, greenbrier, sweet pepperbush, Virginia creeper, waxmyrtle, American holly, honeysuckle, poison-ivy, blueberry, grape, and Carolina jessamine. There are no major limitations for woodland use and management.

Seasonal wetness and rare flooding of low-lying areas limit the use of this soil for building site development, sanitary facilities, and recreation. Wetness can be reduced by drainage systems that include tile and open ditches and land grading for surface drainage. The hazard of flooding at specific sites needs to be determined before use and management is planned.

This Altavista soil is in capability subclass IIw and in woodland group 9W.

Ag—Augusta loamy fine sand. This soil is nearly level and somewhat poorly drained. It is on flats and in depressions on stream and low marine terraces near rivers, creeks, sounds, and bays mainly in the north-central and south-central parts of the county. Mapped areas are irregular in shape and range from 5 to 300 acres.

Typically, the surface layer is very dark grayish brown loamy fine sand 7 inches thick. The subsurface layer is light yellowish brown loamy fine sand to a depth of 10 inches. The subsoil extends to a depth of 55 inches. In the upper part, it is light yellowish brown sandy clay loam that has light brownish gray mottles. It is light brownish gray sandy clay loam in the middle part and light brownish gray fine sandy loam in the lower part. The underlying material to a depth of 80 inches is light gray fine sandy loam and loamy fine sand.

Permeability of the subsoil is moderate, and the available water capacity is moderate. This soil ranges from very strongly acid to medium acid unless lime has been added. The seasonal high water table is 1 foot to 2 feet below the surface. This soil is subject to rare flooding in low-lying areas.

Included with this soil in mapping are small areas of Altavista, Seabrook, and Tomotley soils. The moderately well drained Altavista and Seabrook soils are in slightly higher areas than Augusta soil. The poorly drained Tomotley soils are in depressions. The included soils make up about 10 to 15 percent of this map unit.

About half of the acreage of this Augusta soil is in cropland. A few areas are in pasture, and the rest is mainly in woodland.

In cultivated areas, corn and soybeans are the major crops. Cabbage is grown in a few areas. Wetness is the main limitation. Drainage systems include tile and open ditches. Common pasture forages include tall fescue and Ladino clover.

In woodland areas, loblolly pine, longleaf pine, southern red oak, water oak, laurel oak, yellow-poplar, sweetgum, red maple, white oak, and blackgum are dominant. Common understory plants are redbay, sweetleaf, sweet pepperbush, waxmyrtle, American holly, Virginia creeper, honeysuckle, sweetbay, bitter gallberry, blueberry, greenbrier, switchcane, poison-ivy, and Carolina jessamine. There are no major limitations for woodland use and management.

Seasonal wetness and rare flooding of low-lying areas limit the use of this soil for building site development, sanitary facilities, and recreation. Wetness can be reduced by drainage systems that include tile and open ditches and land grading for surface drainage. The hazard of flooding needs to be determined before the use and management of specific sites is planned.

This Augusta soil is in capability subclass IIIw and in woodland group 9W.

Ap—Arapahoe fine sandy loam. This soil is nearly level and very poorly drained. It is on broad flats and in depressions on low marine and stream terraces mainly in the central part of the county north of Beaufort and Marshallberg. Mapped areas are irregular in shape and range from 5 to 2,000 acres.

Typically, the surface layer is black and very dark gray fine sandy loam 23 inches thick. The subsoil is dark grayish brown fine sandy loam to a depth of 36 inches. The underlying material to a depth of 72 inches is light brownish gray loamy sand and sand.

Permeability of the subsoil is moderately rapid. The surface layer and subsoil range from extremely acid to strongly acid unless lime has been added. The underlying material ranges from medium acid to mildly alkaline. The seasonal high water table is at or near the surface. Water frequently ponds in depressions for brief to long periods unless a drainage system has been installed. This soil is subject to rare flooding.

Included with this soil in mapping are small areas of the Deloss, Ponzer, Tomotley, and Wasda soils. The very poorly drained Deloss and Wasda soils occur at

random within the map unit with no apparent change in landscape. The very poorly drained Ponzer soils are in depressions, and the poorly drained Tomotley soils are in slightly higher areas than Arapahoe soil. The included soils make up about 10 to 20 percent of this map unit.

Arapahoe soil is used mostly as woodland. In a few areas, it is used as cropland.

In woodland areas, loblolly pine, pond pine, sweetgum, blackgum, yellow-poplar, swamp chestnut oak, red maple, willow oak, water oak, and baldcypress are dominant. Hardwoods are dominant in some of the larger depressions. Common understory plants are redbay, sweetbay, American holly, bitter gallberry, large gallberry, fetterbush, sweet pepperbush, switchcane, waxmyrtle, blueberry, huckleberry, titi, honeysuckle, Virginia chainfern, grape, Virginia creeper, cinnamon fern, poison-ivy, and greenbrier. Wetness is a major limitation for commercial woodland. Areas managed for loblolly pine are ditched and bedded. Fertilizer is also used in some plantations.

In cultivated areas, this soil has been intensively drained. Corn, soybeans, potatoes (fig. 6), and cabbage are the main crops. Ditch maintenance is difficult because the sandy underlying material causes ditchbank caving. Drainage systems include open ditches and tile. Suitable outlets may not be available for drainage of some low-lying areas. Land grading improves surface drainage by eliminating depressions where water ponds.

Seasonal wetness, rare flooding, and ponding limit the use of Arapahoe soil for building site development and sanitary facilities. A few areas have been developed using intensive drainage systems similar to those used for cropland. However, water still occasionally ponds for brief periods in drained areas. This soil generally is not used for recreation.

This Arapahoe soil is in capability subclass IIIw (drained) or VIw (undrained). It is in woodland group 10W.

AuB—Autryville loamy fine sand, 0 to 6 percent slopes. This soil is well drained. It is on gently undulating ridges near large drainageways on uplands. Most of the acreage is in scattered high areas near the White Oak and Newport Rivers. Mapped areas are irregular in shape and range from 5 to 100 acres.

Typically, the surface layer is brown loamy fine sand 6 inches thick. The subsurface layer is pale yellow loamy fine sand to a depth of 36 inches. The next layer is yellowish brown fine sandy loam to a depth of 48 inches. Below that layer is brownish yellow and pale yellow loamy fine sand to a depth of 72 inches. Yellowish brown fine sandy loam is between depths of 72 and 80 inches.

Permeability of the subsoil is moderately rapid, and the available water capacity is low. This soil is very strongly acid or strongly acid unless lime has been added. The seasonal high water table is below a depth of 5 feet. Wind erosion is a hazard in areas unprotected by vegetation.

Included with this soil in mapping are small areas of Baymeade, Norfolk, and Goldsboro soils. The well drained Baymeade and Norfolk soils occur at random within the map unit with no apparent change in landscape. The moderately well drained Goldsboro soils are in slightly lower areas than Autryville soil. Areas of wet soils are shown on the map with a special symbol. These areas are smaller than 4 acres. The included soils make up about 10 to 15 percent of this map unit.

This Autryville soil is used mainly as woodland. In a few areas, it is used as pasture or cropland.

In woodland areas, loblolly pine, longleaf pine, southern red oak, live oak, Shumard oak, hickory, southern sugar maple, red maple, sweetgum, white oak, and post oak are dominant. Common understory plants are flowering dogwood, sourwood, turkey oak, yaupon holly, blueberry, Virginia creeper, bitter gallberry, waxmyrtle, sassafras, grape, sweetbay, redbay, American beautyberry, threeawn grass, and poison-ivy. Droughtiness is a concern for woodland use and management.

In cultivated areas, the main crops are corn, tobacco, and soybeans. Leaching of plant nutrients, droughtiness, and wind erosion limit the use of this soil as cropland, and blowing sand can damage young plants. Conservation practices are needed to conserve soil and water. A common pasture forage is coastal bermudagrass.

Autryville soil has no major limitations for building site development. Seepage is a limitation for sanitary facilities. The sandy surface layer is a limitation for recreation use.

This Autryville soil is in capability subclass IIs and in woodland group 7S.

Be—Beaches, coastal. This map unit consists of nearly level to gently sloping soil in long, broad areas adjacent to the ocean (fig. 7). Most of the areas are on Shackleford and Core Banks and range from 40 to more than 1,300 acres.

Typically, the soil consists of pale yellow sand, shells, and shell fragments.

Beaches are flooded daily by ocean tides and are very unstable and highly susceptible to shoreline erosion because of the wind and wave action.

Included in mapping are small, scattered hummocks of excessively drained Newhan soils. The included soils make up less than 5 percent of this map unit.

Beaches are used for recreation and as habitat for coastal birds and some marine species. There is no vegetation because of tidal flooding and severe wind erosion.

Beaches, coastal, is in capability subclass VIIIw. It has not been assigned to a woodland group.

Figure 6.—High yields of Irish potatoes are produced in areas of Arapahoe fine sandy loam that have been drained.

Bf—Beaches, storm tidal. This map unit consists of nearly level, poorly drained soil on Core Banks and Shackleford Banks. The areas are on flats between ocean beaches and marshes on the sound side of the islands. Foredunes are absent or scattered and many old filled inlets lead to this unit from the beach. Mapped areas are long, variable in width, and range from 20 to 900 acres.

This soil consists of sandy material that has few to many shells and shell fragments. The high water table is at or near the surface most of the time. The areas are frequently flooded with salt water by ocean storm tides. Tides 2 to 4 feet above normal flood most areas. The salt concentration ranges from 40 to 60 parts per thousand.

There is no vegetation in these areas because of the high salt concentration. This soil is used only as habitat by some marine species during storm tides.

Beaches, storm tidal, is in capability subclass VIIIw. It has not been assigned to a woodland group.

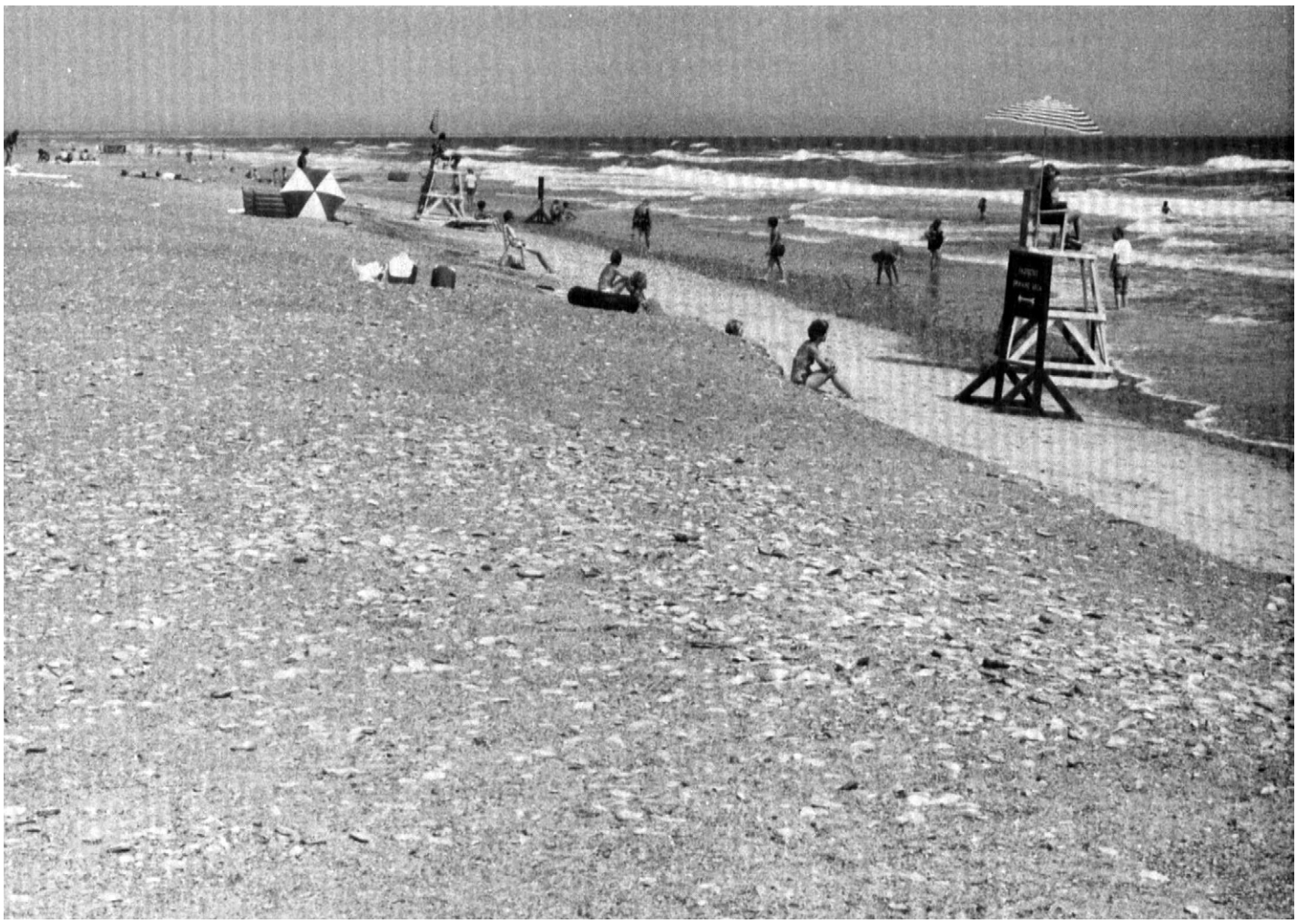

Figure 7.—This area of Beaches, coastal, is one of the recreational areas on the Outer Banks.

BH—Belhaven muck. This soil is nearly level and very poorly drained. It is in depressions and on broad flats on low marine terraces, locally known as pocosins. This soil is mainly in the Open Grounds Pocosin in the east-central part of the county. The mapped areas are irregular in shape and are generally more than 300 acres. The wooded areas are difficult to traverse because of water and dense vegetation. Therefore, observations of this soil in those places were not as detailed as those of other soils. However, the mapping was controlled well enough to make interpretations for the expected uses.

Typically, the surface layer is muck 26 inches thick. The upper 8 inches is granular, black muck, and the lower 18 inches is massive black and dark reddish brown muck. The underlying mineral soil to a depth of 80 inches is very dark brown fine sandy loam, grayish brown sandy clay loam and sand, and greenish gray sand.

Permeability is slow to moderately rapid. The muck is extremely acid unless lime has been added. The upper part of the underlying mineral soil ranges from extremely acid to slightly acid, and the lower part ranges from extremely acid to moderately alkaline. The high water table is at or near the surface most of the time, and the soil is subject to frequent ponding for long periods except in drained areas. This soil is subject to rare flooding. Subsidence is a problem in drained areas.

Included with this soil in mapping are small areas of Dare, Ponzer, and Wasda soils. These soils are very poorly drained. The Dare soils are in the center of the mapped areas, and the Ponzer and Wasda soils are near the edge. The included soils make up 15 to 25 percent of this map unit.

This Belhaven soil is used mainly as cropland. In some areas, it is used as woodland.

In cultivated areas, this soil has been intensively drained and is used mainly for corn, soybeans, and pasture. The drainage systems include open ditches and grading or "crowning" fields for surface drainage. Management problems include subsidence and possible ground fires after drainage. Subsidence exposes buried logs and wood and requires root raking every few years to permit the use of equipment. The organic material is highly reactive with many pesticides, making them ineffective or effective only at high rates.

The vegetation on Belhaven soil occurs as two types, "short pocosin" and "tall pocosin." The pattern of pocosin vegetation is determined by such factors as fire, depth of organic matter, length of periods of saturation, and nutrient availability. The short pocosin type consists of a dense shrub thicket, 3 to 6 feet tall, that has very scattered, stunted pond pines. The short pocosin vegetation is typically in the center of the pocosin over the deepest and most waterlogged organic matter. Common plants are titi, loblolly-bay, honey cup, fetterbush, bitter gallberry, large gallberry, huckleberry, redbay, sweetbay, blackgum, red chokeberry, greenbrier, sphagnum moss, Virginia chainfern, sundew, pitcherplant, bayberry, and sedges. The tall pocosin areas are mostly along the pocosin margin where organic accumulation is thinner. Nutrient availability is better because of greater circulation of ground water *(15)*, and plant growth is more vigorous than in the center of the pocosin, which has a thicker organic accumulation. The shrub layer reaches 10 to 12 feet, and pond pines, 25 to 55 feet tall, form a canopy of up to 75 percent. Loblolly-bay, red maple, sweetbay, redbay, blackgum, and sweetgum are also common. The pocosins are important escape and cover habitat for a variety of wildlife *(10)*. Extreme wetness, low fertility, and possible ground fires after artificial drainage are major limitations for commercial woodland.

Belhaven soil is not used for building site development, sanitary facilities, or recreation because of extreme wetness and the low strength of the organic material.

This Belhaven soil is in capability subclass IVw (drained) or VIIw (undrained). It is in woodland group 4W.

Bn—Beaches-Newhan complex, 0 to 30 percent slopes. This map unit consists of long, narrow areas of coastal beaches and excessively drained Newhan soil on dune ridges (fig. 8). A typical area contains about 60 percent Beaches and 40 percent Newhan soil. The areas are on the Outer Banks, mainly on Bogue Banks and Shackleford Banks. They are adjacent to the ocean and range from 10 to 300 acres. These areas reach a maximum elevation of about 35 feet.

The Beaches typically consist of pale yellow sand, shells, and shell fragments.

The Newhan soil typically has a light brownish gray fine sand surface layer 2 inches thick. The underlying material to a depth of 80 inches is light gray fine sand and sand.

Beaches are flooded daily by ocean tides, and the Newhan soil is flooded by storm tides. The Beaches are very unstable and highly susceptible to shoreline erosion caused by wind and wave action. The Newhan soil has very rapid permeability and very low available water capacity. The soil ranges from neutral to mildly alkaline throughout. It does not have a high water table within a depth of 6 feet. Erosion is a very severe hazard in areas not protected by vegetation. Areas of this map unit are exposed to large amounts of salt spray.

The Beaches are used for recreation and as habitat for coastal birds and some marine species. They do not have vegetation because of tidal flooding and severe wind erosion. The Newhan soil is sparsely vegetated with plants that tolerate extreme droughtiness and salt spray. These include American beachgrass, sea-oats, seashore elder, seacoast bluestem, bitter panicum, seaside goldenrod, and largeleaf pennywort.

Newhan soil is highly valued for building site development because of its location overlooking the ocean. It is limited for this use mainly because of the moderately steep slopes and wind erosion. Also, the sandy material is a poor filter for septic tank effluent, and seepage is a problem. Although grading can create more favorable slopes for building, this destroys native vegetation and causes severe wind erosion. The frontal dunes are important for stability for the barrier islands because they provide protection from ocean storms. Wind erosion can be reduced by planting American beachgrass, bitter panicgrass, or other grasses and shrubs adapted to extreme droughtiness and tolerant of salt spray. Sand fences are also effective in reducing wind erosion.

The Beaches are in capability subclass VIIIw, and Newhan soil is in capability subclass VIIIs. This map unit has not been assigned to a woodland group.

ByB—Baymeade fine sand, 1 to 6 percent slopes. This soil is well drained. It is on gently undulating ridges on uplands near drainageways in the western half of the county. Mapped areas are irregular in shape and range from 5 to 200 acres.

Typically, the surface layer is gray fine sand 5 inches thick. The subsurface layer is fine sand to a depth of 24 inches. It is light gray in the upper part and light yellowish brown in the lower part. The subsoil is fine sandy loam to a depth of 60 inches. It is light yellowish brown in the upper part and mottled yellowish brown, light yellowish brown, and light gray in the lower part. The underlying material to a depth of 80 inches is very pale brown loamy fine sand.

Permeability of the subsoil is moderately rapid, and the available water capacity is very low. The soil ranges from

Figure 8.—Beaches-Newhan complex, 0 to 30 percent slopes, is used mainly as recreation areas or as habitat for coastal and marine wildlife.

very strongly acid to slightly acid unless lime has been added. The seasonal high water table is 4 to 5 feet below the surface. Wind erosion is a hazard in areas unprotected by vegetation.

Included with this soil in mapping are small areas of Autryville, Kureb, Leon, and Mandarin soils. The well drained Autryville soils and the excessively drained Kureb soils occur at random within the map unit with no apparent change in landscape. The poorly drained Leon soils and somewhat poorly drained Mandarin soils are in depressions. Some areas of wet soils in depressions are shown on the map with a special symbol. These areas are smaller than 4 acres. The included soils make up about 10 to 15 percent of this map unit.

This Baymeade soil is used mainly as woodland. In a few areas, it is used as pasture or cropland.

In woodland areas, loblolly pine, longleaf pine, southern red oak, red maple, sweetgum, and post oak are dominant. Common understory plants are flowering dogwood, blackjack oak, sourwood, turkey oak, blueberry, Virginia creeper, bitter gallberry, waxmyrtle, sassafras, grape, sweetbay, redbay, American beautyberry, and threeawn grass. Droughtiness is a concern for woodland use and management.

In cultivated areas, the main crops are corn and soybeans. Leaching of plant nutrients, droughtiness, and wind erosion limit the use of this soil as cropland. Conservation practices are needed to help conserve soil and water. A common pasture forage is coastal bermudagrass.

Baymeade soil has no major limitations for building site development, but seepage and wetness limit its use for sanitary facilities. The sandy surface layer is a limitation for recreation use.

This Baymeade soil is in capability subclass IIIs and in woodland group 6S.

Cd—Corolla-Duckston complex. This map unit consists of Corolla and Duckston soils in depressions. The Corolla soil is nearly level to gently sloping and moderately well drained and somewhat poorly drained. The Duckston soil is nearly level and poorly drained. A typical mapped area contains about 50 percent Corolla

soil and 35 percent Duckston soil. These soils are on the Outer Banks. The largest areas are on Core Banks. Mapped areas are long, variable in width, and range from 5 to 50 acres.

The Corolla soil typically has a very dark grayish brown and grayish brown fine sand surface layer 10 inches thick. The underlying material to a depth of 80 inches is pale brown and light gray sand.

The Duckston soil typically has a surface layer that is very dark gray fine sand 5 inches thick. The underlying material to a depth of 60 inches is light brownish gray and dark grayish brown fine sand.

Permeability is very rapid, and the available water capacity is very low. These soils range from medium acid to moderately alkaline. The seasonal high water table is 1.5 to 3.0 feet below the surface in Corolla soil and 1 foot to 2 feet below the surface in Duckston soil. Elevation is less than 10 feet. These soils are subject to flooding during severe storm tides. Corolla soil floods rarely, and Duckston soil floods frequently for brief periods. These soils are also exposed to variable amounts of salt spray, depending on proximity to the ocean.

Included with these soils in mapping are small areas of Carteret and Newhan soils. The very poorly drained Carteret soils are in marshes. The excessively drained Newhan soils are in small hummocks. The included soils make up about 15 percent of this map unit.

Native vegetation varies depending on the amount of exposure to salt. Salt-tolerant plants, such as seacoast bluestem, seashore elder, largeleaf pennywort, sea rocket, seaside goldenrod, marshhay cordgrass, and bitter panicum, are in the most directly exposed areas. As exposure to salt spray decreases, common plants are eastern baccharis, waxmyrtle, yaupon holly, bayberry, eastern redcedar, Atlantic white-cedar, grape, Virginia creeper, greenbrier, peppervine, wild olive, and live oak. Exposure to salt spray causes these plants to have a sheared appearance that is shaped according to contours of the adjacent dunes.

These soils are used mainly as habitat for coastal wildlife. They are not used as cropland or woodland because of exposure to salt spray and flooding with salt water. Wetness, the hazard of flooding, and the lack of adequate outlets for drainage are major limitations in using these soils for building site development, sanitary facilities, and recreation. Poor filtering capacity and seepage are additional limitations for sanitary facilities.

Corolla and Duckston soils are in capability subclass VIIw. They have not been assigned to a woodland group.

CH—Carteret sand, frequently flooded. This soil is nearly level and very poorly drained. It is in marshes along sounds and bays and around the mouths of rivers and creeks. Elevation is mostly 1 foot to 1.5 feet. Mapped areas are irregular in shape and range from 5 to 300 acres. Access was limited in many places because of water, so observations of this soil were not as detailed as those of other soils. However, the mapping was controlled well enough to make interpretations for the expected uses.

Typically, the surface layer is dark grayish brown and dark gray sand 10 inches thick. The underlying material to a depth of 80 inches is gray loamy sand and greenish gray sand.

This soil ranges from slightly acid to moderately alkaline. The water table is at or near the surface continuously. This soil is subject to flooding at least monthly, and some areas flood weekly with salt water during storm or wind tides. Salt concentration is 15 to 30 parts per thousand.

Included with this soil in mapping are small areas of Hobucken, Corolla, and Duckston soils. The very poorly drained Hobucken soils are in areas of marsh around the mouths of rivers and creeks. The moderately well drained and somewhat poorly drained Corolla soils and the poorly drained Duckston soils are in small, scattered areas in slightly higher positions than those of the Carteret soil. Also included are some low areas of Carteret soil that are flooded daily with salt water. The included soils make up about 15 to 30 percent of this map unit.

This Carteret soil is used for native vegetation that is adapted to extreme wetness, flooding, and exposure to salt. It is not used for cropland, woodland, building site development, sanitary facilities, or recreation because of flooding, ponding, seepage, and excess salt. The dominant vegetation is black needlerush. Other common plants are marshhay cordgrass, saltgrass, saltmarsh bulrush, eastern baccharis, marshelder, glasswort, smooth cordgrass, and saltwort. These marshland areas are an important part of the coastal ecology. The marsh plants contribute nutrients to the estuarine system benefiting fish and shellfish and also provide habitat for wetland wildlife.

This soil is in capability subclass VIIIw. It has not been assigned to a woodland group.

CL—Carteret sand, low, frequently flooded. This soil is nearly level and very poorly drained. It is in marshes on the sound side of the Outer Banks. Elevation is less than 1 foot. Mapped areas are irregular in shape and range from 5 to 200 acres. Access was limited in many places because of water, so observations of this soil were not as detailed as those of other soils. However, the mapping was controlled well enough to make interpretations for the expected uses.

Typically, the surface layer is dark grayish brown and dark gray sand 10 inches thick. The underlying material to a depth of 80 inches is gray loamy sand and greenish gray sand.

This soil is moderately alkaline. The water table is at or near the surface continuously, and the soil is flooded

by ocean tides daily. Salt concentration is 20 to 35 parts per thousand.

Included with this soil in mapping are small areas of Carteret soil in slightly higher marshes that are not flooded daily by the tides or vegetated mainly with smooth cordgrass. The included soil makes up about 15 to 30 percent of this map unit.

This Carteret soil is used for native vegetation (fig. 9) of plants adapted to extreme wetness and flooding with salt water. It is not used as cropland, woodland, building sites, sanitary facilities, or recreation areas because of flooding, ponding, seepage, and excess salt. The dominant vegetation is smooth cordgrass. This plant contributes a much higher amount of nutrients to the estuarine system than other marsh plants. Areas of this unit are an important part of the coastal ecology and provide habitat for wetland wildlife and some marine species during part of their life cycle.

This Carteret soil is in capability subclass VIIIw. It has not been assigned to a woodland group.

CnB—Conetoe loamy fine sand, 0 to 5 percent slopes. This soil is well drained. It is on ridges on low marine and stream terraces in scattered areas near rivers, creeks, sounds, and bays. Mapped areas are irregular in shape and range from 5 to 100 acres.

Typically, the surface layer is dark grayish brown loamy fine sand 4 inches thick. The subsurface layer is light yellowish brown loamy fine sand to a depth of 30 inches. The subsoil extends to a depth of 72 inches. It is yellowish brown fine sandy loam in the upper part and yellowish brown loamy fine sand in the lower part. The

Figure 9.—Most areas of Carteret sand, low, frequently flooded, are in native vegetation, mainly smooth cordgrass.

underlying material to a depth of 80 inches is light yellowish brown loamy sand.

Permeability of the subsoil is moderately rapid, and the available water capacity is low. The soil ranges from very strongly acid to medium acid unless lime has been added. The seasonal high water table is below a depth of 6 feet. This soil is subject to rare flooding for very brief periods in low-lying areas. Wind erosion is a hazard in areas unprotected by vegetation.

Included with this soil in mapping are small areas of Altavista, Seabrook, State, and Wando soils. The moderately well drained Altavista and Seabrook soils are in slightly lower areas than Conetoe soil, and the well drained State and Wando soils occur at random within the map unit with no apparent change in landscape. Some areas of wet soils in depressions are shown on the map with a special symbol. These areas are smaller than 4 acres. The included soils make up about 10 to 15 percent of this map unit.

This Conetoe soil is used mainly as woodland. In a few areas, it is used as pasture or cropland.

In woodland areas, loblolly pine, longleaf pine, southern red oak, Shumard oak, hickory, southern sugar maple, red maple, sweetgum, white oak, and post oak are dominant. Common understory plants are flowering dogwood, sourwood, turkey oak, blueberry, bitter gallberry, Virginia creeper, yaupon holly, waxmyrtle, sassafras, grape, sweetbay, redbay, American beautyberry, threeawn grass, and poison-ivy. Droughtiness is a concern for woodland use and management.

In cultivated areas, corn, soybeans, and tobacco are the main crops. Leaching of plant nutrients, wind erosion, and droughtiness limit the use of this soil for cultivated crops. Blowing sand can damage young plants. Conservation practices are needed to help conserve soil and water. A common pasture forage is coastal bermudagrass.

This soil has no major limitations for building site development; however, it is subject to rare flooding in low-lying areas. The hazard of flooding for specific sites needs to be determined before use and management are planned. Seepage is the main limitation for sanitary facilities. The sandy surface layer is a limitation for recreation uses.

This Conetoe soil is in capability subclass IIs and in woodland group 8S.

Co—Corolla fine sand. This soil is nearly level to gently sloping and moderately well drained and somewhat poorly drained. It is on the Outer Banks. Mapped areas are long, variable in width, and range from 5 to 200 acres. They are behind the frontal dunes.

Typically, the surface layer is very dark grayish brown and grayish brown fine sand 10 inches thick. The underlying material to a depth of 80 inches is pale brown and light gray sand.

Permeability is very rapid, and the available water capacity is very low. The soil ranges from medium acid to mildly alkaline. The seasonal high water table is 1.5 to 3.0 feet below the surface. Elevation is below 10 feet. The soil is subject to rare flooding with salt or fresh water. Corolla soil is exposed to variable amounts of salt spray, depending on proximity to the ocean.

Included with this soil in mapping are small areas of Duckston, Fripp, and Newhan soils. The poorly drained Duckston soils are in depressions, and the excessively drained Fripp and Newhan soils are on small hummocks. The included soils make up 10 to 20 percent of this map unit.

This Corolla soil is used mainly for native vegetation that varies depending on the amount of exposure to salt. Salt tolerant plants, such as seacoast bluestem, seashore elder, largeleaf pennywort, sea rocket, seaside goldenrod, marshhay cordgrass, and bitter panicum, are in the most directly exposed areas. As exposure to salt decreases, common plants are eastern baccharis, waxmyrtle, yaupon holly, bayberry, southern redcedar, Atlantic white-cedar, grape, Virginia creeper, greenbrier, peppervine, wild olive, and live oak. Exposure to salt spray causes the vegetation to have a sheared appearance that is shaped according to contours of the adjacent dunes (fig. 10). Some forested areas of this soil are on the western part of Bogue Banks where the island is wide and foredunes are high. Loblolly pine, sweetgum, live oak, and red maple are dominant in these areas, but the trees grow slowly because of very low available water capacity, rare flooding with salt water, and exposure to salt spray. Redbay, yaupon holly, waxmyrtle, Virginia creeper, blueberry, eastern redcedar, grape, American holly, and greenbrier are common understory plants.

Corolla soil is not used as cropland or commercial woodland because of exposure to salt spray and flooding with salt water.

Seasonal wetness and flooding limit the use of this soil for building site development and sanitary facilities. Poor filtering capacity and seepage are additional limitations for sanitary facilities. Adequate outlets for artificial drainage are not available in many places because of the low elevation. Maintenance of drainage systems is difficult because ditchbanks in the sandy soil cave. Wetness and the sandy texture are limitations for recreation uses.

Corolla soil is in capability subclass VIIw. It has not been assigned to a woodland group.

CrB—Craven loam, 1 to 4 percent slopes. This soil is moderately well drained. It is on low ridges and side slopes on uplands near drainageways. A small acreage of this soil is north of Cape Carteret in the western part of the county. Mapped areas are irregular in shape and range from 5 to 80 acres.

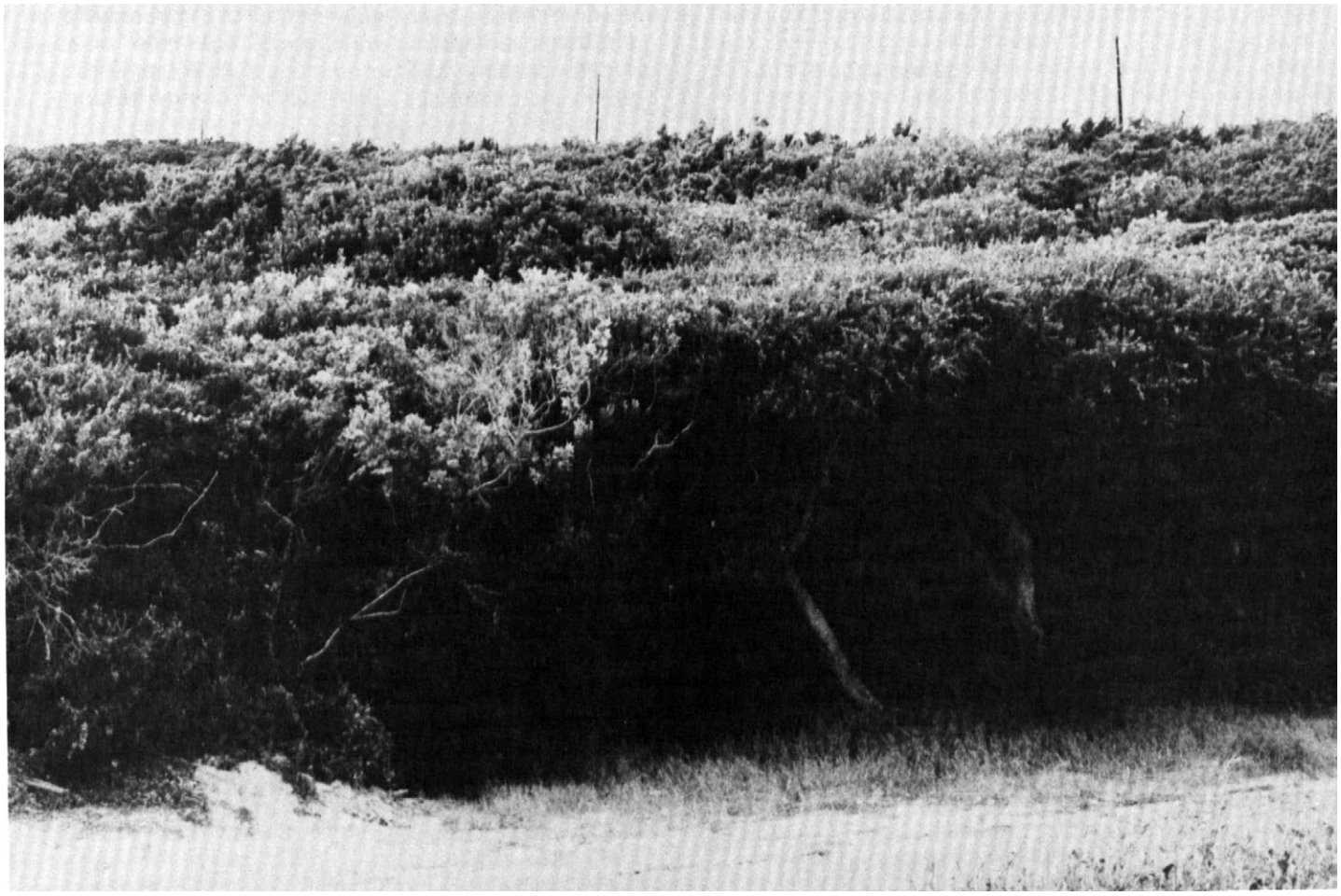

Figure 10.—Native vegetation on Corolla fine sand has a sheared appearance because of exposure to salt spray.

Typically, the surface layer is brown loam 7 inches thick. The subsoil extends to a depth of 40 inches. It is strong brown silty clay in the upper part. In the middle part, it is yellowish brown silty clay that has light gray mottles, and in the lower part, it is brownish yellow sandy clay that has light gray mottles. The underlying material to a depth of 72 inches is brownish yellow fine sandy loam and loamy fine sand.

Permeability of the subsoil is slow, and shrink-swell potential is moderate. The available water capacity is moderate. This soil ranges from extremely acid to strongly acid unless lime has been added. The seasonal high water table is 2 to 3 feet below the surface. Erosion is a hazard in areas unprotected by vegetation.

Included with this soil in mapping are small areas of the Onslow and Goldsboro soils. These soils are moderately well drained. Also included are small areas of Craven soil that are eroded. Some areas of wet soils in depressions are shown on the map with a special symbol. These areas are smaller than 4 acres. The included soils make up about 10 to 15 percent of this map unit.

This Craven soil is used mainly as cropland. In a few areas, it is used as pasture or woodland.

In cultivated areas, the principal crops are corn, soybeans, and tobacco. Erosion is a hazard, and most mapped areas have eroded spots. The surface layer is easily eroded unless protected by vegetation. Conservation practices that reduce erosion and add organic matter are needed. Tillage needs to be avoided if the soil is wet because large clods form, resulting in a poor seedbed, runoff, and erosion. Common pasture forages include tall fescue and Ladino clover.

In woodland areas, loblolly pine, red maple, water oak, sweetgum, yellow-poplar, blackgum, southern red oak, white oak, and post oak are dominant. The understory includes bitter gallberry, sourwood, flowering dogwood, American holly, waxmyrtle, Virginia creeper, redbay,

sweetbay, blueberry, honeysuckle, sweet pepperbush, Carolina jessamine, and poison-ivy. Logging needs to be avoided if the soil is wet as this causes compaction, deep ruts, poor surface drainage, and lower productivity.

Slow permeability, seasonal wetness, moderate shrink-swell potential, and the clayey subsoil are the main limitions to use of this soil for building site development, sanitary facilities, and recreation uses. Foundations should be designed to resist cracking caused by shrinking and swelling as a result of changes in moisture. Also, removal of vegetation at construction sites causes a severe hazard of erosion, and erosion control practices should be used. Seasonal wetness can be reduced with open ditches or grassed waterways. Tile drainage is not used because of slow internal drainage.

This Craven soil is in capability subclass IIIe and in woodland group 8W.

CT—Croatan muck. This soil is nearly level and very poorly drained. It is on broad flats and in depressions, locally known as pocosins. Most of the acreage is on uplands in the Croatan National Forest in the western part of the county. Mapped areas are irregular in shape and range from 25 to more than 10,000 acres. The areas were difficult to traverse because of water and dense vegetation, so observations of this soil were not as detailed as those of other soils. However, the mapping was controlled well enough to make interpretations for the expected uses.

Typically, the surface layer is 38 inches thick. The upper 10 inches consists of granular black muck, and the lower part is massive black and very dark brown muck. The underlying mineral soil to a depth of 65 inches is very dark brown mucky fine sandy loam and gray fine sandy loam.

Permeability is moderately slow to moderately rapid. The organic soil material is extremely acid unless lime has been added. The underlying mineral soil ranges from extremely acid to slightly acid. The water table is at or near the surface most of the time, and water ponds for long periods except where artificial drainage is installed. This soil is also subject to rare flooding. Subsidence is a problem in drained areas.

Included with this soil in mapping are small areas of Torhunta, Pantego, Murville, and Dare soils. These soils are very poorly drained. The Torhunta, Pantego, and Murville soils are near the edge of the mapped areas, and the Dare soils are in the center. The included soils make up about 15 to 25 percent of this map unit.

Croatan soil is used mostly as native woodland. The vegetation occurs as two types, "short pocosin" and "tall pocosin." The pattern of pocosin vegetation is determined by such factors as fire, depth of organic matter, length of periods of saturation, and nutrient availability. The short pocosin type consists of a dense shrub thicket, 3 to 6 feet tall, that has very scattered, stunted pond pines (fig. 11). The short pocosin vegetation is typically in the center of the pocosin over the deepest and most waterlogged accumulations of organic matter. Common plants are titi, loblolly-bay, honey cup, fetterbush, bitter gallberry, large gallberry, huckleberry, redbay, sweetbay, blackgum, red chokeberry, greenbrier, sphagnum moss, Virginia chainfern, sundew, pitcherplant, bayberry, and sedges. The tall pocosin areas are mostly along the pocosin margin where organic deposits are thinner. Nutrient availability is better because of greater circulation of ground water *(15)*, and plant growth is more vigorous than in the center of the pocosin, which has a thicker organic accumulation. The shrub layer reaches 10 to 12 feet, and pond pines, 25 to 55 feet tall, form a canopy of up to 75 percent. Loblolly-bay, red maple, sweetbay, redbay, blackgum, sweetgum, and baldcypress are also common. The wetland areas are important escape and cover habitat for a variety of wildlife *(10)*. Extreme wetness, low fertility, and possible ground fires after artificial drainage are major limitations for commercial woodland.

This soil can be used as cropland if it is intensively drained. Potential crops are corn, soybeans, and wheat. The drainage systems include open ditches and grading or "crowning" fields for surface drainage. Tile is not used because of moderately slow internal drainage. Other problems are subsidence and possible ground fires after drainage. Subsidence exposes buried logs and wood and requires root raking every few years to permit the use of equipment. Also, the organic material is highly reactive with many pesticides, making the pesticides ineffective or effective only at high rates.

This soil is not used for building site development, sanitary facilities, or recreation because of extreme wetness and low strength of the organic material.

This Croatan soil is in capability subclass IVw (drained) or VIIw (undrained). It is in woodland group 6W.

Cu—Corolla-Urban land complex. This map unit consists of areas of nearly level to gently sloping, moderately well drained and somewhat poorly drained Corolla soil and Urban land. The areas are mainly along Bogue Sound where dredge spoil has been deposited on islands, marshes, and low marine terraces and graded for urban development. A typical mapped area contains about 50 percent Corolla soil and 30 to 40 percent Urban land. Mapped areas are irregular in shape and range from 5 to 100 acres.

Typically, Corolla soil has a very dark grayish brown and grayish brown fine sand surface layer 10 inches thick. The underlying material to a depth of 80 inches is pale brown and light gray sand.

Corolla soil has very rapid permeability, and the available water capacity is low. The soil ranges from medium acid to mildly alkaline. The seasonal high water table is 1.5 to 3.0 feet below the surface. This soil is subject to rare flooding for very brief periods during

Figure 11.—This short pocosin vegetation is in an area of Croatan muck in the Croatan National Forest.

severe storm tides. The soil is exposed to variable amounts of salt spray depending on proximity to the sound.

Urban land areas are covered with buildings, streets, driveways, and parking lots.

Included with this complex in mapping are small areas of Duckston, Fripp, and Newhan soils. The poorly drained Duckston soils are in depressions, and the excessively drained Fripp and Newhan soils are on small hammocks. The included soils make up 10 to 20 percent of this map unit.

Seasonal wetness and rare flooding limit the use of this soil for building site development, sanitary facilities, and recreation. The water table cannot be lowered in most places because of the low elevation. Onsite investigation is needed before use and management of specific sites are planned.

This complex has not been assigned to a capability subclass nor to a woodland group.

DA—Dare muck. This soil is nearly level and very poorly drained. It is on broad flats and in depressions, locally called pocosins, on low marine terraces and uplands. The mapped areas are in the Open Grounds Farm in the eastern part of the county and in the Croatan National Forest in the western part. Mapped areas are irregular in shape and range from 25 to 1,500 acres. The areas were difficult to traverse because of water and dense vegetation, so observations of this soil were not as detailed as those of other soils. However, the mapping was controlled well enough to make interpretations for the expected uses.

Typically, the surface layer is 64 inches thick. The upper 11 inches is granular, black muck. The lower part is massive, black and dark reddish brown muck. Buried stumps, logs, and wood fragments are common. The underlying mineral soil to a depth of 80 inches is dark reddish brown mucky sand and grayish brown sand.

Permeability is slow. The organic soil material is 51 to 108 inches thick and is extremely acid. The underlying mineral soil material ranges from extremely acid to medium acid. The water table is at or near the surface continuously, and the soil is subject to frequent ponding for very long periods except in drained areas. This soil is also subject to rare flooding. Subsidence is a problem in drained areas.

Included with this soil in mapping are small areas of Ponzer, Belhaven, and Croatan soils. These soils are very poorly drained. They are thinner, organic soils and are near the edge of the mapped areas. The included soils make up about 15 to 25 percent of this map unit.

This Dare soil is used mainly for native vegetation that is adapted to extreme wetness. This short pocosin vegetation consists of a dense shrub thicket 3 to 6 feet tall that has very scattered, stunted pond pines. There are no large trees because of the very low availability of plant nutrients in the waterlogged soil *(15)*. Common plants in the shrub thicket are titi, loblolly-bay, honey cup, fetterbush, bitter gallberry, large gallberry, huckleberry, redbay, sweetbay, blackgum, red chokeberry, greenbrier, sphagnum moss, Virginia chainfern, bayberry, sundew, pitcherplant, and sedges. The wetland areas are important escape and cover habitat for a variety of wildlife *(10)*.

Some soil in the Open Grounds Farm area has been intensively drained and is used for corn, soybeans, and pasture. The drainage systems include open ditches and grading or "crowning" fields for surface drainage. Management problems include subsidence and possible ground fires after drainage. Subsidence exposes buried logs and wood and requires root raking every few years to permit the use of equipment. The organic material is highly reactive with pesticides, making the pesticides ineffective or effective only at high rates.

Dare soil is not used for building site development, sanitary facilities, or recreation because of extreme wetness and low strength of the organic soil.

This Dare soil is in capability subclass IVw (drained) or VIIw (undrained). It is in woodland group is 4W.

De—Deloss fine sandy loam. This soil is nearly level and very poorly drained. It is on broad flats and in depressions on low marine and stream terraces mainly in the north-central and south-central parts of the county. Mapped areas are irregular in shape and range from 5 to 2,000 acres.

Typically, the surface layer is black fine sandy loam 15 inches thick. The subsoil is gray sandy clay loam to a depth of 45 inches. The underlying material to a depth of 80 inches is gray fine sandy loam.

Permeability of the subsoil is moderate. The soil ranges from extremely acid to strongly acid in the surface layer unless lime has been added. The subsoil ranges from extremely acid to slightly acid. The underlying material ranges from very strongly acid to neutral. The seasonal high water table is at or near the surface. This soil is subject to rare flooding for brief periods in low-lying areas. Water ponds in depressions for brief to long periods except where a drainage system is installed.

Included with this soil in mapping are small areas of Arapahoe, Tomotley, and Wasda soils. The poorly drained Tomotley soils are in slightly higher positions than the Deloss soil, and the very poorly drained Arapahoe soils occur at random within the map unit with no apparent change in landscape. The very poorly drained Wasda soils are in depressions. The included soils make up about 10 to 20 percent of this map unit.

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

In woodland areas, loblolly pine, pond pine, water oak, willow oak, swamp chestnut oak, red maple, blackgum, yellow-poplar, sweetgum, and baldcypress are dominant. Hardwoods are dominant in depressions where water ponds for long periods. Common understory plants are redbay, sweet pepperbush, loblolly-bay, American holly, sweetbay, bitter gallberry, large gallberry, fetterbush, switchcane, huckleberry, waxmyrtle, blueberry, Virginia chainfern, cinnamon fern, poison-ivy, sweetleaf, Virginia creeper, honeysuckle, titi, and greenbrier. Trees grow well on this soil; however, wetness increases seedling mortality and restricts harvest operations. Areas managed for loblolly pine are commonly ditched and bedded. Fertilizer is also used in many plantations.

In cultivated areas, the principal crops are corn and soybeans (fig. 12). A small acreage is used for cabbage and potatoes. Wetness is the main limitation. Drainage systems include tile, open ditches, and land grading for surface drainage. Crops in low-lying areas can be damaged by rare flooding. Common pasture forages include tall fescue and Ladino clover.

Seasonal wetness, ponding in depressions, and rare flooding limit the use of this soil for building site development and sanitary facilities. This soil is generally not used for recreation because of wetness. Wetness can be reduced somewhat with an intensive drainage system that includes tile and open ditches and land grading for surface drainage. However, drained areas can still be subject to rare flooding.

Deloss soil is in capability subclass IIIw (drained) or VIw (undrained). It is in woodland group 10W.

Dm—Deloss mucky loam, frequently flooded. This soil is nearly level and very poorly drained. It is on broad flats on low marine terraces slightly higher than adjacent marshes. The mapped areas are in the eastern part of the county near sounds, bays, and creeks. They are generally oblong, irregular in width, and range from 20 to 250 acres.

Typically, the surface layer is 15 inches thick. It is black mucky loam in the upper part and black fine sandy loam in the lower part. The subsoil is gray sandy clay

Figure 12.—Soybeans is one of the principal crops grown on Deloss fine sandy loam.

loam to a depth of 45 inches. The underlying material to a depth of 60 inches is gray fine sandy loam.

Permeability of the subsoil is moderate. The soil ranges from extremely acid to strongly acid in the surface layer and from extremely acid to slightly acid in the subsoil. The underlying material ranges from very strongly acid to neutral. The high water table is at or near the surface most of the time. This soil is only about 1 foot higher than the adjacent marshes and is flooded frequently with brackish water for brief periods. Outlets for drainage systems generally are not available because of the low elevation.

Included with this soil in mapping are some small areas of very poorly drained Hobucken soils in marshes. The included soils make up about 10 to 15 percent of this map unit.

This Deloss soil is used mainly as habitat for wildlife. The dominant native vegetation consists of sawgrass, black needlerush, big cordgrass, eastern baccharis, and waxmyrtle. Some scattered, stunted pond pine, loblolly pine, Atlantic white-cedar, and red maple are also grown. This plant community reflects the transition from upland forests to salt marshes. Wetness and the hazard of flooding with brackish water are major limitations for woodland use.

This soil is not used for crops, building site development, sanitary facilities, or recreation because of wetness and flooding with brackish water.

This Deloss soil is in capability subclass VIw and in woodland group 4W.

DO—Dorovan muck, frequently flooded. This soil is nearly level and very poorly drained. It is on flood plains mainly along the Newport River. The mapped areas are long, variable in width, and range from 100 to 500 acres. They were difficult to traverse because of water and dense vegetation, so observations of this soil were not as detailed as those of other soils. However, the

mapping was controlled well enough to make interpretations for the expected uses.

Typically, the surface layer is 80 inches thick. The upper 15 inches is black muck, and the lower part is very dark brown muck.

The organic soil material ranges from extremely acid to strongly acid. The water table is at or near the surface continuously. Flooding occurs frequently for very long periods. Subsidence is a problem if this soil is drained.

Included with this soil in mapping are some areas of very poorly drained Masontown soils and some areas of a soil that is similar to Dorovan soil except that the organic material is less than 51 inches thick. These soils occur at random within the map unit with no apparent change in landscape. Also included are a few small areas of very poorly drained Lafitte soils in marshes. The included soils make up about 10 to 20 percent of this map unit.

Dorovan soil is used mainly for native woodland. Baldcypress, blackgum, American elm, sweetgum, green ash, red maple, and swamp tupelo are dominant. The understory commonly includes Virginia willow, redbay, poison-ivy, greenbrier, grape, Virginia creeper, Virginia chainfern, netted chainfern, river birch, lizardstail, Pennsylvania smartweed, arrowhead, cattail, American hornbeam, sedges, climbing hydrangea, Alabama supplejack, royal fern, and cinnamon fern. Wetness and the hazard of flooding are major limitations for commercial woodland use and management. The wetland areas produce a large amount of food for wetland wildlife and support a wide variety of animal species *(10)*.

This soil is not used for crops, building site development, sanitary facilities, or recreation because of extreme wetness, flooding, subsidence, and low strength of the organic material.

Dorovan soil is in capability subclass VIIw and in woodland group 7W.

Du—Duckston fine sand, frequently flooded. This soil is nearly level and poorly drained. It is on the Outer Banks in troughs between dunes and on flats between the dunes and marshes. Generally, elevation is less than 5 feet. Mapped areas are long, variable in width, and range from 5 to 400 acres.

Typically, the surface layer is very dark gray fine sand 5 inches thick. The underlying material to a depth of 60 inches is light brownish gray and dark grayish brown fine sand.

Permeability is very rapid. The soil ranges from medium acid to moderately alkaline. The water table is 1 foot to 2 feet below the surface and fluctuates somewhat in relation to the tides. The soil is subject to frequent flooding with fresh or salt water for brief periods. Duckston soil is exposed to variable amounts of salt spray depending on proximity to the ocean.

Included with this soil in mapping are small areas of Carteret and Corolla soils. The very poorly drained Carteret soils are in marshes. The moderately well drained and somewhat poorly drained Corolla soils are in slightly higher areas than Duckston soil. The included soils make up 10 to 20 percent of this map unit.

This Duckston soil is used mainly for native vegetation that varies depending on the amount of exposure to salt. The most directly exposed areas are vegetated with dense stands of marshhay cordgrass and scattered waxmyrtle, eastern baccharis, Atlantic white-cedar, and seashore elder. In more protected areas, less salt-tolerant grasses and sedges grow along with waxmyrtle, southern redcedar, live oak, black willow, redbay, cattail, blueberry, wild olive, greenbrier, and Virginia creeper. Exposure to salt spray causes the vegetation to have a sheared appearance that is shaped according to contours of the adjacent dunes. Some forested areas are in the western part of Bogue Banks where the island is wide and foredunes are high. Red maple, sweetgum, live oak, water oak, blackgum, and loblolly pine are dominant in these areas. The understory includes waxmyrtle, greenbrier, Virginia creeper, bitter gallberry, southern redcedar, American holly, blueberry, and yaupon holly. Wetness and the hazard of flooding are major limitations to use of this soil as woodland.

Duckston soil is not used for crops, commercial woodland, building site development, sanitary facilities, or recreation. They are used mainly as habitat for wildlife. Wetness, exposure to salt, the hazard of flooding, and the lack of adequate drainage outlets are the major limitations.

This Duckston soil is in capability subclass VIIw. It has not been assigned to a woodland group.

Fr—Fripp fine sand, 2 to 30 percent slopes. This soil is excessively drained. It is on dune ridges on the Outer Banks on Bogue Banks mainly west of Emerald Isle where the island is widest. Elevation ranges from 6 to 30 feet. Mapped areas are long, variable in width, and range from 10 to 300 acres.

Typically, the surface layer is grayish brown fine sand 7 inches thick. The underlying material to a depth of 80 inches is fine sand that is brown in the upper part, yellow in the middle part, and very pale brown in the lower part.

Permeability is rapid, and the available water capacity is very low. The soil ranges from strongly acid to mildly alkaline. It does not have a high water table within a depth of 6 feet.

Included with this soil in mapping are small areas of Corolla soils that are moderately well drained and somewhat poorly drained. They are in small troughs between the dunes. The included soils make up about 5 to 10 percent of this map unit.

This Fripp soil is in a maritime forest of loblolly pine, longleaf pine, live oak, American beech, hickory, cherrybark oak, and blackgum. Common understory

plants are redbay, waxmyrtle, flowering dogwood, yaupon holly, American holly, southern redcedar, sassafras, American beautyberry, grape, Virginia creeper, devils walking stick, and greenbrier. Droughtiness is the main concern for woodland use and management.

Fripp soil is not used as cropland because of droughtiness and the rapid leaching of plant nutrients.

Moderately steep and steep slopes and seepage limit the use of this soil for building site development and sanitary facilities. Although grading can create more favorable slopes for building, this destroys native vegetation and causes severe wind erosion. Also, the dune ridges improve the stability of the barrier islands because they provide protection from ocean storms. Wind erosion can be reduced and stability increased with additional plantings of adapted grasses and shrubs. The sandy texture and excessive slope are the main limitations for recreation uses.

This Fripp soil is in capability subclass VIIs and in woodland group 4S.

GoA—Goldsboro loamy fine sand, 0 to 2 percent slopes. This soil is moderately well drained. It is in slightly convex areas on uplands near drainageways in the western part of the county. Mapped areas are irregular in shape and range from 5 to 200 acres.

Typically, the surface layer is dark grayish brown loamy fine sand 9 inches thick. The subsurface layer is pale brown loamy fine sand to a depth of 12 inches. The subsoil extends to a depth of 63 inches. It is brownish yellow sandy clay loam in the upper part. In the middle part, it is brownish yellow sandy clay loam that has light brownish gray mottles, and in the lower part, it is light yellowish brown fine sandy loam that has light brownish gray mottles. The underlying material to a depth of 80 inches is light brownish gray loamy fine sand.

Permeability of the subsoil is moderate, and the available water capacity is moderate. The soil is very strongly acid or strongly acid unless lime has been added. The seasonal high water table is 2 to 3 feet below the surface.

Included with this soil in mapping are small areas of Norfolk, Craven, Onslow, and Lynchburg soils. The well drained Norfolk soils are in slightly higher areas or closer to drainageways than Goldsboro soil, and the somewhat poorly drained Lynchburg soils are in depressions. The moderately well drained Craven and Onslow soils occur at random within the map unit with no apparent change in landscape. Also included are some areas of a soil that is similar to Goldsboro soil except that it has sandy layers 40 to 60 inches below the surface. Some areas of wet soils in depressions are shown on the map with a special symbol. These areas are smaller than 4 acres. The included soils make up about 15 to 25 percent of this map unit.

This Goldsboro soil is used mainly as cropland. In a few areas, it is used as pasture or woodland.

In cultivated areas, the major crops are corn, tobacco, and soybeans. Wetness is the main limitation. Drainage systems, including tile and open ditches, may be needed, especially in areas where tobacco is grown. Common pasture forages include tall fescue, Ladino clover, and coastal bermudagrass.

In woodland areas, loblolly pine, longleaf pine, southern red oak, water oak, white oak, yellow-poplar, sweetgum, red maple, and blackgum are dominant. Common understory plants are flowering dogwood, redbay, Virginia creeper, sweetleaf, sweet pepperbush, waxmyrtle, American holly, sweetbay, bitter gallberry, greenbrier, honeysuckle, poison-ivy, blueberry, grape, and Carolina jessamine. There are no major limitations for woodland use and management.

Seasonal wetness limits the use of this soil for building site development, sanitary facilities, and recreation. Wetness can be reduced by a drainage system that includes tile and open ditches and land grading for surface drainage.

This Goldsboro soil is in capability subclass IIw and in woodland group 9W.

HB—Hobucken muck, frequently flooded. This soil is nearly level and very poorly drained. It is in marshes adjacent to rivers, creeks, sounds, and bays throughout the county. Elevation is less than 2 feet. Mapped areas are irregular in shape and range from 4 to 2,000 acres. Access was limited in many places because of water, so observations of this soil were not as detailed as those of other soils. However, the mapping was controlled well enough to make interpretations for the expected uses.

Typically, the surface layer is 16 inches thick. The upper 6 inches is black muck that is about 50 percent mineral material. The lower part is very dark gray mucky fine sandy loam that is slightly fluid. The underlying material to a depth of 78 inches is dark gray loamy sand and very dark gray sandy loam.

The soil ranges from slightly acid to moderately alkaline. The water table is at or near the surface most of the time, and the soil is subject to frequent flooding for very brief periods. The salt concentration ranges from 5 to 35 parts per thousand.

Included with this soil in mapping are some areas of Lafitte and Carteret soils and some very poorly drained, clayey soils in marshes. Also included are a few small areas of Arapahoe, Deloss, and Wasda soils on low marine and stream terraces. The included soils are all very poorly drained. They make up about 15 to 25 percent of this map unit.

Hobucken soil is used mainly for native vegetation that is adapted to extreme wetness, flooding, and exposure to salt. It is not used as cropland or woodland nor for building site development, sanitary facilities, or recreation. Common plants are black needlerush, big cordgrass, sawgrass, saltgrass, eastern baccharis, seashore mallow, smooth cordgrass, marshhay

cordgrass, saltmarsh bulrush, glasswort, marshelder, Atlantic white-cedar, and saltwort. These marshland areas are an important part of the coastal ecology. The marsh plants contribute nutrients to the estuaries benefiting fish and shellfish and provide habitat for wetland wildlife.

This Hobucken soil is in capability subclass VIIIw. It has not been assigned to a woodland group.

KuB—Kureb sand, 0 to 6 percent slopes. This soil is excessively drained. It is on ridges on uplands, and the largest areas are along North Carolina Highway 24 west of Morehead City. Mapped areas are irregular in shape and range from 10 to 300 acres.

Typically, the surface layer is gray sand 4 inches thick. The subsurface layer is light gray uncoated sand to a depth of 19 inches. The subsoil extends to a depth of 42 inches. It is brownish yellow loose sand that has bands and nodules of dark brown and strong brown weakly cemented sand. The underlying material to a depth of 80 inches is yellow sand.

Permeability is rapid, and the available water capacity is very low. The soil ranges from very strongly acid to neutral. The seasonal high water table is more than 6 feet below the surface.

Included with this soil in mapping are small areas of Baymeade, Leon, Mandarin, and Wando soils. The well drained Baymeade soils and excessively drained Wando soils occur at random within the map unit with no apparent change in landscape. The somewhat poorly drained Mandarin soils and poorly drained Leon soils are in depressions or near the edge of the mapped areas. The included soils make up about 15 to 25 percent of this map unit.

Kureb soil is used as native woodland (fig. 13). Longleaf pine is the dominant tree, but some loblolly pine also grow on this soil. The understory includes turkey oak, bluejack oak, scrubby post oak, blackjack oak, and threeawn grass. Droughtiness and very low fertility limit the use of this soil as commercial woodland.

This soil is not used as cropland because of droughtiness and very low fertility.

This soil does not have any major limitations for building site development. Seepage and poor filtering in the subsoil are the main limitations for sanitary facilities. Lawn grasses are difficult to establish because of severe droughtiness and leaching of plant nutrients. Loose sand is the main limitation for recreation uses.

Kureb soil is in capability subclass VIIs and in woodland group 3S.

LF—Lafitte muck, frequently flooded. This soil is nearly level and very poorly drained. It is in marshes adjacent to sounds, bays, rivers, and creeks. The largest areas are in the northeastern part of the county. Elevation is less than 2 feet. The mapped areas are long, and variable in width or very broad and irregular in shape. They range from 10 to more than 10,000 acres. Access was limited in many places because of water, so observations of this soil were not as detailed as those of other soils. However, the mapping was controlled well enough to make interpretations for the expected uses.

Typically, the surface layer is black muck 60 inches thick. In the upper 18 inches, the muck has a dense root mat. The underlying mineral material is greenish gray sandy clay loam to a depth of 72 inches.

The soil ranges from slightly acid to moderately alkaline. The water table is at or near the surface continuously, and the soil is subject to frequent flooding for brief to very long periods. The salt concentration generally ranges from 5 to 30 parts per thousand. Subsidence is a problem if this soil is drained.

Included with this soil in mapping are some areas of a soil that is similar to Lafitte soil except that the organic layer is less than 51 inches thick. This soil occurs at random within the mapped areas with no apparent change in landscape. Small areas of very poorly drained Hobucken and Carteret soils adjacent to uplands, low marine terraces, and higher parts of the islands are also included. The included soils make up about 20 to 30 percent of this map unit.

Lafitte soil is used mainly for native vegetation that is adapted to long periods of wetness, flooding, and exposure to salt. It is not used as cropland or woodland nor for building site development, sanitary facilities, or recreation. Common plants are big cordgrass, sawgrass, seashore mallow, saltgrass, smooth cordgrass, rose mallow, black needlerush (fig. 14), and eastern baccharis. These marshland areas are an important part of the ecology of the estuarine system. The marsh plants contribute nutrients to the estuaries benefiting fish and shellfish and provide habitat for wetland wildlife.

This Lafitte soil is in capability subclass VIIIw. It has not been assigned to a woodland group.

Ln—Leon sand. This soil is nearly level to gently sloping and poorly drained. It is on low ridges and flats and in depressions on uplands, low marine terraces, and islands. The largest areas are in the Croatan National Forest in the western part of the county. Other areas are in the vicinity of Atlantic and Beaufort and on Harkers and Cedar Islands. Mapped areas are long and variable in width, or they are irregular in shape. They range from 5 to 100 acres.

Typically, the surface layer is very dark gray sand 6 inches thick. The subsurface layer is gray sand to a depth of 22 inches. The subsoil extends to a depth of 58 inches. It is black, weakly cemented and brittle sand. The underlying material to a depth of 80 inches is gray sand.

Permeability is rapid in the surface and subsurface layers and moderate to moderately rapid in the weakly cemented subsoil. The available water capacity is low. The soil ranges from extremely acid to strongly acid. The

Figure 13.—Native vegetation of turkey oak and longleaf pine is adapted to the droughty conditions of Kureb sand, 0 to 6 percent slopes.

seasonal high water table is commonly within 1 foot of the surface from November to April. This soil is subject to rare flooding in low-lying areas.

Included with this soil in mapping are small areas of Murville, Mandarin, and Kureb soils. The very poorly drained Murville soils are in depressions, and the excessively drained Kureb soils are on ridges. The somewhat poorly drained Mandarin soils are in slightly higher areas than Leon soil. The included soils make up 10 to 15 percent of this map unit.

This Leon soil is used mainly as woodland. Loblolly pine, longleaf pine, and pond pine are dominant, but scattered water oak, blackgum, and red maple also grow on this soil. Common understory plants are threeawn grass, blueberry, huckleberry, brackenfern, bitter gallberry, large gallberry, fetterbush, waxmyrtle, sassafras, turkey oak, redbay, and sweetbay. Wetness during winter months limits woodland use and management; however, this soil is droughty during the growing season.

This soil is not used as cropland because of wetness during winter and spring, droughtiness in summer, and leaching of plant nutrients. In a few areas, it is used for blueberries and for pasture forages such as coastal bermudagrass.

Seasonal wetness and rare flooding of low-lying areas limit the use of this soil for building site development, sanitary facilities, and recreation. A drainage system

Figure 14.—Black needlerush is the dominant vegetation in this area of Lafitte muck, frequently flooded.

reduces wetness, but the weakly cemented subsoil interferes with the performance of the system, and caving of ditchbanks is a maintenance problem. The hazard of flooding needs to be determined at specific sites before use and management are planned. Droughtiness in summer is a problem in establishing and maintaining lawns and shrubs.

This Leon soil is in capability subclass IVw and in woodland group 4W.

Lu—Leon-Urban land complex. This complex consists of nearly level to gently sloping, poorly drained Leon soil and Urban land at Morehead City, Beaufort, and Atlantic Air Station. A typical mapped area contains about 50 percent Leon soil and 30 to 40 percent Urban land. The areas are irregular in shape and range from 10 to 100 acres.

Typically, Leon soil has a very dark gray sand surface layer 6 inches thick. The subsurface layer is gray sand to a depth of 22 inches. The subsoil extends to a depth of 58 inches. It is black, weakly cemented and brittle sand. The underlying material to a depth of 80 inches is gray sand.

Permeability is rapid in the surface and subsurface layers and moderate to moderately rapid in the weakly cemented subsoil. The available water capacity is low. The soil ranges from extremely acid to strongly acid. The seasonal high water table is commonly within 1 foot of the surface from November to April except in drained areas. This soil is subject to rare flooding in low-lying areas.

Urban land areas are covered with buildings, streets, driveways, parking lots, runways, and military facilities.

Included with this complex in mapping are small cut and fill areas where the natural soil has been altered or covered and the slope has been modified. These areas are commonly adjacent to the Urban land. Small areas of Mandarin soils on ridges and Murville soils in depressions are also included. The included soils make up about 10 to 20 percent of this map unit.

Seasonal wetness and the hazard of rare flooding in low-lying areas are the main limitations. Drainage systems have been installed as development progressed; however, these are inadequate in some places, and wetness persists. The weakly cemented subsoil limits the performance of drainage systems. Droughtiness in the summer is a problem in establishing and maintaining lawns and shrubs.

This complex has not been assigned to a capability subclass nor to a woodland group.

Ly—Lynchburg fine sandy loam. This soil is nearly level and somewhat poorly drained. It is on flats and in depressions on uplands in the western half of the county. Mapped areas are irregular in shape and range from 5 to 150 acres.

Typically, the surface layer is dark grayish brown fine sandy loam 8 inches thick. The subsurface layer is pale brown fine sandy loam to a depth of 14 inches. The subsoil extends to a depth of 65 inches. In the upper part, it is pale brown sandy clay loam that has light brownish gray mottles. It is light brownish gray sandy clay loam in the middle and lower parts. The underlying material to a depth of 80 inches is light brownish gray fine sandy loam, sandy clay loam, and loamy fine sand.

Permeability of the subsoil is moderate, and the available water capacity is moderate. The soil ranges from extremely acid to strongly acid unless lime has been added. The seasonal high water table is 1 foot to 1.5 feet below the surface.

Included with this soil in mapping are small areas of Goldsboro, Onslow, and Rains soils. The moderately well drained Goldsboro and Onslow soils are in slightly higher areas than Lynchburg soil, and the poorly drained Rains soils are in depressions. Also included at random within the mapped areas with no apparent change in landscape are some areas of a soil that is similar to Lynchburg soil except that it has a sandy layer 4 to 5 feet below the surface. The included soils make up 15 to 25 percent of this map unit.

This Lynchburg soil is used mainly as cropland. In a few areas, it is used as pasture or woodland.

In cultivated areas, the principal crops are corn, soybeans, and tobacco. Wetness is the main limitation. Drainage systems include tile and open ditches. Common pasture forages include tall fescue and Ladino clover.

In woodland areas, loblolly pine, red maple, sweetgum, water oak, yellow-poplar, southern red oak, blackgum, white oak, and swamp chestnut oak are dominant. Common understory plants are bitter gallberry, sourwood, flowering dogwood, American holly, waxmyrtle, blueberry, honeysuckle, Virginia creeper, grape, sweet pepperbush, Carolina jessamine, poison-ivy, switchcane, sweetleaf, redbay, sweetbay, and greenbrier. This soil has no major limitations for woodland use and management.

Seasonal wetness is a major limitation to use of this soil for building site development, sanitary facilities, and recreation. Wetness can be reduced by a drainage system that includes tile and open ditches and land grading for surface drainage.

This Lynchburg soil is in capability subclass IIw and in woodland group 9W.

MA—Masontown mucky loam, frequently flooded. This soil is nearly level and very poorly drained. It is on flood plains along streams in the western half of the county. Mapped areas are long, variable in width, and range from 10 to more than 2,000 acres. They are difficult to traverse because of water and dense vegetation, so observations of this soil were not as detailed as those of other soils. However, the mapping was controlled well enough to make interpretations for the expected uses.

Typically, the surface layer is black mucky loam and very dark gray fine sandy loam 32 inches thick. The underlying material to a depth of 80 inches is dark grayish brown loamy sand and grayish brown sand.

This soil ranges from medium acid to mildly alkaline. The seasonal high water table is at or near the surface. This soil floods frequently for long periods.

Included with this soil in mapping are some areas of Hobucken, Dorovan, Arapahoe, Deloss, and Tomotley soils. The Hobucken, Dorovan, Arapahoe, and Deloss soils are very poorly drained, and the Tomotley soils are poorly drained. The Hobucken soils are in small areas of marsh, and the Dorovan soils are in lower areas than Masontown soil. The Arapahoe, Deloss, and Tomotley soils are on slightly higher stream terraces. The included soils make up about 20 to 30 percent of this map unit.

This Masontown soil is used as native woodland (fig. 15). The dominant trees are baldcypress, blackgum, green ash, swamp tupelo, sweetgum, red maple, willow oak, water oak, American elm, and swamp chestnut oak. The understory includes Virginia willow, redbay, poison ivy, greenbrier, lizardstail, black willow, arrowhead, American hornbeam, American holly, sedges, climbing hydrangea, Alabama supplejack, netted chainfern, Pennsylvania smartweed, cattail, royal fern, and cinnamon fern. The wetland areas produce large amounts of food for wetland wildlife and support a wide variety of animal species *(10)*. Tree growth is excellent; however, because of wetness and flooding, management of this soil for timber production is difficult.

This soil is not generally used for crops, building site development, sanitary facilities, or recreation because of wetness and flooding.

This Masontown soil is in capability subclass VIIw and in woodland group 12W.

Mc—Mandarin-Urban land complex. This complex consists of areas of nearly level, somewhat poorly drained Mandarin soil and Urban land at Morehead City and Beaufort. A typical mapped area contains about 50 percent Mandarin soil and 30 to 40 percent Urban land. The mapped areas are long, variable in width, and range from 20 to 350 acres.

Typically, Mandarin soil has a gray sand surface layer 3 inches thick. Below the surface layer is an alternating sequence of subsurface layers that are loose or weakly cemented sand. The first subsurface layer is white loose

Figure 15.—Native vegetation of water-tolerant hardwoods grows well on Masontown mucky loam, frequently flooded.

sand to a depth of 27 inches. The next layer is weakly cemented and brittle, dark brown sand to a depth of 49 inches. The second subsurface layer extends to a depth of 60 inches. It is yellow and yellowish brown loose sand. Below that to a depth of 80 inches, the subsoil is brown and very dark brown, weakly cemented and brittle sand.

Mandarin soil has rapidly permeable surface and subsurface layers and moderately permeable, weakly cemented subsoil. The available water capacity is low. This soil ranges from extremely acid to medium acid in the surface and subsurface layers. The upper part of the subsoil ranges from extremely acid to neutral, and the lower part ranges from medium acid to neutral. The seasonal high water table is 1.5 to 3.5 feet below the surface in undrained areas.

Urban land consists of areas covered with buildings, streets, driveways, and parking lots.

Included with this complex in mapping are small cut and fill areas where the natural soil has been altered or covered and the slope has been modified. These areas are commonly adjacent to the Urban land. Also included are small areas of Kureb and Leon soils. Kureb soils are excessively drained and are on higher parts of ridges than Mandarin soil. Leon soils are poorly drained and are in lower areas. The included soils make up about 10 to 20 percent of this map unit.

Seasonal wetness limits the use of this soil for building site development. Seasonal wetness, poor filtering capacity, and seepage are the main limitations for sanitary facilities. A drainage system reduces wetness; however, ditchbank caving is a maintenance problem. Droughtiness in the summer is a problem in establishing and maintaining lawns and shrubs. The sandy texture is a limitation for recreation uses.

This complex has not been assigned to a capability subclass nor to a woodland group.

Mn—Mandarin sand. This soil is nearly level and somewhat poorly drained. It is on ridges on uplands, low marine terraces, and islands. The largest areas of this soil are in the Croatan National Forest in the western part of the county. Mapped areas are long, variable in width, and range from 5 to 100 acres.

Typically, the surface layer is gray sand 3 inches thick. Below the surface layer is an alternating sequence of subsurface layers that are loose or weakly cemented sand. The first subsurface layer is white loose sand to a depth of 27 inches. The next layer is weakly cemented and brittle, dark brown sand to a depth of 49 inches. The second subsurface layer extends to a depth of 60 inches. It is yellow and yellowish brown loose sand. Below that to a depth of 80 inches, the subsoil is brown and very dark brown, weakly cemented and brittle sand.

Permeability is rapid in the surface and subsurface layers and moderate in the subsoil. The available water capacity is low. The soil ranges from extremely acid to medium acid in the surface and subsurface layers. The upper part of the subsoil ranges from extremely acid to neutral, and the lower part ranges from medium acid to neutral. The seasonal high water table is 1.5 to 3.5 feet below the surface.

Included with this soil in mapping are small areas of Baymeade, Kureb, and Leon soils. The well drained Baymeade soils and the excessively drained Kureb soils are on higher parts of ridges than the Mandarin soil. The poorly drained Leon soils are in slightly lower areas. The included soils make up about 10 to 20 percent of this map unit.

This Mandarin soil is used as native woodland. The dominant tree is longleaf pine, but scattered loblolly pine and live oak also grow. The understory includes threeawn grass, turkey oak, bluejack oak, scrubby post oak, brackenfern, bitter gallberry, dwarf waxmyrtle, blueberry, and greenbrier. Droughtiness and very low fertility limit the use of this soil as commercial woodland.

This soil is not used as cropland because of the very low available water capacity and rapid leaching of plant nutrients.

Seasonal wetness limits the use of this soil for building site development. Seasonal wetness, poor filtering capacity, and seepage are the main limitations for sanitary facilities. A drainage system reduces wetness; however, ditchbank caving is a maintenance problem. Droughtiness in the summer is a problem in establishing lawns and shrubs. The sandy texture is a limitation for recreational uses.

This Mandarin soil is in capability subclass VIs and in woodland group 4S.

Mu—Murville mucky sand. This soil is nearly level and very poorly drained. It is on broad flats and in depressions on uplands, islands, and low marine terraces, locally called pocosins. The largest areas are in the Croatan National Forest in the western part of the county, and other areas are in the vicinity of Atlantic and on Cedar Island. Mapped areas are irregular in shape and range from 10 to more than 5,000 acres.

Typically, the surface layer is black mucky sand 10 inches thick. The subsoil is black and very dark brown, weakly cemented sand to a depth of 61 inches. The underlying material to a depth of 80 inches is very dark grayish brown sand.

Permeability is moderately rapid. The soil ranges from extremely acid to strongly acid. The water table is at or near the surface most of the time, and water ponds frequently for brief to long periods. This soil is subject to rare flooding in low-lying areas.

Included with this soil in mapping are small areas of Torhunta, Arapahoe, Leon, Croatan, and Ponzer soils. The Torhunta, Arapahoe, Croatan, and Ponzer soils are very poorly drained. The Leon soils are poorly drained. The Torhunta and Arapahoe soils occur at random within the map unit with no apparent change in landscape. The Leon soils are in slightly higher areas than Murville soil, and the Croatan and Ponzer soils are in the center of the mapped areas. The included soils make up about 15 to 20 percent of this map unit.

This soil is mostly used as native woodland of species adapted to extreme wetness. The vegetation occurs as two types, "short pocosin" and "tall pocosin." The pattern of pocosin vegetation is determined by such factors as fire, length of periods of saturation, and nutrient availability. The short pocosin type is most common and consists of a dense shrub thicket that has scattered, stunted pond pines (fig. 16). Common plants in the shrub thicket are loblolly-bay, honey cup, fetterbush, waxmyrtle, blueberry, bitter gallberry, large gallberry, huckleberry, redbay, sweetbay, titi, red chokeberry, greenbrier, sphagnum moss, Virginia chainfern, bayberry, sundew, pitcherplant, and sedges. In the tall pocosin type, plant growth is more vigorous. The shrub layer is taller, and trees form a canopy of up to 75 percent. Dominant trees are pond pine, loblolly-bay, red maple, blackgum, sweetbay, and redbay. Wetness is a major limitation in commercial woodland use and management.

Murville soil is generally not used for crops, building site development, sanitary facilities, or recreation because of extreme wetness.

Figure 16.—A natural transition is made between short pocosin vegetation on Murville mucky sand and a pine forest on Leon sand.

This Murville soil is in capability subclass Vw and in woodland group 4W.

Nc—Newhan-Corolla complex, 0 to 30 percent slopes. This complex consists of Newhan soil on dunes and Corolla soil in troughs between the dunes. Newhan soil is excessively drained, and Corolla soil is moderately well drained and somewhat poorly drained. A typical area contains about 60 percent Newhan soil and 35 percent Corolla soil. These soils are on the Outer Banks. Newhan soil is 6 to 35 feet in elevation, and Corolla soil is generally below 10 feet in elevation. Mapped areas are long, variable in width, and range from 10 to 500 acres.

The Newhan soil typically has a light brownish gray fine sand surface layer 2 inches thick. The underlying material to a depth of 80 inches is light gray fine sand and sand.

The Corolla soil typically has a very dark grayish brown and grayish brown fine sand surface layer 10 inches thick. The underlying material to a depth of 80 inches is pale brown and light gray sand.

Permeability is very rapid, and the available water capacity is very low. Newhan soil is neutral or mildly alkaline, and Corolla soil ranges from medium acid to mildly alkaline. The seasonal high water table is 1.5 to 3 feet below the surface in Corolla soil. The Newhan soil does not have a high water table within a depth of 6

feet. The Corolla soil is subject to rare flooding with salt or fresh water. The soils in this map unit are exposed to variable amounts of salt spray depending on proximity to the ocean. Wind erosion is a very severe hazard in areas of Newhan soil that are not protected by vegetation.

Included with these soils in mapping are small areas of Duckston and Fripp soils. The poorly drained Duckston soils are in depressions, and the excessively drained Fripp soils are on small, forested dunes. The included soils make up about 5 percent of this map unit.

The Newhan and Corolla soils are used for native vegetation that varies according to the amount of exposure to salt. The most directly exposed areas are sparsely vegetated with salt-tolerant plants, such as American beachgrass, sea-oats, seaside goldenrod, seacoast bluestem, largeleaf pennywort, bitter panicum, and seashore elder. As exposure to salt decreases, vegetation is more dense. Plants common to these areas are live oak, waxmyrtle, eastern redcedar, bayberry, yaupon holly, peppervine, Virginia creeper, grape, wild olive, eastern baccharis, and greenbrier. Exposure to salt spray causes these plants to have a sheared appearance that is shaped according to contours of adjacent dunes.

These soils are not used as woodland or cropland because of exposure to salt spray, rare flooding with salt water in low-lying areas, and droughtiness. They are used mainly as habitat for coastal wildlife. In some areas, the Newhan soil is being developed for building sites, but the moderately steep to steep slopes and the hazard of wind erosion are limitations.

The Newhan soil is in capability subclass VIIIs, and the Corolla soil is in capability subclass VIIw. These soils have not been assigned to a woodland group.

Nd—Newhan fine sand, dredged, 2 to 30 percent slopes. This soil is excessively drained. It is in areas of dredge spoil deposited on islands, marshes, and low marine terraces mainly along Bogue Sound and the Intracoastal Waterway during construction and maintenance of channels. Mapped areas are irregular in shape and range from 5 to 300 acres.

Typically, the soil is layers of light brownish gray fine sand and light gray fine sand and sand to a depth of 80 inches. Shell fragments are in most layers.

Permeability is very rapid, and the available water capacity is very low. The soil is neutral or mildly alkaline. The seasonal high water table is more than 6 feet below the surface. The elevation ranges from 6 to 20 feet. This soil is exposed to variable amounts of salt spray depending on proximity to the sound. Wind erosion is a very severe hazard in areas unprotected by vegetation.

Included with this soil in mapping are small areas of Carteret, Corolla, and Duckston soils. The Carteret soils are in marshes and are very poorly drained. The moderately well drained and somewhat poorly drained Corolla soils and the poorly drained Duckston soils are below 6 feet in elevation. Also included are some areas of a soil that is similar to the Newhan soil along the Intracoastal Waterway. These areas are in forests. The included soils make up 15 to 30 percent of this map unit.

Most areas of this Newhan soil are in various stages of succession of native plants depending on the age of the deposit and the amount of exposure to salt spray. The most recently deposited areas are bare of vegetation. Older areas that are directly exposed to salt spray are sparsely vegetated with marshhay cordgrass, seacoast bluestem, sea-oats, bitter panicum, largeleaf pennywort, and seaside goldenrod. Common plants in less exposed areas are waxmyrtle, live oak, yaupon holly, eastern redcedar, bayberry, peppervine, Virginia creeper, eastern baccharis, and grape.

This soil is not used as cropland or woodland because of exposure to salt spray, extreme droughtiness, and very rapid leaching of plant nutrients. It is used mainly as habitat for coastal wildlife. In a few areas, it is used for building sites. The main limitations for building site development and sanitary facilities are moderately steep slope in some places, seepage, poor filtering capacity, and wind erosion. Unvegetated areas can be stabilized by planting adapted grasses and shrubs. Development that fits in with the topography of vegetated areas can help maintain stability if site disturbance is minimal. The sandy texture and excessive slope are the main limitations for recreation uses.

This Newhan soil is in capability subclass VIIIs. It has not been assigned to a woodland group.

Ne—Newhan-Urban land complex, 0 to 8 percent slopes. This complex consists of areas of excessively drained Newhan soil and Urban land on Bogue Banks. The largest area is at Atlantic Beach. A typical mapped area consists of about 50 percent Newhan soil and 30 to 40 percent Urban land. Newhan soil is on dune ridges that parallel the ocean. The elevation ranges from 6 to 35 feet. Mapped areas are long, variable in width, and range from 5 to 300 acres.

Typically, Newhan soil has a light brownish gray fine sand surface layer 2 inches thick. The underlying material to a depth of 80 inches is light gray fine sand and sand.

Newhan soil has very rapid permeability, and the available water capacity is very low. This soil is neutral or mildly alkaline. It does not have a high water table within a depth of 6 feet. This soil is exposed to variable amounts of salt spray depending on proximity to the ocean. Wind erosion is a very severe hazard in areas unprotected by vegetation.

Urban land areas are covered with buildings, streets, driveways, and parking lots.

Included with this complex in mapping are small cut and fill areas where the natural soil has been altered or covered and the slope has been modified. These areas are commonly adjacent to the Urban land. Also included

are small areas of the moderately well drained and somewhat poorly drained Corolla soils in small troughs between the dunes. The included soils make up about 10 to 20 percent of this map unit.

Wind erosion, seepage, and the poor filtering capacity limit the use of this Newhan soil for building site development and sanitary facilities. Development should fit in with the natural topography minimizing site disturbance. Wind erosion can be reduced by additional plantings of grasses and shrubs adapted to extreme droughtiness and tolerant of salt spray. The sandy texture is the main limitation for recreation uses.

This complex has not been assigned to a capability subclass nor to a woodland group.

Nh—Newhan fine sand, 2 to 30 percent slopes. This soil is excessively drained. It is on dune ridges that parallel the ocean on the Outer Banks. Mapped areas are long, variable in width, and range from 15 to 500 acres.

Typically, the surface layer is light brownish gray fine sand 2 inches thick. The underlying material to a depth of 80 inches is light gray fine sand and sand that contain shell fragments.

Permeability is very rapid, and the available water capacity is very low. This soil is neutral or mildly alkaline. It does not have a high water table within a depth of 6 feet. The elevation ranges from 6 to 35 feet. The soil is exposed to variable amounts of salt spray depending on proximity to the ocean. Wind erosion is a very severe hazard in areas unprotected by vegetation.

Included with this soil in mapping are small areas of Corolla soils. The Corolla soils are moderately well drained and somewhat poorly drained. They are in small troughs between dunes. Also included are a few areas of dune land that do not have any vegetation. The included soils make up about 10 to 20 percent of this map unit.

This soil is used mainly for native vegetation that is tolerate to extreme droughtiness and salt spray. The most directly exposed areas are sparsley vegetated with salt-tolerant plants, such as American beachgrass, seacoast bluestem, seaside goldenrod, bitter panicum, seashore elder, sea-oats, and largeleaf pennywort. Common plants in more protected areas are waxmyrtle, live oak, yaupon holly, southern redcedar, bayberry, peppervine, Virginia creeper, and grape. Exposure to salt spray causes these plants to have a sheared appearance that is shaped according to the dune contours.

Newhan soil is not used as cropland or woodland because of extreme droughtiness, exposure to salt spray, and very rapid leaching of plant nutrients.

This soil is highly valued for building sites because of its location near the ocean. The main limitations for building site development are moderately steep to steep slopes and the hazard of wind erosion. Although grading can create more favorable slopes for building, this destroys native vegetation and causes severe wind erosion. These dune ridges help stabilize the barrier islands because they provide protection from ocean storms. Development that fits in with the natural topography can maintain stability by minimizing site disturbance. Also, stability can be increased with the use of sand fences (see cover photo) and additional plantings of American beachgrass, bitter panicgrass, or other grasses and shrubs adapted to extreme droughtiness and tolerant of salt spray. The main limitations for sanitary facilities are poor filtering capacity and seepage. The sandy texture and excessive slope are the main limitations for recreation uses.

This Newhan soil is in capability subclass VIIIs. It has not been assigned to a woodland group.

NoA—Norfolk loamy fine sand, 0 to 2 percent slopes. This soil is well drained. It is in slightly convex areas on uplands near drainageways in the western part of the county. Mapped areas are irregular in shape and range from 5 to 25 acres.

Typically, the surface layer is brown loamy fine sand 7 inches thick. The subsurface layer is light yellowish brown loamy fine sand to a depth of 13 inches. The subsoil is sandy clay loam to a depth of 68 inches. It is yellowish brown in the upper part, brownish yellow in the middle part, and in the lower part, it is light yellowish brown with light gray mottles. The underlying material to a depth of 80 inches is light yellowish brown sandy loam that has light gray mottles.

Permeability is moderate, and the available water capacity is moderate. The soil is very strongly acid or strongly acid unless lime has been added. The seasonal high water table is 4 to 6 feet below the surface.

Included with this soil in mapping are small areas of Autryville, Onslow, and Goldsboro soils. The well drained Autryville soils are in slightly higher areas than Norfolk soil, or they are near drainageways. The moderately well drained Onslow and Goldsboro soils are in slightly lower areas. Also included at random within the mapped areas with no apparent change in landscape are some areas of a soil that is similar to Norfolk soil except that it has a sandy layer 4 to 5 feet below the surface. Some areas of wet soils in depressions are shown on the map with a special symbol. These areas are smaller than 4 acres. The included soils make up about 10 to 20 percent of this map unit.

This Norfolk soil is used mainly as cropland. In a few areas, it is used as pasture or woodland.

In cultivated areas, the main crops are tobacco, corn, and soybeans. Common pasture forages include tall fescue, Ladino clover, and coastal bermudagrass.

In woodland areas, loblolly pine, longleaf pine, southern red oak, Shumard oak, hickory, yellow-poplar, blackgum, red maple, sweetgum, white oak, water oak, and post oak are dominant. The understory includes flowering dogwood, sourwood, sweetbay, American holly,

Carolina jessamine, waxmyrtle, Virginia creeper, redbay, poison-ivy, blueberry, grape, partridgeberry, and bitter gallberry. This soil has no major limitations for woodland use and management.

Norfolk soil has no major limitations for building site development and recreation uses. Wetness and seepage are the main limitations for sanitary facilities.

This Norfolk soil is in capability class I and in woodland group 9A.

NoB—Norfolk loamy fine sand, 2 to 6 percent slopes. This soil is well drained. It is on low ridges and side slopes on uplands near drainageways in the western part of the county. Mapped areas are irregular in shape and range from 5 to 100 acres.

Typically, the surface layer is brown loamy fine sand 7 inches thick. The subsurface layer is light yellowish brown loamy fine sand to a depth of 13 inches. The subsoil is sandy clay loam to a depth of 68 inches. It is yellowish brown in the upper part, brownish yellow in the middle part, and in the lower part, it is light yellowish brown with light gray mottles. The underlying material to a depth of 80 inches is light yellowish brown sandy loam that has light gray mottles.

Permeability of the subsoil is moderate, and the available water capacity is moderate. The soil is very strongly acid or strongly acid unless lime has been added. The seasonal high water table is 4 to 6 feet below the surface. Erosion is a moderate hazard in areas not protected by vegetation.

Included with this soil in mapping are small areas of Autryville, Baymeade, and Craven soils. The well drained Autryville and Baymeade soils are in slightly higher areas than Norfolk soil, or they are near drainageways. The moderately well drained Craven soils occur at random within the map unit with no apparent change in landscape. Also included are a few areas of a soil that is similar to Norfolk except that it has a sandy layer 4 to 5 feet below the surface. Some small areas of Norfolk soil that are moderately eroded are in the more sloping parts of this map unit. Areas of wet soils in depressions and short steep slopes beside drainageways are shown on the map with special symbols. The areas of wet soils are smaller than 4 acres. The included soils make up about 15 to 30 percent of this map unit.

This Norfolk soil is used mainly as cropland. In a few areas, it is used as pasture or woodland.

In cultivated areas, tobacco, corn, and soybeans are the major crops. Slope, surface runoff, and susceptibility to erosion are the main limitations. Conservation practices that reduce erosion are needed (fig. 17). Common pasture forages include tall fescue, Ladino clover, and coastal bermudagrass.

In woodland areas, loblolly pine, longleaf pine, southern red oak, Shumard oak, hickory, American beech, yellow-poplar, red maple, blackgum, sweetgum, laurel oak, white oak, post oak, and water oak are dominant. The understory includes flowering dogwood, sourwood, sweetbay, Carolina jessamine, waxmyrtle, redbay, poison-ivy, blueberry, grape, partridgeberry, American holly, Virginia creeper, and bitter gallberry. There are no major limitations for woodland use and management.

Norfolk soil has no major limitations for building site development and recreation uses. Wetness and seepage are the main limitations for sanitary facilities.

This Norfolk soil is in capability subclass IIe and in woodland group 9A.

On—Onslow loamy sand. This soil is nearly level and moderately well drained. It is in slightly convex areas on uplands near drainageways in the western part of the county. Mapped areas are irregular in shape and range from 5 to 200 acres.

Typically, the surface layer is dark grayish brown loamy sand 4 inches thick. The subsurface layer extends to a depth of 11 inches. It is light yellowish brown loamy sand that contains weakly to strongly cemented and brittle, dark brown and strong brown nodules. The subsoil is sandy clay loam. It extends to a depth of 65 inches. It is light yellowish brown in the upper part. In the middle part, it is yellow with light gray mottles, and in the lower part, it is light gray. The underlying material to a depth of 80 inches is light gray loamy sand.

Permeability of the subsoil is moderate, and the available water capacity is moderate. The soil ranges from extremely acid to strongly acid unless lime has been added. The seasonal high water table is 1.5 to 3 feet below the surface.

Included with this soil in mapping are small areas of Baymeade, Goldsboro, Lynchburg, Norfolk, and Craven soils. The well drained Baymeade and Norfolk soils are in slightly higher areas than the Onslow soil. The moderately well drained Goldsboro and Craven soils and the somewhat poorly drained Lynchburg soils occur at random within the map unit with no apparent change in landscape. Also included are some areas of a soil that is similar to Onslow soil except that it has sandy layers 3 to 5 feet below the surface. Some areas of wet soils in depressions are shown on the map with a special symbol. These areas are smaller than 4 acres. The included soils make up about 15 to 25 percent of this map unit.

This Onslow soil is used mainly as woodland. A small acreage is in pasture, and the rest is mainly in cropland.

In woodland areas, loblolly pine, longleaf pine, southern red oak, water oak, sweetgum, red maple, post oak, white oak, yellow-poplar, and blackgum are dominant. The understory includes flowering dogwood, redbay, blueberry, bitter gallberry, sourwood, waxmyrtle, American holly, sweetbay, sweetleaf, sweet pepperbush, Virginia creeper, grape, and Carolina jessamine. There are no major limitations for woodland use and management.

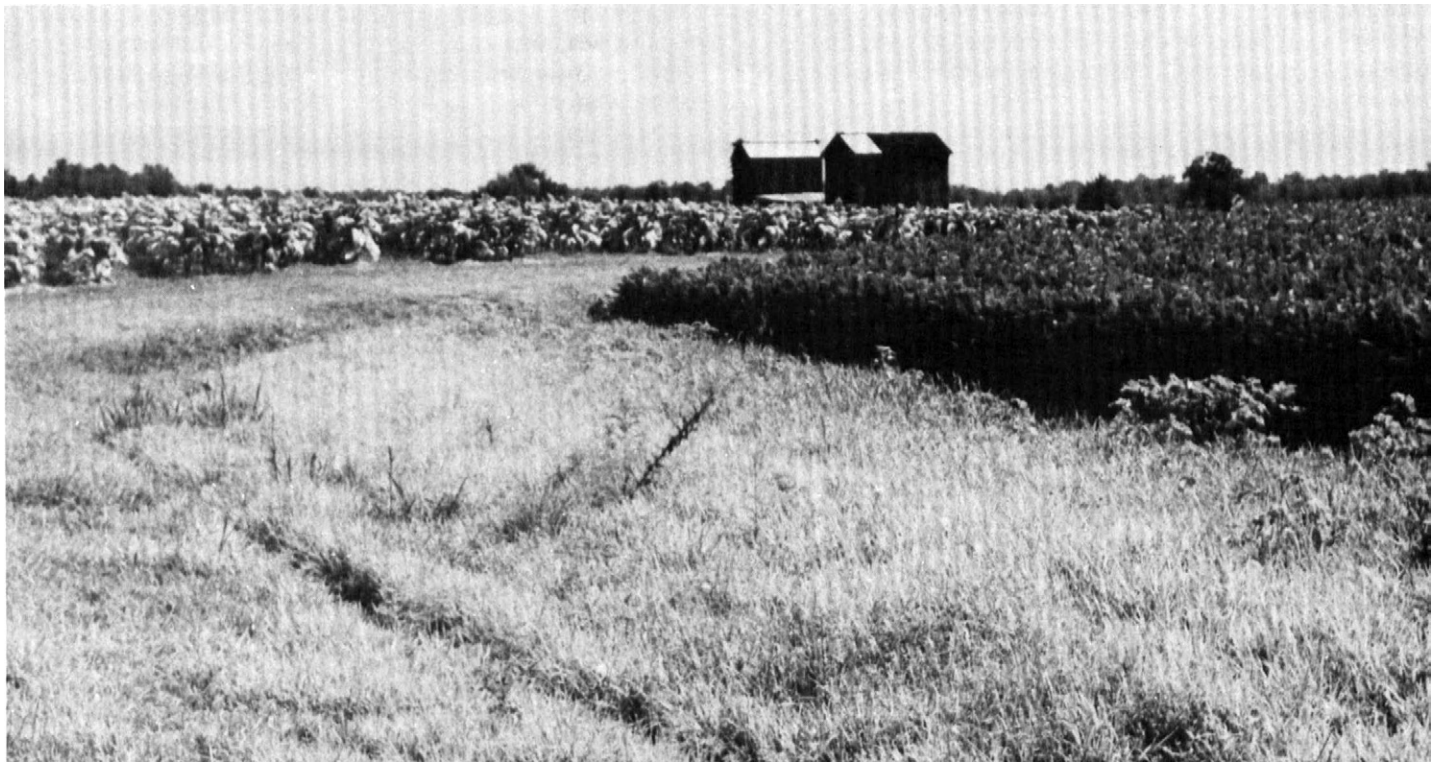

Figure 17.—A grassed waterway helps to control runoff and erosion on Norfolk loamy fine sand, 2 to 6 percent slopes.

In cultivated areas, the main crops are corn, soybeans, and tobacco. Wetness is the main limitation. A drainage system that includes tile and open ditches may be needed, especially where tobacco is grown. Common pasture forages include tall fescue, Ladino clover, and coastal bermudagrass.

Seasonal wetness limits the use of this soil for building site development, sanitary facilities, and recreation. Wetness can be reduced with a drainage system that includes tile and open ditches and land grading for surface drainage.

This Onslow soil is in capability subclass IIw and in woodland group 7A.

Pa—Pantego fine sandy loam. This soil is nearly level and very poorly drained. It is on broad flats and in depressions on uplands. Some of the largest areas are in the Croatan National Forest in the western part of the county. Mapped areas are irregular in shape and range from 5 to more than 2,000 acres.

Typically, the surface layer is black fine sandy loam 14 inches thick. The subsoil extends to a depth of 62 inches. It is gray sandy clay loam in the upper part and gray fine sandy loam in the lower part. The underlying material to a depth of 80 inches is gray loamy sand.

Permeability is moderate. The soil ranges from extremely acid to strongly acid unless lime has been added. The seasonal high water table is at or near the surface. Water ponds in depressions for brief to long periods unless a drainage system has been installed.

Included with this soil in mapping are small areas of Rains and Torhunta soils. The poorly drained Rains soils are in slightly higher areas than Pantego soil. The very poorly drained Torhunta soils and some areas of a soil similar to Pantego except that it has sandy layers 4 to 5 feet below the surface occur at random within the map unit with no apparent change in landscape. The included soils make up about 15 to 25 percent of this map unit.

This Pantego soil is used mainly as woodland. In a few areas, it is used as pasture or cropland.

In woodland areas, loblolly pine, pond pine, water oak, willow oak, swamp chestnut oak, red maple, blackgum, yellow-poplar, and sweetgum are dominant. Hardwoods are dominant in depressions where water ponds for long periods. The understory includes redbay, loblolly-bay, fetterbush, titi, huckleberry, blueberry, sweet pepperbush, Virginia creeper, grape, switchcane, waxmyrtle, bitter gallberry, large gallberry, sweetleaf, sweetbay, bayberry, greenbrier, honeysuckle, poison-ivy, American holly, Virginia chainfern, and cinnamon fern. Trees grow well on this soil; however, wetness causes seedling mortality

and interferes with harvest operations. Areas managed for loblolly pine are generally ditched and bedded. Fertilizer is also used in many plantations.

In cultivated areas, the main crops are corn and soybeans. Wetness is a major limitation. Drainage systems include tile and open ditches and land grading for surface drainage. Suitable drainage outlets can be difficult to develop in depressions. Common pasture forages include tall fescue and Ladino clover.

Seasonal wetness and ponding in depressions limit the use of Pantego soil for building site development, sanitary facilities, and recreation. A few areas have been developed using intensive drainage systems that include tile and open ditches and land grading for surface drainage.

This Pantego soil is in capability subclass IIIw (drained) or VIw (undrained). It is in woodland group 10W.

PO—Ponzer muck. This soil is nearly level and very poorly drained. It is in depressions and on broad flats on low marine terraces in the north-central and east-central parts of the county. These areas are locally known as pocosins, and the largest areas are in the Open Grounds Pocosin. Mapped areas are irregular in shape and range from 20 to more than 5,000 acres. The wooded areas were difficult to traverse because of water and dense vegetation. Therefore, observations of this soil in those places were not as detailed as those of other soils. However, the mapping was controlled well enough to make interpretations for the expected uses.

Typically, the surface layer is black muck 26 inches thick. The upper 10 inches is granular, and the lower part is massive. The underlying mineral soil to a depth of 66 inches is very dark brown mucky fine sandy loam and dark grayish brown sandy clay loam.

Permeability is slow to moderately rapid. The organic soil material is 16 to 51 inches thick and is extremely acid. The underlying mineral soil ranges from extremely acid to mildly alkaline. The high water table is at or near the surface most of the time, and water ponds frequently for very long periods except in drained areas. This soil is also subject to rare flooding. Subsidence is a problem if this soil is drained.

Included with this soil in mapping are small areas of Belhaven, Dare, Deloss, Arapahoe, and Wasda soils. These soils are very poorly drained. The Belhaven and Dare soils are in the center of the mapped areas. The Deloss, Arapahoe, and Wasda soils are near the edge. The included soils make up about 15 to 25 percent of this map unit.

About half of the areas of this Ponzer soil is used as woodland, and the rest is used as cropland.

Ponzer soil has two types of vegetation, "short pocosin" and "tall pocosin." The pattern of pocosin vegetation is determined by such factors as fire, depth of organic matter, length of periods of saturation, and nutrient availability. The short pocosin vegetation is of a dense shrub thicket, 3 to 6 feet tall, that has very scattered, stunted pond pines. This vegetation is typically in the center of the pocosin over the deepest and most waterlogged organic matter. Common plants are titi, loblolly-bay, honey cup, fetterbush, bitter gallberry, large gallberry, huckleberry, redbay, sweetbay, blackgum, red chokeberry, greenbrier, sphagnum moss, Virginia chainfern, sundew, pitcherplant, bayberry, and sedges. The tall pocosin areas are mostly along the pocosin margin where organic accumulation is thinner. Nutrient availability is better because of greater circulation of ground water *(15)* and plant growth is more vigorous than in the center of the pocosin, which has a thicker organic deposit. The shrub layer reaches 10 to 12 feet, and pond pines, 25 to 55 feet tall, form a canopy of up to 75 percent. Loblolly-bay, red maple, sweetbay, redbay, blackgum, sweetgum, and baldcypress are also common. The wetland areas are important escape and cover habitat for a variety of wildlife *(10)*. Extreme wetness, low fertility, and possible ground fires after artificial drainage are major limitations for commercial woodland.

In cultivated areas, this soil has been intensively drained and is used mainly for corn, soybeans, and pasture (fig. 18). The drainage systems include open ditches and grading or "crowning" fields for surface drainage. Other problems are subsidence and possible ground fires after drainage. Subsidence exposes buried logs and wood and requires root raking every few years to permit the use of equipment. The organic material is highly reactive with many pesticides, making pesticides ineffective or effective only at high rates.

Ponzer soil is not used for building site development, sanitary facilities, or recreation because of extreme wetness and the low strength of the organic material.

This Ponzer soil is in capability subclass IVw (drained) or VIIw (undrained). It is in woodland group 6W.

Ra—Rains fine sandy loam. This soil is nearly level and poorly drained. It is on broad flats and in depressions on uplands in the western half of the county. Mapped areas are irregular in shape and range from 5 to more than 1,000 acres.

Typically, the surface layer is black fine sandy loam 8 inches thick. The subsoil extends to a depth of 66 inches. It is gray and light gray sandy clay loam. The underlying material to a depth of 80 inches is gray sandy clay loam and loamy sand.

Permeability of the subsoil is moderate. This soil ranges from extremely acid to strongly acid unless lime has been added. The seasonal high water table is at or near the surface. Water ponds in depressions for brief periods unless a drainage system has been installed.

Included with this soil in mapping are small areas of Lynchburg, Pantego, and Torhunta soils. The somewhat poorly drained Lynchburg soils are in slightly higher areas than Rains soil, and the very poorly drained Pantego and Torhunta soils are in depressions. Also

Figure 18.—Corn is a major crop in areas of Ponzer muck that have been intensively drained.

included at random within the mapped areas with no apparent change in landscape are some areas of soils that are similar to Rains soil except that they have a clayey subsoil or sandy layers 4 to 5 feet below the surface. The included soils make up about 15 to 25 percent of this map unit.

This Rains soil is used mainly as woodland. In a few areas, it is used as pasture or cropland.

In woodland areas, loblolly pine, pond pine, red maple, sweetgum, yellow-poplar, blackgum, water oak, swamp chestnut oak, and willow oak are dominant. The understory includes bitter gallberry, large gallberry, fetterbush, switchcane, sweet pepperbush, greenbrier, sweetleaf, American holly, blueberry, huckleberry, sweetbay, redbay, waxmyrtle, honeysuckle, poison-ivy, Virginia creeper, Virginia chainfern, cinnamon fern, and Carolina jessamine. Wetness is the main limitation for

woodland use and management. Areas managed for loblolly pine benefit from ditching and bedding. Fertilizer is also used in many plantations.

In cultivated areas, the principal crops are corn and soybeans. Wetness is the main limitation. Drainage systems include land grading for surface drainage, open ditches, and tile. Common pasture forages include tall fescue and Ladino clover.

Seasonal wetness limits the use of this soil for building site development, sanitary facilities, and recreation. However, some areas have been developed by using intensive drainage systems that include open ditches and tile and land grading for surface drainage.

This Rains soil is in capability subclass IIIw (drained) or IVw (undrained). It is in woodland group 10W.

Ro—Roanoke loam. This soil is nearly level and poorly drained. It is on broad flats and in depressions on stream and low marine terraces mainly in the north-central and east-central parts of the county. Mapped areas are irregular in shape and range from 10 to 500 acres.

Typically, the surface layer is black loam 8 inches thick. The subsoil extends to a depth of 58 inches. It is gray clay loam in the upper part, gray clay in the middle part, and gray sandy clay loam in the lower part. The underlying material to a depth of 80 inches is gray fine sandy loam.

Permeability is slow, and the shrink-swell potential is moderate. The soil ranges from extremely acid to strongly acid unless lime has been added. The seasonal high water table is at or near the surface. Water ponds in depressions for brief periods. The soil is subject to rare flooding in low-lying areas.

Included with this soil in mapping are small areas of the poorly drained Tomotley soils. Also included are a few areas of a somewhat poorly drained, clayey soil in slightly higher areas than Roanoke soil and a very poorly drained, clayey soil in depressions. The included soils make up about 10 to 20 percent of this map unit.

This Roanoke soil is used mainly as woodland. In a few areas, it is used as pasture or cropland.

In woodland areas, loblolly pine, pond pine, blackgum, sweetgum, water oak, swamp chestnut oak, red maple, yellow-poplar, and willow oak are dominant. The understory includes redbay, sweetbay, American holly, switchcane, sweet pepperbush, greenbrier, waxmyrtle, bitter gallberry, large gallberry, fetterbush, honeysuckle, blueberry, huckleberry, poison-ivy, sweetleaf, grape, Virginia chainfern, cinnamon fern, Virginia creeper, and Carolina jessamine. Wetness is the main limitation. Logging when this soil is wet causes deep ruts, compaction, poor surface drainage, and lower productivity. Areas managed for loblolly pine are generally ditched and bedded. Fertilizer is also being used in some plantations.

In cultivated areas, corn and soybeans are the main crops. Wetness is a major limitation. The slowly permeable subsoil limits internal drainage, so land grading for surface drainage and open ditches are used. Tile is generally not used. Soil structure is destroyed and large clods form if this soil is tiled when wet. This can also result in ponding and a poor seedbed. Common pasture forages include tall fescue and Ladino clover.

Roanoke soil is not commonly used for building site development, sanitary facilities, or recreation because of wetness, moderate shrink-swell potential, slow permeability, the clayey subsoil, and rare flooding of low-lying areas.

This Roanoke soil is in capability subclass IIIw (drained) or IVw (undrained). It is in woodland group 9W.

Se—Seabrook fine sand. This soil is nearly level and moderately well drained. It is in slightly convex areas on stream and low marine terraces mainly in the southern part of the county along Bogue Sound and the White Oak River. Mapped areas are irregular in shape and range from 5 to 150 acres.

Typically, the surface layer is dark grayish brown fine sand 8 inches thick. The underlying material extends to a depth of 80 inches. It is light yellowish brown fine sand in the upper part. In the middle part, it is very pale brown fine sand that has light gray mottles, and it is light gray sand in the lower part.

Permeability is rapid, and the available water capacity is low. The soil ranges from very strongly acid to slightly acid unless lime has been added. The seasonal high water table is 2 to 4 feet below the surface. This soil is subject to rare flooding in low-lying areas. Wind erosion is a hazard in areas not protected by vegetation.

Included with this soil in mapping are small areas of Altavista, Augusta, Conetoe, Leon, and Wando soils. The moderately well drained Altavista soils, the somewhat poorly drained Augusta soils, and the poorly drained Leon soils occur at random within the map unit with no apparent change in landscape. The well drained Wando and Conetoe soils are on low ridges. Some areas of wet soils in depressions are shown on the map with a special symbol. These areas are smaller than 4 acres. The included soils make up about 10 to 15 percent of this map unit.

This Seabrook soil is used mainly as woodland. In a few areas, it is used as pasture or cropland.

In woodland areas, loblolly pine, longleaf pine, red maple, water oak, sweetgum, southern red oak, Shumard oak, blackgum, yellow-poplar, white oak, and willow oak are dominant. The understory includes blueberry, bitter gallberry, redbay, greenbrier, flowering dogwood, turkey oak, blackjack oak, waxmyrtle, sassafras, grape, sweetbay, Virginia creeper, sourwood, sweet pepperbush, and threeawn grass. Droughtiness between rains is the main concern in woodland use and management.

In cultivated areas, the principal crops are corn and soybeans. Watermelons are also grown in a few areas. The main limitations for crops are leaching of plant nutrients during rainy periods and the hazards of droughtiness and wind erosion in dry weather. Blowing sand can damage young plants. A common pasture forage is coastal bermudagrass.

Seasonal wetness, seepage, poor filtering capacity, and rare flooding of low-lying areas limit the use of this soil for building site development and sanitary facilities. Drainage systems including tile and open ditches reduce wetness. Ditches are difficult to maintain because of ditchbank caving. The hazard of flooding needs to be determined before use and management of specific sites are planned. Summer droughtiness is a problem in establishing and maintaining lawns and shrubs. The sandy texture is a limitation for recreation uses.

This Seabrook soil is in capability subclass IIIs and in woodland group 8S.

StA—State loamy fine sand, 0 to 2 percent slopes. This soil is well drained. It is on low ridges on stream and low marine terraces in scattered areas near rivers, creeks, sounds, and bays mainly in the north-central and south-central parts of the county. Mapped areas are irregular in shape and range from 5 to 50 acres.

Typically, the surface layer is brown loamy fine sand 7 inches thick. The subsurface layer is light yellowish brown loamy fine sand to a depth of 11 inches. The subsoil extends to a depth of 46 inches. It is strong brown sandy clay loam in the upper part, yellowish brown sandy clay loam in the middle part, and brownish yellow fine sandy loam in the lower part. The underlying material is brownish yellow loamy fine sand and yellow sand to a depth of 80 inches.

Permeability of the subsoil is moderate, and the available water capacity is moderate. The soil ranges from very strongly acid to medium acid unless lime has been added. The seasonal high water table is 4 to 6 feet below the surface. This soil is subject to rare flooding in low-lying areas.

Included with this soil in mapping are small areas of Conetoe and Altavista soils. The well drained Conetoe soils occur at random within the map unit with no apparent change in landscape. The moderately well drained Altavista soils are in slightly lower areas than State soil. Some areas of wet soils in depressions and sandy soils in higher areas are shown on the map with a special symbol. These areas are smaller than 4 acres. The included soils make up about 10 to 15 percent of this map unit.

This State soil is used mainly as cropland. In a few areas, it is used as pasture or woodland.

In cultivated areas, the main crops are corn, soybeans, and tobacco. There are no major limitations for cultivated crops. Common pasture forages include coastal bermudagrass, tall fescue, and Ladino clover.

In woodland areas, loblolly pine, longleaf pine, southern red oak, Shumard oak, laurel oak, hickory, yellow-poplar, red maple, sweetgum, white oak, water oak, post oak, and blackgum are dominant. The understory includes flowering dogwood, sourwood, sweetbay, redbay, American holly, blueberry, bitter gallberry, partridgeberry, grape, Virginia creeper, waxmyrtle, Carolina jessamine, and poison-ivy. There are no major limitations for woodland use and management.

This soil has no major limitations for building site development and recreation uses except in low-lying areas where the soil is subject to rare flooding. The hazard of flooding needs to be determined before use and management of specific sites is planned. Wetness and seepage are the main limitations for sanitary facilities.

This State soil is in capability class I and in woodland group 10A.

Tm—Tomotley fine sandy loam. This soil is nearly level and poorly drained. It is on broad flats and in depressions on low marine and stream terraces mainly in the north-central and south-central parts of the county. Mapped areas are irregular in shape and range from 5 to 2,000 acres.

Typically, the surface layer is dark gray fine sandy loam 7 inches thick. The subsurface layer is light brownish gray fine sandy loam to a depth of 11 inches. The subsoil extends to a depth of 54 inches. It is light brownish gray fine sandy loam in the upper part and gray sandy clay loam in the middle and lower parts. The underlying material to a depth of 80 inches is gray loamy fine sand.

Permeability of the subsoil is moderate, and the available water capacity is moderate. The soil ranges from extremely acid to strongly acid unless lime has been added. The seasonal high water table is at or near the surface. This soil is subject to rare flooding in low-lying areas. Water ponds in depressions for brief periods unless a drainage system has been installed.

Included with this soil in mapping are small areas of Arapahoe, Augusta, Roanoke, and Deloss soils. The very poorly drained Arapahoe and Deloss soils are in depressions. The somewhat poorly drained Augusta soils are in slightly higher areas than Tomotley soil. The poorly drained Roanoke soils occur at random within the map unit with no apparent change in landscape. The included soils make up about 10 to 20 percent of this map unit.

This Tomotley soil is used mainly as woodland. In a few areas, it is used as pasture or cropland.

In woodland areas, loblolly pine, pond pine, red maple, sweetgum, yellow-poplar, blackgum, water oak, swamp chestnut oak, and willow oak are dominant. The understory includes bitter gallberry, large gallberry, fetterbush, switchcane, sweet pepperbush, greenbrier, sweetleaf, American holly, blueberry, huckleberry,

sweetbay, redbay, waxmyrtle, Virginia creeper, honeysuckle, poison-ivy, Carolina jessamine, Virginia chainfern, and cinnamon fern. Wetness is the main limitation for woodland use and management. Areas managed for loblolly pine benefit from ditching and bedding.

In cultivated areas, the principal crops are corn and soybeans. A small acreage is used for cabbage (fig. 19) and potatoes. Wetness is the main limitation. Drainage systems include open ditches and tile and land grading for surface drainage. Common pasture forages include tall fescue and Ladino clover.

Seasonal wetness and rare flooding of low-lying areas limit the use of this soil for building site development, sanitary facilities, and recreation. However, some areas have been developed using intensive drainage systems that include open ditches and tile and land grading for surface drainage. The hazard of flooding needs to be determined before use and management of specific sites are planned.

This Tomotley soil is in capability subclass IIIw (drained) or IVw (undrained). It is in woodland group 10W.

To—Torhunta mucky fine sandy loam. This soil is nearly level and very poorly drained. It is on broad flats and in depressions on uplands. Some of the largest areas are in Croatan National Forest in the western part of the county. Mapped areas are irregular in shape and range from 5 to 2,000 acres.

Typically, the surface layer is black mucky fine sandy loam and fine sandy loam 20 inches thick. The subsoil is dark grayish brown fine sandy loam to a depth of 33 inches. The underlying material to a depth of 80 inches is light brownish gray fine sandy loam in the upper part and gray loamy sand in the lower part.

Permeability is moderately rapid. This soil ranges from extremely acid to strongly acid unless lime has been added. The seasonal high water table is at or near the surface. Water ponds in depressions for brief to long periods except in drained areas.

Included with this soil in mapping are small areas of Pantego, Murville, Leon, and Rains soils. The very poorly drained Pantego and Murville soils occur at random within the map unit with no apparent change in landscape. The poorly drained Leon and Rains soils are

Figure 19.—Cabbage is grown in this drained area of Tomotley fine sandy loam.

in slightly higher areas than Torhunta soil. The included soils make up about 10 to 20 percent of this map unit.

This Torhunta soil is used mainly as woodland. In a few areas, it is used as pasture or cropland.

In woodland areas, loblolly pine, pond pine, water oak, yellow-poplar, sweetgum, blackgum, swamp chestnut oak, red maple, willow oak, and baldcypress are dominant. Hardwoods dominate in depressions where water ponds for long periods. The understory includes redbay, loblolly-bay, fetterbush, sweet pepperbush, switchcane, waxmyrtle, bayberry, greenbrier, bitter gallberry, large gallberry, sweetleaf, blueberry, huckleberry, Virginia creeper, honeysuckle, poison-ivy, American holly, Virginia chainfern, titi, cinnamon fern, and honey cup. Wetness is the main limitation for commercial woodland use and management. Areas managed for loblolly pine need ditching and bedding (fig. 20). Fertilizer is also used in some plantations.

In cultivated areas, corn and soybeans are the major crops. Wetness is the main limitation. Drainage systems include tile and open ditches and land grading to eliminate depressions where water ponds. Ditch maintenance is difficult because the sandy underlying material causes ditchbank caving. Also, suitable outlets may not be available for drainage of depressions. Common pasture forages include tall fescue and Ladino clover.

Seasonal wetness and ponding in depressions limit the use of Torhunta soil for building site development and sanitary facilities. However, a few areas have been developed using intensive drainage systems that include open ditches and tile and land grading for surface drainage. This soil generally is not used for recreation because of wetness.

This Torhunta soil is in capability subclass IIIw (drained) or IVw (undrained). It is in woodland group 9W.

WaB—Wando fine sand, 0 to 6 percent slopes. This soil is well drained. It is on ridges on low marine and stream terraces mainly in the southern part of the county along Bogue Sound. Mapped areas are irregular in shape and range from 5 to 300 acres.

Figure 20.—This clearcut on Torhunta mucky fine sandy loam will be ditched, bedded, and planted to loblolly pine.

Typically, the surface layer is dark brown fine sand 8 inches thick. The underlying material to a depth of 80 inches is strong brown, yellow, brownish yellow, and reddish yellow fine sand.

Permeability is rapid, and the available water capacity is low. The soil ranges from medium acid to neutral unless lime has been added. The seasonal high water table is more than 5 feet below the surface. Wind erosion is a hazard in areas not protected by vegetation.

Included with this soil in mapping are small areas of Conetoe, Seabrook, and Kureb soils. The well drained Conetoe soils and the excessively drained Kureb soils occur at random within the map unit with no apparent change in landscape. The moderately well drained Seabrook soils are in slightly lower areas than Wando soil. Some areas of wet soils in depressions are shown on the map with a special symbol. These areas are smaller than 4 acres. The included soils make up about 10 to 15 percent of this map unit.

This Wando soil is used mainly as woodland. The rest is mainly in cropland and pasture.

In woodland areas, loblolly pine, longleaf pine, live oak, sweetgum, southern red oak, Shumard oak, post oak, blackjack oak, red maple, and white oak are dominant. The understory includes turkey oak, bluejack oak, sourwood, yaupon holly, sassafras, redbay, blueberry, waxmyrtle, grape, American beautyberry, threeawn grass, and flowering dogwood. Droughtiness is the main concern in commercial woodland.

In cultivated areas, corn and soybeans are the main crops. A small acreage is in watermelons. Droughtiness, leaching of plant nutrients, and wind erosion limit the use of this soil as cropland. A common pasture forage is coastal bermudagrass.

The location of this soil near the coast and its good drainage make it a preferred soil for building site development. However, seepage and poor filtering capacity in the subsoil are limitations for sanitary facilities. Summer droughtiness is a problem in establishing and maintaining lawns and shrubs. The sandy surface layer is a limitation for recreation uses.

This Wando soil is in capability subclass IIIs and in woodland group 6S.

Ws—Wasda muck. This soil is nearly level and very poorly drained. It is on broad flats and in depressions on low marine terraces. The largest areas are in the Open Ground Pocosin in the east-central part of the county. Mapped areas are irregular in shape and range from 20 to 500 acres.

Typically, the surface layer is 31 inches thick. It is black muck in the upper 15 inches and very dark grayish brown loam below that. The subsoil is dark grayish brown clay loam to a depth of 45 inches. The underlying material to a depth of 77 inches is gray sand.

Permeability of the subsoil is moderate. This soil ranges from extremely acid to strongly acid in the organic surface layer unless lime has been added. The mineral layers are very strongly acid or strongly acid in the upper part and medium acid to moderately alkaline in the lower part. The seasonal high water table is at or near the surface. Water frequently ponds for long periods except in drained areas. This soil is also subject to rare flooding. Subsidence can be a problem in drained areas.

Included with this soil in mapping are small areas of the Arapahoe, Belhaven, Deloss, and Ponzer soils. These soils are very poorly drained. The Arapahoe and Deloss soils are in slightly higher areas or on the edge of the areas nearer to drainageways than Wasda soil. The Belhaven and Ponzer soils are in the parts of the mapped areas farthest from drainageways. The included soils make up about 15 to 25 percent of this map unit.

About half of the acreage of this soil is in cropland. In a few areas, this soil is used as pasture or woodland.

In cultivated areas, this soil has been intensively drained and is used mainly for corn and soybeans. The drainage systems include open ditches and land grading for surface drainage. Tile is used in some places. Common pasture forages include tall fescue and Ladino clover.

In woodland areas, pond pine, loblolly pine, blackgum, red maple, sweetgum, and baldcypress are dominant. Hardwoods are dominant in depressions where water ponds for long periods. The understory includes redbay, sweetbay, titi, loblolly-bay, fetterbush, bitter gallberry, large gallberry, greenbrier, huckleberry, blueberry, red chokeberry, sphagnum moss, honey cup, waxmyrtle, bayberry, sundew, pitcherplant, Virginia chainfern, and sedges. Wetness is a major limitation for commercial woodland. Areas managed for loblolly pine are generally ditched, bedded, and fertilized.

Wasda soil is not used for building site development, sanitary facilities, or recreation because of extreme wetness.

This Wasda soil is in capability subclass IIIw (drained) or VIw (undrained). It is in woodland group 10W.

WuB—Wando-Urban land complex, 0 to 6 percent slopes. This complex consists of areas of excessively drained Wando soil and Urban land at Morehead City, Beaufort, and Bogue Air Station. A typical mapped area contains about 50 percent Wando soil and 30 to 40 percent Urban land. The Wando soil is on gently undulating, low ridges on low marine terraces. Mapped areas are irregular in shape and range from 10 to 250 acres.

Typically, Wando soil has a dark brown fine sand surface layer 8 inches thick. The underlying material to a depth of 80 inches is strong brown, yellow, brownish yellow, and reddish yellow fine sand.

Wando soil has rapid permeability and low available water capacity. The soil ranges from medium acid to

neutral unless lime has been added. The seasonal high water table is more than 5 feet below the surface.

Urban land areas are covered with buildings, streets, driveways, and parking lots.

Included with this complex in mapping are small cut and fill areas where the natural soil has been altered or covered and the slope has been modified. These areas are commonly adjacent to the Urban land. Small areas of Conetoe and Seabrook soils are also included. The well drained Conetoe soils occur at random within the map unit with no apparent change in landscape. The moderately well drained Seabrook soils are in slightly lower areas than Wando soil. The included soils make up about 10 to 20 percent of this map unit.

This soil does not have any major limitations for building site development, but seepage and poor filtering capacity are limitations for sanitary facilities. Summer droughtiness is a problem in establishing and maintaining lawns and shrubs. The sandy texture is a limitation for recreation uses.

This complex has not been assigned to a capability subclass nor to a woodland group.

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 providing the Nation's short- and long-range needs for food and fiber. The acreage of high-quality farmland is limited, and the U.S. Department of Agriculture recognizes that government at local, state, and Federal levels, as well as individuals, must encourage and facilitate the wise use of our Nation's prime farmland.

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

Prime farmland soils may presently be in use as cropland, pasture, or woodland, or they may be in other uses. They either are used for producing 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. Public land is land not available for farming in national forests, national parks, military reservations, and state parks.

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

Prime farmland occurs throughout the county on uplands, stream terraces, and low marine terraces near major drainageways. The main crops are soybeans and corn, and a small acreage is in tobacco, potatoes, cabbage, and sorghum.

In some parts of the survey area a recent trend in land use has been the conversion of some prime farmland to urban and industrial uses. The loss of prime farmland to these uses puts pressure on marginal lands, which generally are wet.

The following map units, or soils, make up prime farmland in Carteret 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 are described in the section "Detailed Soil Map Units." This list does not constitute a recommendation for a particular land use.

Soils that have a high water table, are subject to flooding, or are droughty may qualify as prime farmland soils if the limitations or hazards are overcome by drainage, flood control, or irrigation. Onsite evaluation is necessary to determine the effectiveness of corrective measures. More information on the criteria for prime farmland soils can be obtained at the local office of the Soil Conservation Serive.

AaA Altavista loamy fine sand, 0 to 2 percent slopes
CrB Craven loam, 1 to 4 percent slopes
GoA Goldsboro loamy fine sand, 0 to 2 percent slopes
NoA Norfolk loamy fine sand, 0 to 2 percent slopes
NoB Norfolk loamy fine sand, 2 to 6 percent slopes
On Onslow loamy sand
StA State loamy fine sand, 0 to 2 percent slopes

Use and Management of the Soils

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

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

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

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

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

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

Crops and Pasture

Howard Garner, soil conservation technician, and Foy 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.

Over 46,000 acres in Carteret County was used for crops and pasture in 1981, according to the North Carolina Agricultural Extension Service. Of this total, there were 16,200 acres of soybeans, 15,300 acres of corn, 1,100 acres of Irish potatoes double-cropped mainly with soybeans, and 868 acres of tobacco. In 1981, about 13,000 acres was used for pasture and hay. A small acreage is used for small grain, vegetables, fruit, and berries.

Tobacco is commonly grown on soils that have good natural drainage, such as Altavista, Craven, Goldsboro, Norfolk, Onslow, and State soils. Corn and soybeans are also grown on well drained and moderately well drained soils and in artificially drained areas of somewhat poorly drained, poorly drained, and very poorly drained soils. Many of the soils are well suited to small grains and vegetables, fruit, and berries. The latest information on growing these crops can be obtained from local offices of the Agricultural Extension Service and the Soil Conservation Service.

The main pasture forages are coastal bermudagrass on the droughty, sandy Autryville, Baymeade, Conetoe, Seabrook, and Wando soils and a tall fescue and Ladino clover mixture on soils that have adequate available water capacity.

Field Drainage

In Carteret County, wetness is a problem on about 90 percent of the acreage suitable for farming. The design of the drainage systems depends on the soil and the crops to be grown. Only limited artificial drainage is needed on moderately well drained Altavista, Goldsboro, Onslow, and Seabrook soils. The somewhat poorly drained, poorly drained, and very poorly drained soils require more intensive drainage systems. These consist of a system of primary canals, a secondary system of parallel field ditches, or tile drains, or both, and land grading for surface drainage (fig. 21).

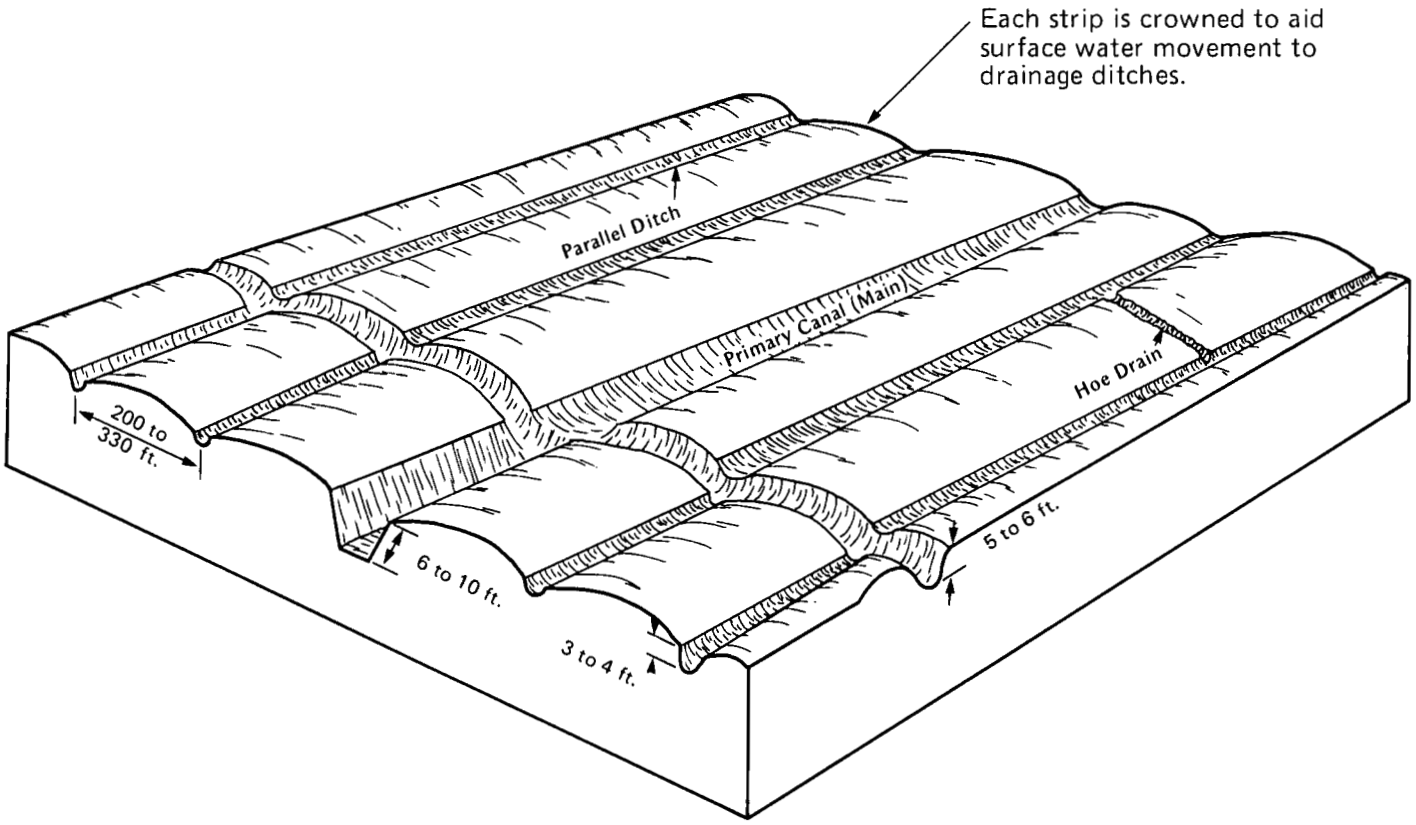

Figure 21.—Artificial drainage systems are commonly used in fields of very poorly drained organic and mineral soils in Carteret County. The distance between ditches varies with the type of soil and the crops to be grown.

The loamy, somewhat poorly drained to very poorly drained Arapahoe, Augusta, Deloss, Lynchburg, Pantego, Rains, Tomotley, Torhunta, and Wasda soils are moderately rapidly permeable or moderately permeable. These soils generally respond well to properly designed surface and subsurface drainage. The field ditches in these soils are commonly 200 to 330 feet apart. Drainage ditches, tile drains, and flashboard risers can be used to control the removal of excess water and subsurface irrigation. By impounding runoff, they also aid in denitrification, which improves water quality. In the wetter soils, the area between the ditches is crowned in the middle to allow excess water to run off. In some fields, water furrows, or hoe drains, are used to carry surface water to the field ditches. Land grading is generally used to fill in low areas or depressions, smooth fields, and make a uniform grade for removing excess rainwater. In areas of Arapahoe and Torhunta soils, the ditches may require frequent maintenance because of ditchbank caving. Ditch depth is limited because unstable banks cause ditches to fill. Seeding ditchbanks with permanent grass helps stabilize the ditches in these soils.

Because subsurface drainage is not as effective on the slowly permeable, clayey Roanoke soils and the organic Belhaven, Croatan, and Ponzer soils, tile drains are generally not used. A system of canals, parallel field ditches, and land grading to crown the fields between ditches is more effective. Timely farming operations on the organic soils are critical because the soils become waterlogged and untrafficable. Organic soils are also subject to subsidence, exposure of buried logs and wood, and possible ground fires after drainage.

Control of Erosion

Control of water and wind erosion is needed on some of the soils in Carteret County. Water erosion is a hazard on the gently sloping Craven and Norfolk soils. Some small and narrow, gently sloping areas of Altavista, Goldsboro, Onlsow, and State soils near drainageways are also susceptible to water erosion. Grassed waterways, field borders, conservation tillage, crop residue management, diversions, close-growing crops in rotations, and a permanent vegetative cover on some soils help control water erosion. A combination of these practices is generally needed if row crops are grown. In areas of the more poorly drained soils, hoe drains can cause an erosion hazard. Drop structures are needed where the hoe drains let out into open ditches to prevent ditchbanks from washing away. Erosion can be reduced in these soils by grading the fields to reduce the number of hoe drains. Reducing erosion improves crop production and water quality and lowers the loss of nutrients.

Autryville, Baymeade, Conetoe, Seabrook, and Wando soils are highly susceptible to wind erosion. These soils are droughty and subject to leaching of plant nutrients. Many of the other soils in the county have a sandy surface layer, and wind erosion can be a problem in large fields. Leaving crop residue on the surface or growing a cover crop until planting time helps conserve moisture and reduces leaching of plant nutrients. Leaving strips of small grain between rows of tobacco reduces sand blowing on newly planted fields. Establishing permanent windbreaks between fields also helps reduce wind erosion.

Soil Fertility

None of the soils in Carteret County have enough natural fertility to produce economic returns on crops. They have a naturally acid surface layer, and lime and fertilizer are required to make them suitable for most crop production.

Liming requirements are a major concern to the farmer because the acidity level in the soil affects the availability of many of the nutrient elements to plants and the activity of beneficial bacteria. Lime counteracts the adverse effects of aluminum on crops grown in the county. Also, calcitic lime provides calcium, and dolomitic lime provides both calcium and magnesium for plant growth.

A soil test is used as a guide to indicate how much and what kind of lime should be used. For example, in soils that have a sandy surface texture, magnesium and available calcium levels may be low. The desired pH levels may differ depending upon the soil properties and the crop to be grown.

Soil testing for predicting nitrogen requirements is not dependable. Appropriate rates depend on the crop and the potential productivity of the soil. For example, nitrogen rates for corn on soils that have a yield of 125 to 150 bushels per acre are 140 to 160 pounds of nitrogen per acre. Where the yield is 100 bushels per acre, the rate is 100 to 120 pounds per acre. Where corn follows soybeans, rates can be reduced by 20 to 30 pounds of nitrogen per acre.

The need for phosphorus and potassium can be predicted from soil tests. In Carteret County, it is important to have a soil test of each field for these nutrients, because phosphorus and potassium tend to build up in the soil.

In areas of native vegetation, the organic Belhaven, Croatan, and Ponzer soils are extremely acid and much lower in natural fertility than most of the mineral soils in the county. Lime is required to reach the pH levels needed for crops after these soils are cleared and drained. However, crops grow well at somewhat lower pH levels in organic soils than in mineral soils. Nitrogen is a constituent of the organic matter, but often the carbon/nitrogen ratio is so high that the nitrogen is unavailable to plants. Therefore, nitrogen fertilizers are needed in organic soils just as in the mineral soils. Potassium and phosphorus initially are low in these soils, and application of these nutrients should be based on soil tests. The organic soils may be deficient in the micronutrient copper. In Carteret County, copper deficiency has occurred in wheat. Each field should be tested to determine if copper should be added.

Chemical Weed Control

The use of herbicides for weed control in crops is a common practice in Carteret County. Successful use results in less tillage and is an intergral part of modern farming. Selected soil properties such as organic matter content and texture of the surface layer affect the rate of herbicide application. Estimates for both of these properties were determined for the soils described in this report. Table 15 shows a general range of organic matter content. The surface texture is shown in table 14 in the USDA texture column.

In some cases, the organic matter content projected for the different soils may range outside that shown in the table 15. Higher ranges may occur in soil areas that have received high amounts of animal or man made waste. Soils currently being brought into cultivation may have higher levels of organic matter content in their surface layer than like soils that have been in cultivation for a long time. Conservation tillage may also increase organic matter content in the surface layer. Lower levels

of organic matter are common in soil areas where the surface layer has been partly or completely removed by erosion, land smoothing, or other activities. Current soil tests need to be used to measure organic matter content before determining required herbicide rates. The lables of herbicides show specific application rates based on organic matter content and soil surface texture.

Rapid leaching of herbicides can damage young plants or prevent normal seed germination in sandy soils that have less than 2 percent organic matter. The effectiveness of herbicides commonly decreases as the organic matter level exceeds 6 to 10 percent. The label for specific herbicides shows the application rates based on organic matter content and surface texture.

Pasture and hayland acreages in Carteret County are mostly planted in coastal bermudagrass, tall fescue, and Ladino clover. Most coastal bermudagrass areas are used as hayland and are predominantly on soils that have a sandy surface layer, such as Autryville, Baymeade, Conetoe, Leon, Seabrook, and Wando soils. Soil test recommendations are needed for initial establishment of coastal bermudagrass, and maintenance of nitrogen, phosphorus, and potassium levels is essential to production. Nitrogen application requires special attention since each cutting of hay removes a significant amount of nitrogen from the soil. A mixture of tall fescue and Ladino clover is used in most of the pastures in the county and is found on soils that have adequate available water capacity, such as Altavista, Arapahoe, Augusta, Belhaven, Craven, Croatan, Deloss, Goldsboro, Lynchburg, Norfolk, Onslow, Pantego, Ponzer, Rains, State, Tomotley, Torhunta, and Wasda soils. Soil test recommendations are needed for establishment of tall fescue or fescue/clover pastures. After a good stand is established, only 1 to 2 tons of lime need to be applied every 3 to 5 years. Since tall fescue makes most of its growth in the spring and fall, fertilizer recommendations generally call for applications of nitrogen in February and again in September for best results. Tall fescue grows very little in hot, dry periods during summer months, so it should not be grazed shorter than 3 inches. Livestock rotation between pastures in the summer is the best management procedure.

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

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

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

Crops other than those shown in table 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 rangeland, for woodland, and for engineering purposes.

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

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

Class I soils have few limitations that restrict their use.

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

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

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

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

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

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

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

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w* or *s* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless a 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); and *s* shows that the soil is limited mainly because it is shallow, droughty, or stony.

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* or *s*.

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

Woodland Management and Productivity

Edwin J. Young, forester, Soil Conservation Service, and Obie Willingham, forester, North Carolina Forest Service, helped prepare this section.

Originally, the area that is now Carteret County was forested, except for the marshes, beaches, and sand dunes. In 1984, commercial forest covered 187,888 acres, or 56 percent of the county. Of this amount, corporate and individual private landowners owned 69,571 acres; Croatan National Forest, 55,937 acres; other public agencies, 6,067 acres; forest products industry, 52,448 acres; and farmers, 3,865 acres.

Forests provide wood products, scenic beauty, wildlife habitat, outdoor recreation, and protection of water quality. Clearing additional land for farming, urban encroachment, and other forest withdrawals continue to reduce the commercial forest acreage. Commercial forest land is capable of economically producing crops of industrial wood.

On the better drained soils, common trees include loblolly pine, longleaf pine, upland oaks, and hickories. Loblolly pine, pond pine, bottomland oaks, sweetgum, blackgum, yellow-poplar, and red maple are common on the more poorly drained soils. Pond pine, redbay, sweetbay, loblolly-bay, and blackgum are common on the soils in pocosins, which are saturated nearly all the time. Baldcypress, swamp tupelo, blackgum, ash, elm, water tupelo, and American hornbeam are common on flood plains and in depressions where water ponds for long periods.

Loblolly pine is an important commercial timber species in Carteret County (fig. 22) because it grows fast, is adapted to the soil and climate, has a high market value, and is easy to establish and manage.

Loblolly pine grows on a wide variety of soils. It grows best on moist soils that have a deep surface layer and a loamy or clayey subsoil. The highest yields are in areas of the poorly drained Rains and Tomotley soils and the very poorly drained Arapahoe, Deloss, Pantego, and Wasda soils that have been ditched and bedded. Water management practices are needed to protect seedlings from ponded water, reduce plant competition, and permit conversion of native stands of pond pine to loblolly pine. Many of the other soils in Carteret County produce good crops of pine, although the yield is lower than that for the soils named above.

Foresters encourage landowners to manage for pine instead of hardwoods on sites suited to pine. Quality pine can be produced more rapidly and in greater volume than quality hardwoods. Prescribed burning reduces hardwood competition, improves wildlife habitat, protects from wildfire, and establishes pine more economically.

Pond pine of non-commercial value mostly grow on the very poorly drained and organic Belhaven, Croatan, Dare, and Ponzer soils in large pocosins. These areas have very poor potential for conversion to loblolly pine because of the difficulty of developing adequate drainage, poor soil fertility, high development cost, possibility of ground fires after drainage, and high possibility of stand failure.

Deep and excessively drained sandy soils, such as the Fripp, Kureb, and Wando soils, have very low site quality. Leon, Mandarin, and Murville soils also have poor site quality because of a weakly cemented pan in the subsoil.

Four forest types have been identified in Carteret County for a forest survey *(24)*. They are loblolly pine, oak-pine, oak-gum-maple, and longleaf pine.

Loblolly pine makes up 94,204 acres. This forest type has more than 50 percent loblolly pine. Pond pine, longleaf pine, southern red oak, water oak, swamp chestnut oak, white oak, willow oak, red maple, hickory, sweetgum, blackgum, and yellow-poplar also grow. The soils range from excessively drained to very poorly drained. A significant acreage of pond pine growing on very poorly drained soils is included in this forest type.

Oak-pine makes up 34,747 acres. Hardwoods are more than 50 percent of this forest type, but pines make up 25 to 50 percent. The hardwood species that grow in the loblolly pine forest type also grow in this forest type. The dominant species vary, depending on soil drainage. This timber type represents a trend toward hardwood

Figure 22.—Loblolly pine logs are used as chip and saw logs and for pulpwood.

dominance where pine management practices have not been applied. The understory generally consists of hardwood seedlings and saplings along with shrubs, which are more tolerant of shade than pines. The soils range from well drained to very poorly drained.

Oak-Gum-Maple makes up 38,166 acres. This forest type consists of hardwood forests on broad interstream flats, in depressions, and on narrow flood plains. The soils are poorly drained or very poorly drained. Water oak, swamp chestnut oak, willow oak, blackgum, red maple, and yellow-poplar are on the flats and in depressions. The flood plains are forested with swamp tupelo, baldcypress, water tupelo, American elm, red maple, green ash, and American hornbeam.

Longleaf pine makes up 20,771 acres. This forest type has more than 50 percent longleaf pines. Lesser amounts of loblolly pine, scattered turkey oak, blackjack oak, post oak, live oak, sweetgum, and blackgum also grow. This forest type is mainly on sandy soils that range from excessively drained to poorly drained.

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

The first tree listed for each soil under the column "Important trees" is the indicator species for that soil. An indicator species is a tree that is common in the area and that is generally the most productive on a given soil.

The first part of the ordination symbol, a number, indicates the potential productivity of a soil for the indicator species in cubic meters per hectare. The larger the number, the greater the potential productivity. Potential productivity is based on the site index and the point where mean annual increment is the greatest.

The second part of the ordination symbol, a letter, indicates the major kind of soil limitation for use and management. The letter *W* indicates a soil in which excessive water, either seasonal or year-round, causes a significant limitation. The letter *S* indicates a dry, sandy soil. The letter *A* indicates a soil that has no significant restrictions or limitations for forest use and management. If a soil has more than one limitation, the priority is as follows: W and S.

Ratings of the *erosion hazard* indicate the probability that damage may occur if site preparation activities or harvesting operations expose the soil. The risk is *slight* if no particular preventive measures are needed under ordinary conditions; *moderate* if erosion control measures are needed for particular silvicultural activities; and *severe* if special precautions are needed to control erosion for most silvicultural activities. Ratings of *moderate* or *severe* indicate the need for construction of higher standard roads, additional maintenance of roads, additional care in planning of harvesting and reforestation operations, or use of specialized equipment.

Ratings of *equipment limitation* indicate limits on the use of forest management equipment, year-round or seasonal, because of such soil characteristics as 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 must be used. On the steepest slopes, even tracked equipment cannot operate; 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 steep enough that wheeled equipment cannot be operated safely across the slope, if soil wetness restricts equipment use from 2 to 6 months per year, if stoniness restricts ground-based equipment, or if special equipment is needed to avoid or reduce soil compaction. The rating is *severe* if slopes are steep enough that tracked equipment cannot be operated safely across the slope, if soil wetness restricts equipment use for more than 6 months per year, if stoniness restricts ground-based equipment, or if special equipment is needed to avoid or reduce soil compaction. Ratings of *moderate* or *severe* indicate a need to choose the most suitable equipment and to carefully plan the timing of harvesting and other management operations.

Ratings of *seedling mortality* refer to the probability of death of naturally occurring or properly planted seedlings of good stock in periods of normal rainfall as influenced by kinds of soil or topographic features. *Seedling mortality* is caused primarily by too much water or too little water. The factors used in rating a soil for seedling mortality are texture of the surface layer, depth and duration of the water table, rock fragments in the surface layer, rooting depth, and the aspect of the slope. Mortality generally is greatest on soils that have a sandy or clayey surface layer. The risk is *slight* if, after site preparation, expected mortality is less than 25 percent; *moderate* if expected mortality is between 25 and 50 percent; and *severe* if expected mortality exceeds 50 percent. Ratings of *moderate* or *severe* indicate that it may be necessary to use containerized or larger than usual planting stock or to make special site preparations, such as bedding, furrowing, installing surface drainage, or providing artificial shade for seedings. 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*. 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. Site index values shown in table 7 are based on measurements at selected sites in Carteret County or other counties, or both, and the use of published site index curves *(3, 4, 5, 6, 11, 19, 21)*. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

The soils that are commonly used to produce timber have the yield predicted in the Productivity column of table 6 and given as cubic feet per acre per year. Cubic feet per acre can be converted to board feet per acre by multiplying by a factor of about 5. They yield is predicted at the point where mean annual increment culminates.

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

Recreation

In table 8, the soils of the survey area are rated according to the limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the

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

In table 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 gentle slopes and are not wet or subject to flooding during the period of use. The surface absorbs rainfall readily but remains firm and is not dusty when dry. Strong slopes can greatly increase the cost of constructing campsites.

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

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is firm after rains and is not dusty when dry.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, are not subject to flooding more than once a year during the period of use, and have moderate slopes.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, are not subject to prolonged flooding during the period of use, and have moderate slopes. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

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

Wildlife is related to soils through a direct relationship with plants. Wildlife species are associated with given types of plant communities that are directly related to particular kinds of soils. Proper management of soil, water, and plants to produce suitable habitat effectively maintains and improves wildlife populations.

The soils of Carteret County produce a wide variety of plants that provide food, cover, and protection for wildlife. Upland species, such as squirrel, rabbit, fox, mourning dove, and many species of songbirds, are abundant. Deer are plentiful throughout the county, and a small number of black bear are in the more remote areas. Furbearers, such as raccoon, muskrat, mink, otter, and opossum, are also abundant. Because of the large acreage of marshes and water and the hundreds of miles of shoreline, many species of waterfowl are in the county.

The better drained, productive soils in the county are largely in farmland. Many fields are small and provide good edge habitat for such species as quail, rabbit, and dove. Other species, such as deer, hawks, and many species of songbirds, are also attracted to these areas. Food, nesting cover, brood areas, and resting cover are primary habitat elements that are provided by land use patterns associated with these soils. Areas which have not been cleared generally support good woodland habitat of mixed oaks and pine. The Altavista, Augusta, Conetoe, Craven, Goldsboro, Lynchburg, Norfolk, Onslow, Seabrook, and State soils are in this group.

One group of soils in Carteret County is characterized by open stands of pine with sparse to moderate understory and a ground layer cover of wiregrass. The dominant soils are Baymeade, Kureb, Leon, and Mandarin soils. A large acreage is in the Croatan National Forest in the western part of the county. This group has low plant diversity and few, if any, oaks other than scrub oaks. These areas are the prime habitat for an endangered species, the red-cockaded woodpecker.

Wet soils make up a large acreage within the county. The vegetative community on a given site of these wet soils varies greatly depending largely on the depth and duration of flooding, ponding, or the degree of wetness, or a combination of these factors. The vegetative community directly influences the wildlife species present.

Most of the acreage of wet soils in the county are in large blocks. Some of these blocks are being cleared, drained, and converted to cropland, while many others are being clearcut, drained, and planted to loblolly pine. The wet soils are mainly Arapahoe, Belhaven, Deloss,

Pantego, Ponzer, Rains, Tomotley, Torhunta, and Wasda soils.

The drainage and resultant change in land use or vegetative community, or both, often determine the type and quality of wildlife habitat on a given site. Edge habitat is at a minimum where large fields occur, so small game habitat is generally poor. Also, populations of deer and bear have been affected by direct loss of escape cover as the woodland was cleared. Wildlife habitat can be improved in these areas by using field borders, field windbreaks, conservation tillage, and shelterbelts.

Other wet soils on which little clearing or drainage has been done are on flood plains and in depressions, pocosins, and marshes.

The Arapahoe, Dorovan, Masontown, Roanoke, and Wasda soils on flood plains and in some wet depressions are mainly in forests of green ash, red maple, blackgum, baldcypress, swamp tupelo, and other water-tolerant hardwoods. These areas provide excellent wildlife habitat.

Some large blocks of the very poorly drained Belhaven, Croatan, Dare, Murville, Ponzer, and Wasda soils are in pocosins. Although the carrying capacity for black bear, deer, and other wildlife is not high, these areas serve as escape and cover habitat *(10)*. Large pocosins are in Croatan National Forest and in the Open Grounds. However, much of the Open Grounds has been cleared for farming.

A large acreage of salt marsh is in the county, especially in the eastern part and on the Outer Banks. The Carteret, Hobucken, and Lafitte soils in these marshes serve an important role in the ecology of the county's estuarine waters. The marsh plants contribute nutrients benefiting fish and shellfish to the estuaries and provide habitat for waterfowl and other wetland wildlife. A large acreage of marsh on Cedar Island is in a national waterfowl refuge. Also, a number of impoundments have been constructed on privately-owned marshes for waterfowl management.

The Outer Banks is highly diverse in habitat for coastal wildlife. The habitats include ocean beaches, sparsely vegetated sand dunes, dense shrub thickets, pine forests, and salt marshes.

Carteret County has extensive acreage of estuarine water that serves as fish and shellfish habitat. The county's location next to the Atlantic Ocean provides access to a rich marine habitat suitable for both commercial fishing and sport fishing.

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, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

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

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

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, the available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, 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, spruce, fir, 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, and slope. Examples of wetland plants are smartweed, wild millet, saltgrass, cordgrass, rushes, sedges, and canes.

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

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

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

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include woodpeckers, squirrels, 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, otter, mink, and beaver.

Engineering

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

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

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

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

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, 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 recreational 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 a weakly cemented pan or a very firm dense layer, soil texture, and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to a weakly 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 to 6 feet are not considered.

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

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to a weakly 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, 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 that good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

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

The health department in Carteret County administers a program of site evaluation and issues permits for installation of septic tanks and absorption fields. Sanitarians evaluate each site and determine its suitability for waste disposal using criteria adopted by the state of North Carolina. These criteria differ from those used to rate the soils in table 11. Individuals who are considering an onsite waste disposal system should contact the Carteret County Health Department in Beaufort.

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

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

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

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

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

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

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

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

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

Construction Materials

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

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

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

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

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

more than 10, a high shrink-swell potential, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

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

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

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

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

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

Soils rated *good* have friable, loamy material to a depth of at least 40 inches, and slopes are 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 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 soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and releases a variety of plant available 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 ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

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

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

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

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

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

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

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 a weakly cemented layer 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 a weakly cemented layer, slope, and the hazard of cutbanks caving. The productivity of some soils after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope and wetness affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

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

Soil Properties

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

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

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

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

Engineering Index Properties

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

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

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. 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 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, or component, consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They influence the soil's adsorption of cations, moisture retention, shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3 bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

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

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage in each major soil layer is stated in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time, but rather the ability of the soil to store water. Higher volumes indicate longer rain-free periods that can occur before plants wilt.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur 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 of a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops. Some organic soils have a high carbon to nitrogen ratio and are not effective sources of nitrogen.

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 are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

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

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

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

Group A/D. A dual hydrologic group is given for certain wet, sandy soils that have a thin infiltration rate if drained. The first letter applies to the drained condition, and the second letter applies to the undrained condition.

Group B/D. A dual hydrologic group is given for certain wet soils that can be adequately drained. The first letter applies to the drained condition, and the second letter applies to the undrained condition.

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

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

Frequency, duration, and probable dates of occurrence are estimated. Frequency generally is expressed as *none, rare, occasional,* or *frequent. None* means that flooding is not probable. *Rare* means that flooding is unlikely but possible under unusual weather conditions (there is a near 0 to 5 percent chance of flooding in any year). *Occasional* means that flooding occurs infrequently under normal weather conditions (there is a 5 to 50 percent chance of flooding in any year). *Frequent* means that flooding occurs often under normal weather conditions (there is more than a 50 percent chance of flooding in any year). *common* is used when classification as occasional or frequent does not affect interpretations. Duration is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 days to 1 month), and *very long* (more than 1 month). The time of year that floods are most likely to occur is expressed in months. November-May, for example, means that flooding can occur during the period November through May. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information on flooding is based on evidence in the soil profile, namely, thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons, which are characteristic of soils that are not subject to flooding.

Also considered 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.

The two numbers in the "High water table-Depth" column indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. "More than 6.0" indicates that the water table is below a depth of 6 feet or that the water table exists for less than a month.

Subsidence is the settlement of organic soils or of saturated mineral soils of very low density. Subsidence results from either desiccation and shrinkage or oxidation of organic material, or both, following drainage. Subsidence takes place gradually, usually over a period of several years. Table 16 shows the expected initial subsidence, which usually is a result of drainage, and total subsidence, which results from a combination of factors.

Not shown in the table is subsidence caused by an imposed surface load or by the withdrawal of ground water throughout an extensive area as a result of lowering the water table.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severely corrosive environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

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

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

Engineering Index Test Data

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

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

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

Formation of the Soils

This section discusses the factors of soil formation and relates them to the soils in the survey area.

Factors of Soil Formation

Soil is the product of the combined effects of parent material, climate, plant and animal life, time, and relief. These five factors determine the characteristics of the soil in any of the natural soil bodies. 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 part of the soil to another; and transformation of mineral and organic substances within the soil *(14)*.

Parent Material

Parent material has been a factor in the formation of the soils of Carteret County. It has caused differences in such characteristics as thickness and texture of horizons, mineral makeup, amount and thickness of organic matter, and chemistry of the soil.

The soils in Carteret County formed in surficial sediment of the Talbot and Pamlico marine terraces (Talbot and Pamlico Surfaces), alluvium recently deposited in drainageways, accumulation of organic material on the broad undissected interstream areas and in drainageways and marshes, and sand deposited by wind and waves on barrier islands of the Outer Banks.

The kinds of parent material, although related, differ in mineral and chemical composition. Many differences in the soils of Carteret County are attributed to the parent material in which the soils formed. The soils in Carteret County are grouped as follows, according to the parent material in which they formed.

Altavista, Augusta, Deloss, Goldsboro, Lynchburg, Norfolk, Onslow, Pantego, Rains, State, Tomotley, and Wasda soils formed in moderately fine textured sediment.

Arapahoe, Autryville, Baymeade, Conetoe, Hobucken, Masontown, and Torhunta soils formed in moderately coarse textured sediment.

Carteret, Corolla, Duckston, Fripp, Kureb, Leon, Mandarin, Murville, Newhan, Seabrook, and Wando soils formed in coarse textured sediment.

Craven and Roanoke soils formed in fine textured sediment.

Belhaven, Croatan, Dare, Dorovan, Lafitte, and Ponzer soils formed in an accumulation of organic matter in wet areas.

Climate

Climate helps to determine which kinds of plants and animals live in and on the soil. The climate of Carteret County is warm and humid, with long, hot summers and short, mild winters. Except in continuously saturated soil, mild temperatures and abundant rainfall promote rapid decomposition of organic matter, hasten chemical reactions, speed leaching of soluble bases, and increase translocation of the less soluble fine particles in the soil profile *(16)*. Consequently, the soils, except for those that are flooded with salt water or exposed to salt spray, are acid, strongly leached, and low in natural fertility. Most of the soils have a higher content of clay in the B horizon than in the A or C horizons, except for those soils that formed in sand and recent alluvium.

Plant and Animal Life

Plants and animals determine the kind of organic matter and the way it is incorporated into the soil. Pine forests cover most of the dissected uplands in Carteret County. Pond pine and shrubs cover the undissected interstream areas. Baldcypress, green ash, blackgum, sweetgum, and other hardwoods predominate on the flood plains. Plants such as black needlerush, smooth cordgrass, and saltgrass are in the salt marshes. The Outer Banks has native vegetation that varies according to the amount of exposure to salt. Soils have not formed on the beaches because salt concentrations are too high for plant growth. Dune ridges that are directly exposed to salt spray are sparsely vegetated with salt-tolerant plants that can live in extremely droughty conditions. Examples are American beachgrass, seacoast bluestem, largeleaf pennywort, and sea-oats. Live oak, southern redcedar, bayberry, wild olive, peppervine, and eastern baccharis are common plants as exposure to salt decreases. The salt spray causes these plants to have a sheared appearance. Areas on the Outer Banks not affected by salt spray are in pine forests.

Plant roots bring nutrients from the lower horizons to the higher horizons and aid development of soil structure and porosity. Animals transfer soil particles from one horizon to another. Both plants and animals add organic

matter. This organic matter is considered the energy source for the biological activity in which micro-organisms consume oxygen in a saturated A horizon. The micro-organisms can reduce the oxygen level of the ground water, and the resulting anaerobic conditions can exist for several days or even weeks. Saturation and anaerobic conditions reduce and make soluble the red and yellow iron compounds in soil. Leaching of iron results in the gray subsoil in the poorly drained soils. Saturation retards oxidation of organic matter and contributes to the development of organic soil.

Time

The horizons in a soil profile take a long time to develop. Relief changes with time. Some of the differences in the soils in Carteret County reflect a difference in age and changes in relief because of natural or geologic erosion. Older soils, such as Goldsboro, Lynchburg, and Rains soils in the nearly level upland areas, have well developed horizons and a thick profile. By contrast, younger soils, such as Carteret soils in marshes, have almost no horizon development, and Altavista, Conetoe, and Tomotley soils on low marine terraces have well developed horizons but only a thin profile. The younger soils also contain a higher percentage of weatherable minerals than soils on the older uplands.

Relief

The relief in Carteret County largely results from dissection of parts of the original nearly level landscape by rivers and creeks extending inland from the sounds and bays, or of wind and wave action on sand deposits along previous or present shorelines. The degree of dissection and relief caused by wind and waves affects the formation of the soils by influencing the depth to the water table and the geologic removal of soil material by slope retreat.

The soils near drainageways and on ridges are moderately well drained to excessively drained. The seasonal high water table ranges from 2 feet to more than 6 feet. Loamy soils, such as the Altavista, Autryville, Baymeade, Conetoe, Goldsboro, Norfolk, Onslow, and State soils, have a light color A horizon or Ap horizon, a thick E horizon, and a brightly colored Bt horizon. Sandy soils on the higher parts of ridges that have a light color A or Ap horizon and a C horizon ranging from brightly colored to white are the Fripp, Kureb, Newhan, Seabrook, and Wando soils. Corolla and Mandarin soils are somewhat wetter and sandy. They are in slightly lower areas.

The soils that are in broad, nearly level interstream areas and in depressions are somewhat poorly drained to very poorly drained. The seasonal high water table is at or near the surface. Arapahoe, Augusta, Deloss, Lynchburg, Pantego, Rains, Tomotley, Torhunta, and Wasda soils are loamy and have a dark color A or Ap horizon, a gray Btg or Bg horizon, and a gray Cg horizon. Duckston, Leon, and Murville soils are sandy and have a dark color A horizon and a grayish Cg horizon. Many of these sandy soils also have a weakly cemented Bh horizon.

The largest interstream areas have an accumulation of organic matter in the most undissected part. Here, the rainfall exceeds both evapotranspiration and the slow overland flow of water to the distant drainageways. The organic litter from each year's growth decomposes more slowly than it is produced. The organic Belhaven, Croatan, Dare, and Ponzer soils are in these areas.

Carteret, Dorovan, Hobucken, Lafitte, and Masontown soils on flood plains and in marshes are in the lowest positions in Carteret County. These soils are very poorly drained. They are flooded frequently with fresh or salt water and have a dark color A or O horizon and a grayish Cg horizon.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(22)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or on laboratory measurements. Table 18 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

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

SUBORDER. Each order is divided into suborders, primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is 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 excessive development, 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. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, 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. The Rains series is an example and is classified as fine-loamy, siliceous, thermic Typic Paleaquults.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The location of this pedon 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 (22)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

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

Altavista Series

The Altavista series consists of moderately well drained soils on low marine and stream terraces. These soils formed in moderately fine textured sediment. Slope ranges from 0 to 2 percent.

Typical pedon of Altavista loamy fine sand, 0 to 2 percent slopes; at Merrimon, 1.25 miles northwest of the junction of State Road 1318 and State Road 1321, and 30 feet east of State Road 1321:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) loamy fine sand; weak medium granular structure; very friable; common fine roots; neutral; abrupt smooth boundary.
E—8 to 14 inches; light yellowish brown (2.5Y 6/4) loamy fine sand; weak medium granular structure; very friable; few fine roots; slightly acid; abrupt wavy boundary.
Bt1—14 to 27 inches; yellowish brown (10YR 5/6) sandy clay loam; common fine and medium faint strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; common fine pores; very strongly acid; clear wavy boundary.
Bt2—27 to 33 inches; brownish yellow (10YR 6/6) sandy clay loam; common fine and medium faint yellowish brown (10YR 5/6) mottles and common medium distinct light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine pores; very strongly acid; gradual wavy boundary.
BC—33 to 55 inches; light yellowish brown (2.5Y 6/4) fine sandy loam; common medium distinct light gray (10YR 7/2) and yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; very friable; common lenses of sandy clay loam; very strongly acid; gradual wavy boundary.
C—55 to 72 inches; light yellowish brown (2.5Y 6/4) fine sandy loam; common medium distinct gray (10YR 6/1) and yellowish brown (10YR 5/6) mottles; massive; very friable; few lenses of sandy clay loam; very strongly acid.

The A, E, and B horizons are 38 to 65 inches thick. Reaction ranges from very strongly acid to medium acid throughout unless lime has been added.

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

The E horizon has hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 3 or 4.

The Bt horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 3 to 8; or it has hue of 7.5YR, value of 5 or 6, and chroma of 6 or 8. In some pedons, mottles that have chroma of 1 or 2 are within the upper 24 inches of the Bt horizon. In some pedons, the lower part of the Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2. The Bt horizon is commonly sandy clay loam or clay loam but ranges from clay loam to sandy loam and fine sandy loam.

The C horizon has hue of 10YR or 2.5Y, value of 6 to 8, and chroma of 1 to 4. It is sandy or loamy sediment.

Arapahoe Series

The Arapahoe series consists of very poorly drained soils on low marine and stream terraces. These soils formed in moderately coarse textured sediment. Slope ranges from 0 to 2 percent.

Typical pedon of Arapahoe fine sandy loam; 1.8 miles north of Beaufort on North Carolina Highway 101, 0.6 mile east on a farm path, and 300 feet north of the path:

Ap—0 to 14 inches; black (10YR 2/1) fine sandy loam; weak medium granular structure; very friable; many fine roots; slightly acid; clear wavy boundary.
A—14 to 23 inches; very dark gray (10YR 3/1) fine sandy loam; weak medium granular structure; very friable; common fine roots; strongly acid; clear wavy boundary.
Bg—23 to 36 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak medium subangular blocky structure; very friable; few fine roots; strongly acid; clear wavy boundary.
Cg1—36 to 54 inches; light brownish gray (2.5Y 6/2) loamy sand; massive; very friable; medium acid; gradual wavy boundary.
Cg2—54 to 72 inches; light brownish gray (2.5Y 6/2) sand; single grained; loose; medium acid.

The A and Bg horizons are 24 to 60 inches thick. Reaction of the surface layer and the subsoil ranges from extremely acid to strongly acid unless lime has been added. The underlying material ranges from medium acid to mildly alkaline.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2; or it is neutral and has value of 2 or 3. It is 10 to 24 inches thick.

The Bg horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 or 2. It is fine sandy loam, sandy loam, or loam.

The Cg horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2; or it has hue of 5GY, 5G, or 5BG, value of 4 or 5, and chroma of 1. The Cg horizon is sandy or loamy sediment.

Augusta Series

The Augusta series consists of somewhat poorly drained soils on low marine and stream terraces. These soils formed in moderately fine textured sediment. Slope ranges from 0 to 2 percent.

Typical pedon of Augusta loamy fine sand; 8 miles north of Beaufort to the junction of North Carolina Highway 101 and State Road 1160, 1 mile southwest on State Road 1160, and 30 feet northwest of the road:

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) loamy fine sand; weak medium granular structure; very friable; few weakly cemented brown (7.5YR 4/4) nodules up to 0.5 inch in diameter; common fine and medium roots; very strongly acid; clear wavy boundary.
E—7 to 10 inches; light yellowish brown (10YR 6/4) loamy fine sand; common fine and medium distinct strong brown (7.5YR 5/6) mottles and few fine and

medium distinct light brownish gray (2.5Y 6/2) mottles; weak medium granular structure; very friable; few fine roots; very strongly acid; clear wavy boundary.

Bt—10 to 16 inches; light yellowish brown (10YR 6/4) sandy clay loam; common fine and medium distinct light brownish gray (2.5Y 6/2) mottles and few medium distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; common fine pores; very strongly acid; clear wavy boundary.

Btg—16 to 36 inches; light brownish gray (2.5Y 6/2) sandy clay loam; common medium distinct yellowish brown (10YR 5/8) and light yellowish brown (10YR 6/4) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; common fine pores; very strongly acid; gradual wavy boundary.

BCg—36 to 55 inches; light brownish gray (2.5Y 6/2) fine sandy loam, lenses and pockets of sandy clay loam; common medium distinct brownish yellow (10YR 6/8) mottles; weak medium and coarse subangular blocky structure; very friable; very strongly acid; gradual wavy boundary.

Cg—55 to 80 inches; light gray (10YR 7/1) stratified fine sandy loam and loamy fine sand; common medium faint light yellowish brown (10YR 6/4) mottles; massive; very friable; very strongly acid.

The A, E, and B horizons are 40 to 60 inches thick. Reaction ranges from very strongly acid to medium acid throughout unless lime has been added.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 1 or 2.

The E horizon has hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 2 to 4.

The Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 to 6. Some pedons do not have a Bt horizon. The Btg horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. This horizon begins within a depth of 20 inches. It has common or many mottles in shades of red, yellow, brown, and gray. The Bt and Btg horizons are sandy clay loam or clay loam.

The Cg horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2; or it is neutral and has value of 5 to 7. The Cg horizon is stratified sandy or loamy sediment.

Autryville Series

The Autryville series consists of well drained soils on uplands. These soils formed in moderately coarse textured sediment. Slope ranges from 0 to 6 percent.

Typical pedon of Autryville loamy fine sand, 0 to 6 percent slopes; 1.3 miles southeast of Kuhns on North Carolina Highway 58, 500 feet north on a farm path, and 25 feet east of the path:

A—0 to 6 inches; brown (10YR 5/3) loamy fine sand; weak fine and medium granular structure; very friable; common fine and medium roots; very strongly acid; clear wavy boundary.

E—6 to 36 inches; pale yellow (2.5Y 7/4) loamy fine sand; weak medium granular structure; very friable; few fine roots; very strongly acid; abrupt wavy boundary.

Bt—36 to 48 inches; yellowish brown (10YR 5/6) fine sandy loam; weak medium subangular blocky structure; very friable; few fine roots; very strongly acid; gradual wavy boundary.

E'1—48 to 56 inches; brownish yellow (10YR 6/8) loamy fine sand; massive; very friable; very strongly acid; clear wavy boundary.

E'2—56 to 72 inches; pale yellow (2.5Y 7/4) loamy fine sand; massive; very friable; very strongly acid; clear wavy boundary.

B't—72 to 80 inches; yellowish brown (10YR 5/6) fine sandy loam; massive; very friable; very strongly acid.

The A, E, and B horizons are more than 60 inches thick. Reaction is very strongly acid or strongly acid throughout unless lime has been added.

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

The E horizon has hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 3 or 4. It is loamy sand, loamy fine sand, sand, or fine sand.

The Bt horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 6 or 8. It is sandy loam, fine sandy loam, or sandy clay loam. Some pedons have a BC horizon that has the same colors as the Bt horizon or has hue of 10YR or 2.5Y, value of 6, and chroma of 4. The BC horizon is loamy sand or loamy fine sand.

The E' horizon has hue of 10YR, value of 6 to 8, and chroma of 2 to 8; or it has hue of 2.5Y, value of 6 or 7, and chroma of 4. It is sand, fine sand, loamy fine sand, or loamy sand.

The B't or Bt' horizon has colors similar to those of the BC horizon, or it is mottled in shades of yellow, brown, red, or gray. The B't or Bt' horizon is sandy loam, fine sandy loam, or sandy clay loam.

Some pedons have a C horizon that has hue of 10YR or 2.5Y, value of 6 to 8, and chroma of 1 to 8. It is sandy or loamy sediment.

Baymeade Series

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

Typical pedon of Baymeade fine sand, 1 to 6 percent slopes; 3.8 miles south of Kuhns on North Carolina Highway 58, 1.3 miles southwest on State Road 1106, and 20 feet east of the road:

A—0 to 5 inches; gray (10YR 5/1) fine sand; weak fine granular structure; very friable; many fine and medium roots; many uncoated sand grains; very strongly acid; clear smooth boundary.
E—5 to 12 inches; light gray (10YR 7/2) fine sand, single grained; loose; common fine and medium roots; many uncoated sand grains; very strongly acid; clear wavy boundary.
E/Bh—12 to 24 inches; light yellowish brown (10YR 6/4) fine sand (E); single grained; loose; common irregularly shaped nodules and pockets of strongly cemented dark brown (7.5YR 3/2) and weakly cemented strong brown (7.5YR 5/6) organic stained fine sand (Bh); few fine and medium roots; very strongly acid; clear wavy boundary.
Bt—24 to 48 inches; light yellowish brown (10YR 6/4) fine sandy loam; many medium and coarse faint yellowish brown (10YR 5/8) mottles and few fine distinct yellowish red (5YR 5/8) mottles; weak medium subangular blocky structure; very friable; very strongly acid; gradual wavy boundary.
BC—48 to 60 inches; mottled yellowish brown (10YR 5/8), light yellowish brown (10YR 6/4), and light gray (10YR 7/1) fine sandy loam; weak medium subangular blocky structure; very friable; very strongly acid; gradual wavy boundary.
C—60 to 80 inches; very pale brown (10YR 7/3) loamy fine sand; common coarse faint light gray (10YR 7/1) and brownish yellow (10YR 6/6) mottles; single grained; loose; very strongly acid.

The A and E horizons combined are 20 to 40 inches thick. Reaction ranges from very strongly acid to slightly acid throughout unless lime has been added.

The A horizon has hue of 10YR, value of 4 to 6, and chroma of 1.

The upper part of the E horizon has hue of 10YR or 2.5Y, value of 6 to 8, and chroma of 1 or 2. In addition to these colors, the lower part of the E horizon and the E part of the E/Bh horizon can have hue of 10YR or 2.5Y, value of 5 to 8, and chroma of 3 or 4. The E horizon is sand or fine sand. Weakly cemented or strongly cemented, brittle nodules and pockets of organic stained sand make up 5 to 20 percent of the Bh part of the E/Bh horizon. The Bh part of the E/Bh horizon has hue of 7.5YR or 10YR, value of 3 to 6, and chroma of 2 to 6.

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, sandy loam, or sandy clay loam. The BC horizon has colors similar to those of the Bt horizon, or it is mottled in shades of red, yellow, brown, or gray. The BC horizon is fine sandy loam, sandy loam, loamy sand, or loamy fine sand.

The C horizon has hue of 10YR or 2.5Y, value of 6 to 8, and chroma of 1 to 8. It is sandy or loamy sediment. Some pedons have few or common Bh nodules in the C horizon.

Belhaven Series

The Belhaven series consists of very poorly drained soils on low marine terraces. These soils formed in moderately thick beds of organic material that are underlain by moderately fine to coarse textured sediment. Slope is less than 2 percent.

Typical pedon of Belhaven muck; 4 miles north of Beaufort to the junction of U.S. Highway 70 and State Road 1300, 7.5 miles north on State Road 1300 to Open Grounds Farm office, 3 miles east on a farm road to a shop, 1.5 miles south on a farm road, and 50 feet west of the road:

Op—0 to 8 inches; black (N 2/0) broken face and rubbed muck; 5 percent fiber, less than 1 percent rubbed; moderate medium granular structure; very friable; common fine roots; few medium hard blocky peds of organic material on surface; strongly acid; clear smooth boundary.
Oa1—8 to 13 inches; black (10YR 2/1) broken face and rubbed muck; 10 percent fiber, less than 1 percent rubbed; massive; very friable, slightly sticky, greasy, and paste-like; few fine roots; common medium pieces of charcoal; extremely acid; clear wavy boundary.
Oa2—13 to 26 inches; dark reddish brown (5YR 2/2) broken face and rubbed muck; 30 percent fiber, less than 1 percent rubbed; massive; very friable, slightly sticky, greasy, and paste-like; few buried stumps, logs, and wood fragments; common fine and medium pieces of charcoal; extremely acid; clear wavy boundary.
2A—26 to 30 inches; very dark brown (10YR 2/2) fine sandy loam; massive; very friable; common fine roots; extremely acid; clear wavy boundary.
2Cg1—30 to 38 inches; grayish brown (10YR 5/2) sandy clay loam; common medium and coarse faint dark grayish brown (10YR 4/2) mottles; massive; friable; common fine and medium roots; very strongly acid; abrupt wavy boundary.
2Cg2—38 to 52 inches; grayish brown (2.5Y 5/2) sand; single grained; loose; strongly acid; clear smooth boundary.
2Cg3—52 to 80 inches; greenish gray (5GY 5/1) sand; single grained; loose; neutral.

Belhaven soils have a highly decomposed organic horizon 16 to 51 inches thick. Reaction of the organic material is extremely acid unless lime has been added. Buried logs, stumps, and wood fragments make up as much as 20 percent of the organic material. The underlying mineral horizon ranges from extremely acid to

slightly acid in the upper part and extremely acid to moderately alkaline in the lower part.

The organic horizon has hue of 10YR, 5YR, or 2.5YR, value of 2 or 3, and chroma of 1 or 2; or it is neutral and has value of 2 or 3. The Oa1 or Op horizon consists of muck that has granular structure. The lower part of the organic horizon is massive and very greasy and paste-like when wet. Ten inches or more of this part of the horizon has hue of 5YR or 2.5YR. If drained and aerated, the organic material forms blocky structure. This material will then harden and dry irreversibly.

The underlying mineral horizons have hue of 10YR to 5Y, value of 2 to 6, and chroma of 1 or 2; or they can have hue of 5GY or 5G, value of 4 to 6, and chroma of 1 in the lower part. The horizons are loamy in the upper 12 inches or more and sandy, loamy, or clayey sediment in the lower part.

Carteret Series

The Carteret series consists of very poorly drained soils in marshes. These soils formed in coarse textured sediment. Slope is less than 2 percent.

Typical pedon of Carteret sand, frequently flooded; on Bogue Banks, 0.7 mile east of the Atlantic Beach-Morehead City Causeway at Atlantic Beach on State Road 1201, and 250 feet north of the road:

A1—0 to 4 inches; dark grayish brown (2.5Y 4/2) sand; weak medium granular structure; very friable; many fine roots; common coarse shell fragments; moderately alkaline; clear smooth boundary.

A2—4 to 10 inches; dark gray (N 4/0) sand; weak medium granular structure; very friable; many fine roots; common medium and coarse shell fragments; moderately alkaline; gradual smooth boundary.

Cg1—10 to 34 inches; gray (N 5/0) loamy sand; massive; very friable; common fine roots in upper part; common medium shell fragments; neutral; gradual smooth boundary.

Cg2—34 to 80 inches; greenish gray (5GY 5/1) sand; single grained; loose; common medium and coarse shell fragments; moderately alkaline.

The A and Cg horizons combined are 80 inches or more thick. Reaction ranges from slightly acid to moderately alkaline. Salt concentration ranges from 15 to 35 parts per thousand. These soils have few to many shell fragments.

The A horizon has hue of 10YR to 5Y, value of 3 or 4, and chroma of 1 or 2; or hue of 5GY, value 3 or 4, and chroma of 1; or it is neutral and has value of 3 or 4.

The Cg horizon has hue of 10YR to 5G, value of 4 or 5, and chroma of 1; or it is neutral and has value of 4 or 5. It is loamy sand, loamy fine sand, sand, or fine sand. In some pedons, this horizon has thin layers of loamy or clayey material.

Conetoe Series

The Conetoe series consists of well drained soils on low marine and stream terraces. These soils formed in moderately coarse textured sediment. Slope ranges from 0 to 5 percent.

Typical pedon of Conetoe loamy fine sand, 0 to 5 percent slopes; near South River, 0.25 mile west of the junction of State Road 1319 and State Road 1318, 0.15 mile east on a farm path, and 30 feet north of the path:

Ap—0 to 4 inches; dark grayish brown (10YR 4/2) loamy fine sand; weak medium granular structure; very friable; common fine and medium roots; slightly acid; clear wavy boundary.

E—4 to 30 inches; light yellowish brown (10YR 6/4) loamy fine sand; weak medium granular structure; very friable; few fine roots; very strongly acid; abrupt wavy boundary.

Bt—30 to 40 inches; yellowish brown (10YR 5/6) fine sandy loam; common large lenses and pockets of very pale brown (10YR 7/4) sand; weak medium subangular blocky structure; very friable; very strongly acid; gradual wavy boundary.

BC—40 to 72 inches; yellowish brown (10YR 5/6) loamy fine sand; massive; very friable; medium acid; gradual wavy boundary.

C—72 to 80 inches; light yellowish brown (2.5Y 6/4) loamy sand; massive; very friable; medium acid.

The A and E horizons combined are 20 to 40 inches thick. Reaction ranges from very strongly acid to medium acid throughout unless lime has been added.

The A or Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 1 to 3; or it has hue of 2.5Y, value of 4 or 5, and chroma of 2.

The E horizon has hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 3 to 8. Texture is loamy fine sand, fine sand, loamy sand, or sand.

The Bt horizon has hue of 7.5YR, value of 5 or 6, and chroma of 6 or 8; or it has hue of 10YR, value of 5 to 7, and chroma of 4 to 8. Texture is fine sandy loam or sandy loam.

The C horizon has hue of 7.5YR, value of 5 or 6, and chroma of 6 or 8; or it has hue of 10YR or 2.5Y, value of 5 to 8, and chroma of 1 to 8. It is sandy sediment.

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 sediment. Slope ranges from 0 to 6 percent.

Typical pedon of Corolla fine sand; on Bogue Banks at Fort Macon State Park, 270 feet west of a parking lot on a public beach, and 300 feet north of the beach:

A—0 to 4 inches; very dark grayish brown (10YR 3/2) fine sand; single grained; loose; many fine and medium roots; few fine and medium shell fragments; mildly alkaline; clear smooth boundary.
AC—4 to 10 inches; grayish brown (10YR 5/2) fine sand; single grained; loose; common fine and medium roots; common fine and medium shell fragments; mildly alkaline; clear smooth boundary.
C—10 to 18 inches; pale brown (10YR 6/3) sand; single grained; loose; common fine roots; common fine and medium shell fragments; mildly alkaline; diffuse smooth boundary.
Cg1—18 to 42 inches; light gray (2.5Y 7/2) sand; single grained; loose; few fine roots; common fine and medium shell fragments; mildly alkaline; diffuse smooth boundary.
Cg2—42 to 80 inches; light gray (2.5Y 7/2) sand; single grained; loose; many medium and coarse shell fragments; mildly alkaline.

The A and C horizons combined are 80 inches or more thick. Reaction ranges from medium acid to mildly alkaline. In most pedons, these soils have few to many shell fragments.

The A and AC horizon have hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 1 or 2. Some pedons have an Ab horizon at 24 to 72 inches below the surface.

The C horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 3 or 4. Mottles that have chroma of 1 or 2 are at a depth of 15 to 40 inches. The Cg horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2. The C and Cg horizons are sand or fine sand.

Craven Series

The Craven series consists of moderately well drained soils on uplands. These soils formed in fine textured sediment. Slope ranges from 1 to 4 percent.

Typical pedon of Craven loam, 1 to 4 percent slopes; 3 miles north of Cape Carteret on North Carolina Highway 58, 0.7 mile north on State Road 1109, 0.5 mile west on State Road 1106, 0.75 mile south on State Road 1108, and 25 feet west of the road:

Ap—0 to 7 inches; brown (10YR 5/3) loam; weak medium granular structure; very friable; common fine roots; slightly acid; abrupt smooth boundary.
Bt1—7 to 22 inches; strong brown (7.5YR 5/6) silty clay; few fine distinct yellowish red (5YR 5/8) and light yellowish brown (10YR 6/4) mottles; moderate fine and medium angular blocky structure; very firm, sticky and plastic; many distinct clay films on faces of peds; common fine pores; very strongly acid; clear wavy boundary.
Bt2—22 to 31 inches; yellowish brown (10YR 5/6) silty clay; common fine distinct yellowish red (5YR 5/8) mottles and common fine and medium distinct light gray (10YR 7/2) mottles; moderate fine and medium angular blocky structure; very firm, sticky and plastic; many distinct clay films on faces of peds; few fine pores; very strongly acid; clear wavy boundary.
BC—31 to 40 inches; brownish yellow (10YR 6/6) sandy clay; common medium distinct yellowish red (5YR 5/8) and light gray (10YR 7/2) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; very strongly acid; clear wavy boundary.
C1—40 to 49 inches; brownish yellow (10YR 6/6) fine sandy loam; common medium distinct yellowish red (5YR 5/8) and light gray (10YR 7/2) mottles; massive; very friable; very strongly acid; gradual wavy boundary.
C2—49 to 72 inches; brownish yellow (10YR 6/6) loamy fine sand; common medium distinct strong brown (7.5YR 5/8) and light gray (10YR 7/2) mottles; massive; very friable; very strongly acid.

The A and B horizons are 24 to 60 inches thick. Reaction ranges from extremely acid to strongly acid throughout unless lime has been added.

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

The upper part of the Bt horizon has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 4 to 8. The lower part of the Bt horizon has base colors that are similar to those of the upper part and few to many mottles that have chroma of 1 or 2; or it has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2, and mottles in shades of red, yellow, or brown. The Bt horizon is clay loam, silty clay loam, silty clay, or clay.

The C horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 3 to 6. Some pedons have a Cg horizon that has hue and value similar to those in the C horizon, but has chroma of 1 or 2. The C or Cg horizon is sandy, loamy, or clayey sediment.

Croatan Series

The Croatan series consists of very poorly drained soils on uplands. These soils formed in moderately thick beds of organic material underlain by moderately coarse to moderately fine textured sediment. Slope is less than 2 percent.

Typical pedon of Croatan muck; in Croatan National Forest, 3.2 miles southwest of Havelock on State Road 1756 to Camp Bryan Road, 1.4 miles west on Camp Bryan Road to a logging road, 1 mile south and 1 mile west on the logging road, 50 feet north of the road:

Oa1—0 to 10 inches; black (10YR 2/1) broken face and rubbed muck; 30 percent fiber, about 10 percent rubbed; moderate medium granular structure; very friable; many fine, medium, and coarse roots; extremely acid; clear smooth boundary.

Oa2—10 to 20 inches; black (10YR 2/1) broken face and rubbed muck; 15 percent fiber, about 5 percent rubbed; massive; very friable; common fine roots; extremely acid; gradual smooth boundary.
Oa3—20 to 38 inches; very dark brown (10YR 2/2) broken face and rubbed muck; 10 percent fiber, less than 5 percent rubbed; massive; very friable; common fine roots; extremely acid; clear wavy boundary.
2A—38 to 44 inches; very dark brown (10YR 2/2) mucky fine sandy loam; massive; very friable; extremely acid; clear wavy boundary.
2Cg—44 to 65 inches; gray (5Y 5/1) fine sandy loam; massive; extremely acid; gradual wavy boundary.

Croatan soils have a highly decomposed organic horizon that is 16 to 51 inches thick. Buried logs, stumps, and wood fragments make up as much as 10 percent of the organic material. The organic material is extremely acid unless lime has been added. The underlying mineral horizon ranges from extremely acid to slightly acid.

The organic horizon has hue of 7.5YR to 5Y, value of 2 or 3, and chroma of 1 or 2; or it is neutral and has value of 2 or 3. The Oa1 or Op horizon is muck that has granular structure. The lower part of the organic horizon is massive.

The underlying mineral horizon has hue of 5YR to 5Y, value of 2 to 6, and chroma of 1 to 3 in the upper part. The lower part has hue of 5GY or 5G, value of 4 to 6, chroma of 1 or 2, in addition to the colors of the upper part. The mineral horizon is loamy in the upper 12 inches or more and sandy, loamy, or clayey in the lower part.

Dare Series

The Dare series consists of very poorly drained soils on uplands and low marine terraces. These soils formed in thick beds of organic material. Slope is less than 1 percent.

Typical pedon of Dare muck; 4 miles north of Beaufort to the junction of U.S. Highway 70 and State Road 1300, 7.5 miles north on State Road 1300 to Open Grounds Farm office, 7 miles east and 2 miles south on a farm road, and 30 feet west of the road:

Oa1—0 to 11 inches; black (10YR 2/1) broken face and rubbed muck; about 45 percent fibers, less than 10 percent rubbed; moderate medium granular structure; very friable, slightly sticky; many fine and medium roots; few medium pieces of charcoal; extremely acid; clear smooth boundary.
Oa2—11 to 30 inches; black (10YR 2/1) broken face and rubbed muck; about 25 percent fibers, less than 2 percent rubbed; massive; very friable; slightly sticky, greasy and paste-like; few fine roots; common buried stumps, logs, and wood fragments; extremely acid; gradual smooth boundary.
Oa3—30 to 64 inches; dark reddish brown (5YR 3/2) broken face and rubbed muck; about 25 percent fibers, less than 1 percent rubbed; massive; slightly sticky, very greasy and paste-like; common buried stumps, logs, and wood fragments; extremely acid; clear wavy boundary.
2Cg1—64 to 70 inches; dark reddish brown (5YR 3/2) mucky sand; massive; very friable; extremely acid; gradual wavy boundary.
2Cg2—70 to 80 inches; grayish brown (10YR 5/2) sand; single grained; loose; extremely acid.

Dare soils have a highly decomposed organic horizon that is 51 to 108 inches thick. Buried logs, stumps, and wood fragments make up as much as 25 percent of the organic material. The organic material is extremely acid. The underlying mineral horizon ranges from extremely acid to medium acid.

The surface layer has hue of 10YR, value of 2, and chroma of 1 or 2; hue of 5YR, value of 2, and chroma of 1; or it is neutral and has value of 2. It is muck that has granular structure.

The subsurface layer has hue of 10YR, value of 2, and chroma of 1 or 2; hue of 5YR or 2.5YR, value of 2 or 3, and chroma of 1 or 2; or it is neutral and has value of 2. Ten inches or more of the subsurface layer have hue of 5YR or 2.5YR. The organic material is massive, paste-like, and greasy when wet. If drained and aerated, the organic material forms blocky structure. Over a short period, this material hardens and dries irreversibly.

The underlying mineral horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 to 4; or hue of 7.5YR or 5YR, value of 3 or 4, and chroma of 2 to 4; or hue of 5GY or 5G, value of 4 to 6, and chroma of 1; in addition to the colors of the organic horizon. The mineral horizon is sandy. Some pedons have thin layers of loamy material.

Deloss Series

The Deloss series consists of very poorly drained soils on low marine and stream terraces. These soils formed in moderately fine textured sediment. Slope is less than 2 percent.

Typical pedon of Deloss fine sandy loam; 2.6 miles southeast of Harlowe on North Carolina Highway 101, 1.4 miles southwest of the intersection of North Carolina Highway 101 and State Road 1160, and 20 feet south of State Road 1160:

A—0 to 15 inches; black (10YR 2/1) fine sandy loam; weak medium granular structure; very friable; many fine and medium roots; very strongly acid; clear wavy boundary.
Btg—15 to 39 inches; gray (10YR 5/1) sandy clay loam; common medium faint very dark grayish brown (10YR 3/2) and pale brown (10YR 6/3) mottles;

weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few medium roots; common fine pores; very strongly acid; gradual wavy boundary.

BCg—39 to 45 inches; gray (10YR 6/1) sandy clay loam; common medium distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine pores; very strongly acid; gradual wavy boundary.

Cg—45 to 80 inches; gray (5Y 6/1) fine sandy loam; common medium distinct brownish yellow (10YR 6/6) mottles; massive; very friable; very strongly acid.

The A and B horizons are 40 to 60 inches thick. The surface layer ranges from extremely acid to strongly acid unless lime has been added. The subsoil ranges from extremely acid to slightly acid unless lime has been added. The underlying material ranges from very strongly acid to neutral.

The A or Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2; or it is neutral and has value of 2 or 3. Texture is fine sandy loam or mucky loam.

The Btg horizon has hue of 10YR, value of 2 to 6, and chroma of 1 or 2; hue of 2.5Y, value of 4 to 6, and chroma of 2; or it is neutral and has value of 3 to 5. Texture is sandy clay loam or clay loam.

The Cg horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2; hue of 5GY or 5G, value of 4 to 6, and chroma of 1; or it is neutral and has value of 4 to 7. The Cg horizon is sandy or loamy sediment.

Dorovan Series

The Dorovan series consists of very poorly drained soils on flood plains. These soils formed in thick beds of organic material. Slope is less than 1 percent.

Typical pedon of Dorovan muck, frequently flooded; 0.25 mile south of Newport along the Atlantic and East Carolina Railroad to the Newport River Bridge, 30 feet west of the bridge, and 50 feet south of the river:

Oa1—0 to 12 inches; black (10YR 2/1) broken face and rubbed muck; 40 percent fibers, about 15 percent rubbed; massive; very friable, nonsticky; many fine, medium, and coarse roots; very strongly acid; clear wavy boundary.

Oa2—12 to 80 inches; very dark brown (10YR 2/2) broken face and rubbed muck; 30 percent fibers, about 5 percent rubbed; massive; very friable, nonsticky; few fine roots; few buried logs, stumps, and wood fragments; very strongly acid.

Dorovan soils have an organic horizon that is 51 to 80 inches or more thick. Reaction ranges from extremely acid to strongly acid.

The organic horizon has hue of 5YR to 2.5Y, value of 2 or 3, and chroma of 1 or 2; or it is neutral and has value of 2 or 3. Buried logs, stumps, and wood fragments are in the lower part of the horizon.

Dorovan soils in Carteret County are taxadjuncts to the Dorovan series because most pedons are somewhat less acid than is permitted for the range of the series. However, these differences do not affect the overall use, management, and behavior of these soils.

Duckston Series

The Duckston series consists of poorly drained soils. These soils formed in coarse textured sediment and are on the Outer Banks. Slope is 0 to 2 percent.

Typical pedon of Duckston fine sand, frequently flooded; on Bogue Banks west of Emerald Isle, about 1.7 miles west of the intersection of North Carolina Highway 58 and the road leading to the Emerald Isle pier, then about 1,100 feet north of North Carolina Highway 58, and 80 feet south of Bogue Sound:

A—0 to 5 inches; very dark gray (10YR 3/1) fine sand; weak medium granular structure; very friable; many uncoated sand grains; many fine and medium roots; slightly acid; clear wavy boundary.

Cg—5 to 50 inches; light brownish gray (2.5Y 6/2) fine sand; single grained; loose; few fine roots; neutral; clear wavy boundary.

Ab—50 to 60 inches; dark grayish brown (10YR 4/2) fine sand; single grained; loose; many uncoated sand grains; slightly acid.

Duckston soils have a sandy horizon 60 inches or more thick. Reaction ranges from medium acid to moderately alkaline. In some pedons, these soils have few to many shell fragments.

The A horizon has hue of 10YR to 5Y, value of 3 to 5, and chroma of 1 or 2; or it is neutral and has value of 3 to 5.

The Cg horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2; or hue of 5GY, value of 5 or 6, and chroma of 1; or it is neutral and has value of 5 to 7. Texture is sand or fine sand.

Fripp Series

The Fripp series consists of excessively drained soils. These soils formed in coarse textured sediment and are on the Outer Banks. Slope ranges from 2 to 30 percent.

Typical pedon of Fripp fine sand, 2 to 30 percent slopes; on Bogue Banks, 1.5 miles west of Atlantic Beach on State Road 1201, 1,000 feet north on a street and 20 feet east of the street:

A—0 to 7 inches; grayish brown (10YR 5/2) fine sand; weak fine granular structure; loose; common fine, medium, and coarse roots; medium acid; clear smooth boundary.

C1—7 to 13 inches; brown (10YR 5/3) fine sand; single grained; loose; common fine roots; medium acid; gradual wavy boundary.
C2—13 to 50 inches; yellow (10YR 7/6) fine sand; single grained; loose; few fine roots; medium acid; diffuse wavy boundary.
C3—50 to 80 inches; very pale brown (10YR 7/4) fine sand; single grained; loose; slightly acid.

Fripp soils are sandy to a depth of 80 inches or more. Reaction ranges from strongly acid to mildly alkaline. Some pedons have a few shell fragments.

The A horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2.

The C horizon has hue of 7.5YR to 2.5Y, value of 5 to 8, and chroma of 1 to 8.

Goldsboro Series

The Goldsboro series consists of moderately well drained soils on uplands. These soils formed in moderately fine textured sediment. Slope is 0 to 2 percent.

Typical pedon of Goldsboro loamy fine sand, 0 to 2 percent slopes; 0.6 mile north of Stella on State Road 1100 and 30 feet east of the road:

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) loamy fine sand; weak medium granular structure; very friable; common fine roots; neutral; abrupt smooth boundary.
E—9 to 12 inches; pale brown (10YR 6/3) loamy fine sand; weak medium granular structure; very friable; few fine roots; medium acid; clear wavy boundary.
Bt1—12 to 27 inches; brownish yellow (10YR 6/8) sandy clay loam; weak medium subangular blocky structure; friable; slightly sticky and slightly plastic; few fine roots; common fine pores; very strongly acid; clear wavy boundary.
Bt2—27 to 50 inches; brownish yellow (10YR 6/6) sandy clay loam; common medium distinct light brownish gray (10YR 6/2) and strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine pores; very strongly acid; gradual wavy boundary.
BC—50 to 63 inches; light yellowish brown (10YR 6/4) fine sandy loam; many medium faint light brownish gray (10YR 6/2) and common medium distinct strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; very friable; very strongly acid; gradual wavy boundary.
Cg—63 to 80 inches; light brownish gray (10YR 6/2) loamy fine sand; common medium faint light yellowish brown (10YR 6/4) mottles; massive; very friable; very strongly acid.

The A, E, and B horizons are 60 to 80 inches thick. Reaction is very strongly acid or strongly acid unless lime has been added.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 4 or 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 2 to 4.

Some pedons have a BE horizon that has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 3 to 8. Mottles that have chroma of 1 or 2 are within 30 inches of the surface. Texture is sandy loam or fine sandy loam.

The upper part of the Bt horizon has the same colors in the matrix and mottles as those of the BE horizon. The lower part of the Bt horizon is mottled in shades of yellow, brown, red, or gray. The Bt horizon is sandy clay loam.

Some pedons have a BC horizon that has mottles in the same colors as those in the lower part of the Bt horizon. Many pedons have a BCg horizon that has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. The BC or BCg horizon is sandy loam, fine sandy loam, or sandy clay loam.

The C or Cg horizon has colors that are similar to those of the BC horizon. It is sandy, loamy, or clayey sediment.

Goldsboro soils in Carteret County are taxadjuncts to the Goldsboro series because most pedons have a more than 20 percent decrease in clay content from the maximum within a depth of 40 to 60 inches and do not have skeletans. However, these differences do not affect the overall use, management, and behavior of these soils.

Hobucken Series

The Hobucken series consists of very poorly drained soils in marshes. These soils formed in moderately coarse textured sediment. Slope is less than 1 percent.

Typical pedon of Hobucken muck, frequently flooded; 1.15 miles northeast of Williston on U.S. Highway 70 and 40 feet south of the highway:

Oa—0 to 6 inches; black (10YR 2/1) muck; 50 percent fiber, 10 percent rubbed; about 50 percent mineral material; massive; very friable; many fine roots; mildly alkaline, strongly acid after drying; gradual wavy boundary.
A—6 to 16 inches; very dark gray (10YR 3/1) mucky fine sandy loam; massive; very friable; slightly fluid; many fine roots; moderately alkaline, strongly acid after drying; gradual wavy boundary.
Cg1—16 to 26 inches; dark gray (10YR 4/1) loamy sand; massive; common lenses of sandy loam; very friable; common fine roots; moderately alkaline, extremely acid after drying; clear wavy boundary.
Cg2—26 to 55 inches; very dark gray (5Y 3/1) sandy loam; common medium distinct gray (5Y 5/1)

mottles; common lenses of sandy clay loam; massive; friable; slightly sticky and slightly plastic; common fine roots; moderately alkaline, extremely acid after drying; clear wavy boundary.
Cg3—55 to 78 inches; dark gray (5Y 4/1) loamy sand; massive; very friable; few fine roots; common medium shell fragments; moderately alkaline, neutral after drying.

Hobucken soils range from slightly acid to moderately alkaline in their natural setting. In some pedons, air-dried soil becomes extremely acid. Salt concentration generally ranges from 10 to 35 parts per thousand. Horizons between depths of 8 and 20 inches are typically slightly fluid.

The O horizon has hue of 10YR, value of 2, and chroma of 1 or 2; or it is neutral and has value of 2. The organic surface layer is generally less than 7 inches thick. Some pedons do not have an O horizon

The A horizon has hue of 10YR to 5Y, value of 2 or 3, and chroma of 1 or 2. It is loam, fine sandy loam, sandy loam, or their mucky counterparts.

The Cg horizon has hue of 10YR to 5Y, value of 3 to 7, and chroma of 1 or 2; hue of 5GY or 5G, value of 5 or 6, and chroma of 1; or it is neutral and has value of 3 to 7. It is loamy or sandy sediment. Some pedons in this horizon have thin strata of clayey material.

Kureb Series

The Kureb series consists of excessively drained soils on uplands. These soils formed in coarse textured sediment. Slope ranges from 0 to 6 percent.

Typical pedon of Kureb sand, 0 to 6 percent slopes; 1.0 mile west of Newport, 0.4 mile north of the intersection of U.S. Highway 70 and State Road 1206, and 300 feet west of U.S. Highway 70:

A—0 to 4 inches; gray (10YR 5/1) sand; single grained; loose; common fine roots; many light gray uncoated sand grains; strongly acid; clear wavy boundary.
E—4 to 19 inches; light gray (10YR 7/1) uncoated sand; single grained; loose; neutral; abrupt wavy boundary.
C/Bh—19 to 42 inches; brownish yellow (10YR 6/6) sand (C); single grained; loose; common weakly cemented and brittle bands and nodules of dark brown (10YR 3/3) and strong brown (7.5YR 5/6) sand (Bh); very strongly acid; gradual irregular boundary.
C—42 to 80 inches; yellow (10YR 7/6) sand; single grained; loose; slightly acid.

Kureb soils are sand to a depth of 80 inches or more. Reaction ranges from very strongly acid to neutral.

The A horizon has hue of 10YR, value of 4 to 6, and chroma of 1. It has many light gray or white uncoated sand grains.

The E horizon has hue of 10YR, value of 7 or 8, and chroma of 1 or 2. The sand grains are uncoated.

The C part of the C/Bh horizon has hue of 10YR, value of 5 to 7, and chroma of 3 to 8. The Bh part has hue of 5YR to 10YR, value of 3 to 5, and chroma of 2 to 8.

The C horizon has hue of 10YR, value of 6 to 8, and chroma of 1 to 8.

Lafitte Series

The Lafitte series consists of very poorly drained soils in marshes. These soils formed in thick beds of organic material. Slope is less than 1 percent.

Typical pedon of Lafitte muck, frequently flooded; on Cedar Island, 1.7 miles north of Thorofare Bridge, and 0.1 mile south of Merkle Bay:

Oa1—0 to 18 inches; black (10YR 2/1) broken face and rubbed muck; 50 percent fibers, about 10 percent rubbed; massive; very friable; many fine and medium roots; neutral; clear smooth boundary.
Oa2—18 to 60 inches; black (10YR 2/1) broken face and rubbed muck; 40 percent fibers, about 5 percent rubbed; massive; very fluid; slight sulfur odor; mildly alkaline; gradual smooth boundary.
2Cg—60 to 72 inches; greenish gray (5GY 5/1) sandy clay loam; massive; friable, slightly sticky and slightly plastic; moderately alkaline.

Lafitte soils have an organic horizon 51 to 80 inches thick. Reaction ranges from slightly acid to moderately alkaline. Salt concentration generally ranges from 5 to 30 parts per thousand.

The organic horizon has hue of 10YR, value of 2, and chroma of 1 or 2; or it has hue of 7.5YR, value of 3, and chroma of 2.

The 2Cg horizon has hue of 5Y to 5GY, value of 4 or 5, and chroma of 1. It is sandy, loamy, or clayey sediment.

Leon Series

The Leon series consists of poorly drained soils on uplands and low marine terraces. These soils formed in coarse textured sediment. Slope ranges from 0 to 5 percent.

Typical pedon of Leon sand; on Harkers Island, 0.65 mile south of Harkers Island Bridge on State Road 1335, 0.4 mile east on an unpaved road and 20 feet south of the road:

A—0 to 6 inches; very dark gray (10YR 3/1) sand; many uncoated light gray (10YR 7/1) sand grains; weak fine granular structure; very friable; many fine and medium roots; extremely acid; abrupt wavy boundary.

E—6 to 22 inches; gray (10YR 6/1) uncoated sand; single grained; loose; few fine roots; extremely acid; abrupt wavy boundary.
Bh1—22 to 27 inches; black (10YR 2/1) sand; massive; weakly cemented, brittle; thick organic coatings on sand grains; few fine roots and pores; extremely acid; gradual wavy boundary.
Bh2—27 to 58 inches; black (5YR 2/1) sand; massive; weakly cemented, brittle; thick organic coatings on sand grains; few uncoated sand grains; few fine pores; extremely acid; gradual irregular boundary.
Cg—58 to 80 inches; gray (10YR 5/1) sand; common coarse faint dark grayish brown (10YR 4/2) mottles; single grained; loose; very strongly acid.

Leon soils are sandy to a depth of 80 inches or more. Reaction ranges from extremely acid to strongly acid unless lime has been added.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1; or it is neutral and has value of 2 to 4. Many uncoated sand grains mixed with sand grains coated with organic matter cause a salt and pepper appearance.

The E horizon has hue of 10YR or 2.5Y, value of 5 to 8, and chroma of 1 or 2; or it is neutral and has value of 5 to 7.

The Bh horizon has hue of 10YR, 7.5YR, or 5YR, value of 2 or 3, and chroma of 1 to 3 (fig. 23). This horizon is sand or fine sand but can have a loamy feel and appearance because of the organic matter content. It is generally weakly cemented and brittle, but some parts can be strongly cemented. Some pedons have several sequences of an E horizon and a Bh horizon.

The C horizon has hue of 10YR or 2.5Y, value of 4 to 8, and chroma of 1 to 3. It is sand or fine sand.

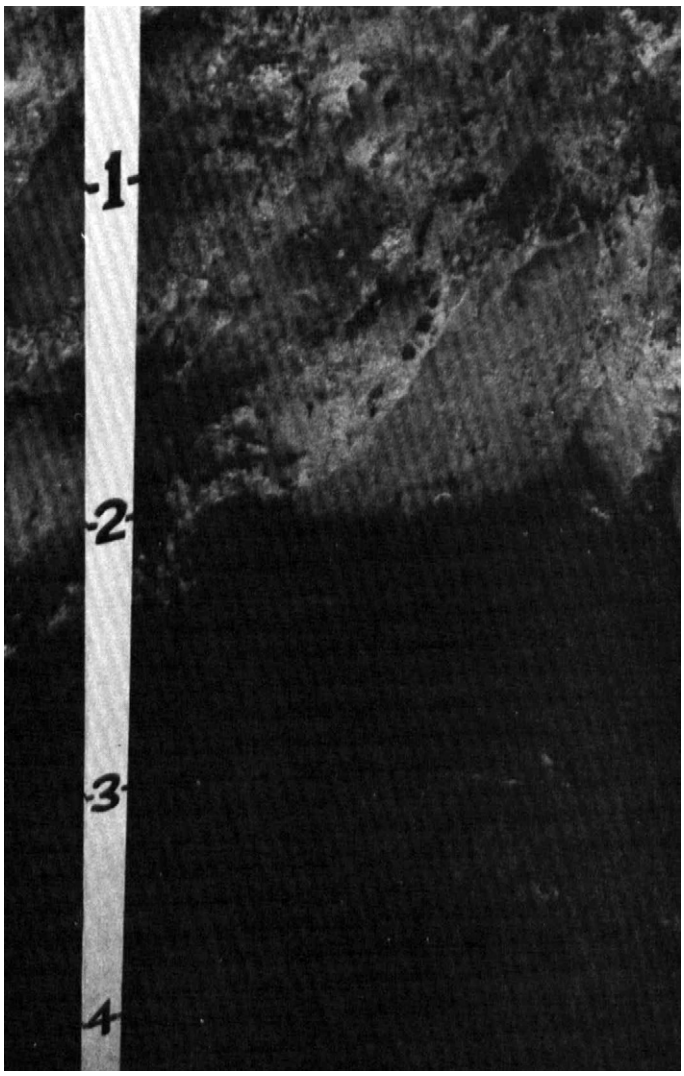

Figure 23.—The dark colored, weakly cemented subsoil (Bh horizon) begins at a depth of about 2 feet in Leon sand.

Lynchburg Series

The Lynchburg series consists of somewhat poorly drained soils on uplands. These soils formed in moderately fine textured sediment. Slope is 0 to 2 percent.

Typical pedon of Lynchburg fine sandy loam; 2.8 miles east of Newport on State Road 1154 and 650 feet south of the road:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak medium granular structure; very friable; common fine roots; slightly acid; abrupt smooth boundary.
E—8 to 14 inches; pale brown (10YR 6/3) fine sandy loam; few fine and medium faint light brownish gray (10YR 6/2) mottles and few fine distinct brownish yellow (10YR 6/6) mottles; weak medium granular structure; very friable; common fine roots; very strongly acid; clear wavy boundary.
Bt—14 to 19 inches; pale brown (10YR 6/3) sandy clay loam; common medium distinct brownish yellow (10YR 6/6) mottles and common medium faint light brownish gray (2.5Y 6/2) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; common fine pores; very strongly acid; gradual wavy boundary.
Btg—19 to 51 inches; light brownish gray (2.5Y 6/2) sandy clay loam; common medium distinct brownish yellow (10YR 6/6) and strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; very strongly acid; gradual wavy boundary.
BCg—51 to 65 inches; light brownish gray (2.5Y 6/2) sandy clay loam; common medium distinct strong brown (7.5YR 5/8) and brownish yellow (10YR 6/6)

mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; very strongly acid; gradual wavy boundary.

Cg—65 to 80 inches; light brownish gray (10YR 6/2) fine sandy loam, pockets of sandy clay loam and loamy fine sand; common medium distinct brownish yellow (10YR 6/6) and strong brown (7.5YR 5/8) mottles; weak medium platy structure; very friable; very strongly acid.

The A, E, and B horizons are 60 to 80 inches thick. Reaction ranges from extremely acid to strongly acid unless lime has been added.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 2 to 4, and chroma of 1 or 2.

The E horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 2 to 4.

The Bt horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 3 to 6. Some pedons do not have a Bt horizon. The Btg horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. This horizon begins within a depth of 20 inches. It has common to many mottles in shades of yellow, brown, red, or gray. The Bt and Btg horizons are sandy clay loam or clay loam.

The Cg horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2; or it is neutral and has value of 5 to 7. It is stratified sandy, loamy, or clayey sediment.

Mandarin Series

The Mandarin series consists of somewhat poorly drained soils on uplands and low marine terraces. These soils formed in coarse textured sediment. Slope ranges from 0 to 2 percent.

Typical pedon of Mandarin sand; 0.5 mile west of Newport on U.S. Highway 70, 0.2 mile north of the intersection of State Road 1124 and U.S. Highway 70, and 200 feet west of the highway:

A—0 to 3 inches; gray (10YR 6/1) sand; single grained; loose; many uncoated white (10YR 8/1) sand grains; common fine and medium roots; strongly acid; clear wavy boundary.

E—3 to 27 inches; white (10YR 8/1) uncoated sand; single grained; loose; few fine roots; medium acid; abrupt wavy boundary.

Bh—27 to 49 inches; dark brown (7.5YR 3/2) sand; few medium distinct yellowish brown (10YR 5/6) mottles; massive; weakly cemented, brittle; few strongly cemented nodules; strongly acid; abrupt wavy boundary.

E'1—49 to 55 inches; yellow (10YR 7/8) sand; single grained; loose; medium acid; abrupt wavy boundary.

E'2—55 to 60 inches; yellowish brown (10YR 5/6) sand; single grained; loose; medium acid; clear wavy boundary.

Bh'1—60 to 71 inches; brown (10YR 4/3) sand; single grained; loose; common weakly cemented very dark grayish brown (10YR 3/2) nodules; medium acid; clear wavy boundary.

Bh'2—71 to 80 inches; very dark brown (10YR 2/2) sand; massive; weakly cemented, brittle; medium acid.

Mandarin soils are sand or fine sand to a depth of 80 inches or more. Reaction ranges from extremely acid to neutral in the surface and subsurface layers. The upper part of the subsoil ranges from extremely acid to neutral, and the lower part ranges from medium acid to neutral.

The A horizon has hue of 10YR, value of 3 to 6, and chroma of 1; or it is neutral and has value of 3 to 6.

The E horizon has hue of 10YR, value of 5 to 8, and chroma of 1 to 8.

The Bh and Bh' horizons have hue of 2.5YR to 10YR, value of 2 to 4, and chroma of 1 to 4. The sand grains are coated with organic matter. These horizons are weakly cemented and brittle in many pedons.

Masontown Series

The Masontown series consists of very poorly drained soils on flood plains. These soils formed in moderately coarse textured alluvium. Slope is less than 2 percent.

Typical pedon of Masontown mucky loam, frequently flooded; 4.2 miles west of Newport on State Road 1124, and 300 feet west of the road:

A1—0 to 27 inches; black (10YR 2/1) mucky loam; moderate medium granular structure; very friable; many fine and medium roots; neutral; gradual wavy boundary.

A2—27 to 32 inches; very dark gray (10YR 3/1) fine sandy loam; few medium faint dark grayish brown (10YR 4/2) mottles; weak medium granular structure; very friable; common fine roots; neutral; clear irregular boundary.

Cg1—32 to 52 inches; dark grayish brown (10YR 4/2) loamy sand; many medium and coarse faint very dark gray (10YR 3/1) mottles; common lenses and pockets of sand and sandy loam; very friable; few fine roots; neutral; gradual wavy boundary.

Cg2—52 to 80 inches; grayish brown (10YR 5/2) sand; many medium and coarse faint dark grayish brown (10YR 4/2) mottles; single grained; loose; neutral.

Masontown 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 and has value of 2 or 3. This horizon is more than 24 inches thick.

The Cg horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2; or it is neutral and has value of 4 to 7. It is sandy loam, fine sandy loam, silt loam, loam, loamy sand, or sand. Some pedons have thin strata of

finer texture, but the soils between depths of 10 and 40 inches average 10 to 18 percent clay.

Murville Series

The Murville series consists of very poorly drained soils on uplands and low marine terraces. These soils formed in coarse textured sediment. Slope is less than 1 percent.

Typical pedon of Murville mucky sand; 2 miles south of Harlowe on North Carolina Highway 101, 1.4 miles south on State Road 1155, 0.8 mile west on U.S. Forest Service Road 124 and 150 feet north of the road:

A—0 to 10 inches; black (10YR 2/1) mucky sand; weak medium granular structure; very friable; common clean sand grains; many fine and medium roots; extremely acid; abrupt wavy boundary.
Bh1—10 to 17 inches; black (10YR 2/1) sand; massive; weakly cemented, brittle; sand grains coated with organic matter; common fine roots and pores; extremely acid; gradual wavy boundary.
Bh2—17 to 44 inches; very dark brown (10YR 2/2) sand; massive; weakly cemented, brittle; sand grains coated with organic matter; extremely acid; clear wavy boundary.
Bh3—44 to 61 inches; black (10YR 2/1) sand; massive; weakly cemented; sand grains coated with organic matter; extremely acid; gradual wavy boundary.
C—61 to 80 inches; very dark grayish brown (10YR 3/2) sand; single grained; loose; very strongly acid.

The A and Bh horizons are 30 to more than 50 inches thick. Reaction ranges from extremely acid to strongly acid.

The A horizon has hue of 10YR to 5YR, value of 2 or 3, and chroma of 1 or 2; or it is neutral and has value of 2 or 3. It has a loamy feel because of high organic matter content. The A horizon is 10 inches or more thick. Some pedons have an intermittent E horizon several inches thick.

The Bh horizon has hue of 10YR to 5YR, value of 2 or 3, and chroma of 1 or 2; or it is neutral and has value of 2 or 3. It is sand, fine sand, loamy fine sand, or loamy sand that is coated with organic matter and is weakly cemented and brittle.

The C horizon has hue of 10YR to 5YR, value of 3 to 7, and chroma of 1 to 4. It is typically sand or loamy sand, but in some pedons, this horizon is loamy.

Newhan Series

The Newhan series consists of excessively drained soils on the Outer Banks. These soils formed in coarse textured sediment. Slope ranges from 2 to 30 percent.

Typical pedon of Newhan fine sand, 2 to 30 percent slopes; on Bogue Banks at Fort Macon State Park, 200 feet west of the parking lot, and 150 feet north of the beach:

A—0 to 2 inches; light brownish gray (10YR 6/2) fine sand; single grained; loose; few fine roots; mildly alkaline; clear wavy boundary.
C1—2 to 32 inches; light gray (10YR 7/2) fine sand; single grained; loose; common dark minerals and shell fragments; mildly alkaline; diffuse wavy boundary.
C2—32 to 80 inches; light gray (10YR 7/2) sand; single grained; loose; common dark minerals and shell fragments; mildly alkaline.

Newhan soils are sand or fine sand to a depth of 80 inches or more. Reaction is neutral or mildly alkaline. In some horizons, shell fragments make up to 25 percent of the volume.

The A horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 to 3. Some pedons do not have an A horizon.

The C horizon has hue of 10YR to 5Y, value of 5 to 8, and chroma of 1 to 6.

Norfolk Series

The Norfolk series consists of well drained soils on uplands. These soils formed in moderately fine textured sediment. Slope ranges from 0 to 6 percent.

Typical pedon of Norfolk loamy fine sand, 0 to 2 percent slopes; 0.5 mile north of Stella on State Road 1100 and 50 feet west of the road:

Ap—0 to 7 inches; brown (10YR 5/3) loamy fine sand; weak medium granular structure; very friable; common fine roots; neutral; abrupt smooth boundary.
E—7 to 13 inches; light yellowish brown (10YR 6/4) loamy fine sand; weak medium granular structure; very friable; few fine roots; neutral; clear smooth boundary.
Bt1—13 to 30 inches; yellowish brown (10YR 5/8) sandy clay loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; common fine pores; very strongly acid; gradual wavy boundary.
Bt2—30 to 37 inches; brownish yellow (10YR 6/6) sandy clay loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; common fine pores; very strongly acid; gradual wavy boundary.
Bt3—37 to 58 inches; light yellowish brown (10YR 6/4) sandy clay loam; common medium faint yellowish brown (10YR 5/8) mottles and common fine and medium distinct light gray (10YR 7/2) mottles; weak medium subangular blocky structure; friable, slightly

sticky and slightly plastic; few fine pores; very strongly acid; gradual wavy boundary.
BC—58 to 68 inches; light yellowish brown (10YR 6/4) sandy clay loam; common medium distinct light gray (10YR 7/2) and yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; very strongly acid; gradual wavy boundary.
C—68 to 80 inches; light yellowish brown (10YR 6/4) sandy loam; common medium distinct light gray (10YR 7/2) mottles; massive; very friable; very strongly acid.

The A, E, and B horizons are 60 to more than 80 inches thick. Reaction is very strongly acid or strongly acid unless lime has been added.

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

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 3 or 4; or it has hue of 2.5Y, value of 6, and chroma of 4.

The Bt horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 to 8. It is sandy clay loam or clay loam.

The C horizon has similar colors to those of the lower part of the Bt horizon, or it is mottled in shades of red, gray, brown, or yellow. This horizon is sandy, loamy, or clayey sediment.

Onslow Series

The Onslow series consists of moderately well drained soils on uplands. These soils formed in moderately fine textured sediment. Slope ranges from 0 to 3 percent.

Typical pedon of Onslow loamy sand; 2.7 miles east of Newport on State Road 1154, 0.3 mile south on a farm path, and 50 feet east of the path:

A—0 to 4 inches; dark grayish brown (10YR 4/2) loamy sand; weak medium granular structure; very friable; many uncoated sand grains; common fine and medium roots; very strongly acid; abrupt wavy boundary.
E/Bh—4 to 11 inches; light yellowish brown (10YR 6/4) loamy sand; weak medium granular structure; very friable; many weakly to strongly cemented and brittle dark brown (10YR 4/3) and strong brown (7.5YR 5/8) nodules 0.25 to 0.75 inch in diameter; few fine roots; strongly acid; clear wavy boundary.
Bt1—11 to 22 inches; light yellowish brown (10YR 6/4) sandy clay loam; common medium distinct reddish yellow (7.5YR 6/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; common fine pores; very strongly acid; clear wavy boundary.
Bt2—22 to 46 inches; yellow (10YR 7/6) sandy clay loam; common medium distinct light gray (10YR 7/2) mottles and common medium faint yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine pores; very strongly acid; gradual wavy boundary.
BCg—46 to 65 inches; light gray (10YR 7/2) sandy clay loam; common medium distinct brownish yellow (10YR 6/8) mottles and few medium prominent red (2.5YR 5/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; very strongly acid; clear wavy boundary.
Cg—65 to 80 inches; light gray (10YR 7/2) loamy sand; single grained; loose; strongly acid.

The A, E/Bh, and B horizons are 60 to 72 inches thick. Reaction ranges from extremely acid to strongly acid unless lime has been added.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 or 2.

The E part of the E/Bh horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 to 4. The Bh part makes up 15 to 35 percent of the horizon and consists of weakly to strongly cemented nodules. It has hue of 10YR to 5YR, value of 3 to 5, and chroma of 2 to 5.

The Bt horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 3 to 8. Mottles that have chroma of 1 or 2 are at a depth of 18 to 30 inches. Some pedons have a Btg horizon that has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. The Bt and Btg horizons are sandy clay loam, clay loam, sandy loam, or fine sandy loam.

The Cg horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. It is sandy, loamy, or clayey sediment.

Pantego Series

The Pantego series consists of very poorly drained soils on uplands. These soils formed in moderately fine textured sediment. Slope is less than 2 percent.

Typical pedon of Pantego fine sandy loam; 4.1 miles west of Newport on State Road 1124, 3.5 miles north on State Road 1125, 0.5 mile west on a logging road, and 25 feet south of the road:

A—0 to 14 inches; black (10YR 2/1) fine sandy loam; very friable; weak medium granular structure; many fine and medium roots; extremely acid; clear wavy boundary.
Btg—14 to 52 inches; gray (10YR 5/1) sandy clay loam; common medium distinct brownish yellow (10YR 6/8) and very dark gray (10YR 3/1) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; common fine pores; very strongly acid; gradual wavy boundary.

BCg—52 to 62 inches; gray (10YR 5/1) fine sandy loam; common medium distinct brownish yellow (10YR 6/8) mottles; massive; very strongly acid; gradual wavy boundary.
Cg—62 to 80 inches; gray (10YR 5/1) loamy sand; massive; very friable; common lenses of fine sandy loam; very strongly acid.

The A and B horizons are 60 to 80 inches thick. Reaction ranges from extremely acid to strongly acid unless lime has been added.

The A or Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1; or it is neutral and has value of 2 or 3. It is 10 to 24 inches thick.

The Btg horizon has hue of 10YR to 5Y, value of 3 to 7, and chroma of 1 or 2; or it is neutral and has value of 3 to 7. This horizon is sandy clay loam, clay loam, or sandy clay. The content of clay ranges from 18 to 35 percent in the upper 20 inches of the Btg horizon, and the content of silt is less than 30 percent.

The Cg horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2; hue of 5GY or 5G, value of 4 to 7, and chroma of 1; or it is neutral and has value of 5 to 7. This horizon is sandy, loamy, or clayey sediment.

Pantego soils in Carteret County are taxadjuncts to the Pantego series because most pedons have a more than 20 percent decrease in clay content from the maximum within a depth of 40 to 60 inches and do not have skeletans. However, these differences do not affect the overall use, management, and behavior of these soils.

Ponzer Series

The Ponzer series consists of very poorly drained soils on low marine terraces. These soils formed in moderately thick beds of organic material underlain by moderately coarse to moderately fine textured sediment. Slope is less than 1 percent.

Typical pedon of Ponzer muck; 2 miles north of Masontown on U.S. Highway 70 to Nelson Bay Canal, 2.3 miles west on a farm road, 1 mile north on a farm road, and 50 feet east of the road:

Oa1—0 to 10 inches; black (10YR 2/1) broken face and rubbed muck; 40 percent fiber, less than 10 percent rubbed; moderate medium granular structure; very friable; many fine and medium roots; extremely acid; clear wavy boundary.
Oa2—10 to 26 inches; black (10YR 2/1) broken face and rubbed muck; 20 percent fiber, less than 5 percent rubbed; massive; very friable; common fine roots; extremely acid; diffuse wavy boundary.
2A—26 to 54 inches; very dark brown (10YR 2/2) mucky fine sandy loam; massive; very friable; extremely acid; clear wavy boundary.
2Cg—54 to 66 inches; dark grayish brown (10YR 4/2) sandy clay loam; massive; friable, slightly sticky and slightly plastic; very strongly acid.

Ponzer soils have a highly decomposed organic horizon 16 to 51 inches thick. The organic material is extremely acid unless lime has been added. Buried logs, stumps, and wood fragments make up as much as 10 percent of the organic material. The underlying mineral horizon ranges from extremely acid to mildly alkaline.

The organic horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2; or it is neutral and has value of 2 or 3. The surface layer is muck that has granular structure. The lower part of the organic horizon is massive.

The underlying mineral horizons have hue of 10YR to 5Y, value of 2 to 6, and chroma of 1 or 2. In the lower part, they can have hue of 5GY or 5G, value of 4 to 6, and chroma of 1. The mineral horizons are loamy in the upper 12 inches or more and sandy, loamy, or clayey sediment in the lower part.

Rains Series

The Rains series consists of poorly drained soils on uplands. These soils formed in moderately fine textured sediment. Slope is less than 2 percent.

Typical pedon of Rains fine sandy loam; 2.8 miles east of Newport on State Road 1154 and 50 feet north of the road:

Ap—0 to 8 inches; black (10YR 2/1) fine sandy loam; weak fine granular structure; very friable; common fine roots; medium acid; abrupt smooth boundary.
Btg1—8 to 24 inches; gray (10YR 5/1) sandy clay loam; common medium distinct brownish yellow (10YR 6/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; common fine pores; very strongly acid; gradual wavy boundary.
Btg2—24 to 42 inches; light gray (10YR 7/2) sandy clay loam; common fine and medium distinct brownish yellow (10YR 6/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine pores; very strongly acid; gradual wavy boundary.
BCg—41 to 66 inches; light gray (10YR 7/1) sandy clay loam; common fine and medium distinct brownish yellow (10YR 6/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; very strongly acid; gradual wavy boundary.
Cg—66 to 80 inches; gray (10YR 6/1) sandy clay loam, pockets of loamy sand; few fine distinct brownish yellow (10YR 6/8) mottles; weak medium platy structure; friable; very strongly acid.

The A and B horizons are 60 to 80 inches thick. Reaction ranges from extremely acid to strongly acid unless lime has been added.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 2 to 4, and chroma of 1 or 2; or it is neutral and has value of 2 to 4.

The Btg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2; or it is neutral and has value of 4 to 7. This horizon is sandy clay loam or clay loam.

The Cg horizon has hue of 10YR, value of 5 to 7, and chroma of 1; or it is neutral and has value of 5 to 7. It is sandy, loamy, or clayey sediment.

Roanoke Series

The Roanoke series consists of poorly drained soils on stream and low marine terraces. These soils formed in fine textured sediment. Slope is less than 2 percent.

Typical pedon of Roanoke loam; 4.3 miles east of Harlowe on North Carolina Highway 101, 0.6 mile north on State Road 1161, and 200 feet north of the road:

A—0 to 8 inches; black (10YR 2/1) loam; moderate medium granular structure; very friable; many fine, medium, and coarse roots; very strongly acid; clear smooth boundary.

BEg—8 to 13 inches; gray (10YR 5/1) clay loam; few fine distinct yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; common fine roots; common fine pores; very strongly acid; clear wavy boundary.

Btg—13 to 51 inches; gray (10YR 5/1) clay; common medium distinct brownish yellow (10YR 6/6) and yellowish brown (10YR 5/8) mottles; moderate medium angular blocky structure; firm, sticky and plastic; few fine roots; few fine pores; many distinct clay films on faces of peds; very strongly acid; abrupt wavy boundary.

BCg—51 to 58 inches; gray (10YR 6/1) sandy clay loam; many medium distinct brownish yellow (10YR 6/6) mottles; massive; friable, slightly sticky and slightly plastic; very strongly acid; gradual wavy boundary.

Cg—58 to 80 inches; gray (10YR 5/1) fine sandy loam; common medium distinct light yellowish brown (10YR 6/4) mottles; massive; very friable; common thin lenses of clay; strongly acid.

The A and B horizons are 40 to 60 inches thick. Reaction ranges from extremely acid to strongly acid unless lime has been added.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 2 to 4, and chroma of 1 or 2; or it is neutral and has value of 2 to 4. It is less than 10 inches thick.

The Btg horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2; or it is neutral and has value of 5 to 7. This horizon is clay, silty clay, or clay loam.

The Cg horizon has colors similar to those of the Btg horizon and can have hue of 5GY, value of 5 or 6, and chroma of 1. It is sandy, loamy, or clayey sediment.

Seabrook Series

The Seabrook series consists of moderately well drained soils on stream and low marine terraces. These soils formed in coarse textured sediment. Slope is 0 to 2 percent.

Typical pedon of Seabrook fine sand; 3 miles north of Cape Carteret on North Carolina Highway 58, 0.75 mile north on State Road 1109, 1.3 miles west on State Road 1106, 0.5 mile south on a farm path, and 20 feet east of the path:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) fine sand; single grained; loose; common fine roots; slightly acid; abrupt smooth boundary.

C1—8 to 24 inches; light yellowish brown (10YR 6/4) fine sand; few medium faint yellowish brown (10YR 5/8) mottles; single grained; loose; few fine roots; medium acid; gradual wavy boundary.

C2—24 to 48 inches; very pale brown (10YR 7/4) fine sand; common medium faint light gray (10YR 7/2) and yellowish brown (10YR 5/8) mottles; single grained; loose; medium acid; gradual wavy boundary.

Cg—48 to 80 inches; light gray (10YR 7/2) sand; common medium faint very pale brown (10YR 7/3) mottles; single grained; loose; medium acid.

Seabrook soils are sandy to a depth of 80 inches or more. Reaction ranges from very strongly acid to slightly acid unless lime has been added. Few or common small concretions are in some pedons.

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

The C horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 3 to 8. The Cg horizon has hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 1 or 2. Mottles or base colors that have chroma of 1 or 2 are within 40 inches of the surface. The C and Cg horizons are sand, loamy sand, loamy fine sand, or fine sand.

State Series

The State series consists of well drained soils on stream and low marine terraces. These soils formed in moderately fine textured sediment. Slope ranges from 0 to 2 percent.

Typical pedon of State loamy fine sand, 0 to 2 percent slopes; 2.3 miles southeast of Harlowe on North Carolina Highway 101 to State Road 1160, 0.8 mile east to State Road 1158, 1.4 miles south on State Road 1158, 0.5 mile west on a farm path, and 30 feet south of the path:

Ap—0 to 7 inches; brown (10YR 5/3) loamy fine sand; weak medium granular structure; very friable; common fine roots; medium acid; abrupt smooth boundary.

E—7 to 11 inches; light yellowish brown (10YR 6/4) loamy fine sand; weak medium granular structure; few fine roots; medium acid; abrupt wavy boundary.
Bt1—11 to 31 inches; strong brown (7.5YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; common fine pores; very strongly acid; gradual wavy boundary.
Bt2—31 to 40 inches; yellowish brown (10YR 5/8) sandy clay loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine pores; very strongly acid; clear wavy boundary.
BC—40 to 46 inches; brownish yellow (10YR 6/8) fine sandy loam; massive; very friable; strongly acid; clear wavy boundary.
C1—46 to 53 inches; brownish yellow (10YR 6/6) loamy fine sand; massive; very friable; very strongly acid; clear wavy boundary.
C2—53 to 80 inches; yellow (10YR 7/6) sand; common thin lenses and pockets of light gray (10YR 7/2) uncoated sand and strong brown (7.5YR 5/8) loamy sand and sandy loam; single grained; loose; strongly acid.

The A, E, and B horizons are 35 to 60 inches thick. Reaction ranges from very strongly acid to medium acid unless lime has been added.

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

The E horizon has hue of 10YR, value of 6 or 7, and chroma of 3 to 8.

The Bt horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 6 or 8. It is sandy clay loam.

The C horizon has hue of 7.5YR to 2.5Y, value of 4 to 7, and chroma of 2 to 8. It is sandy or loamy sediment.

Tomotley Series

The Tomotley series consists of poorly drained soils on stream and low marine terraces. These soils formed in moderately fine textured sediment. Slope is 0 to 2 percent.

Typical pedon of Tomotley fine sandy loam; 4 miles north of Beaufort to the junction of U.S. Highway 70 and State Road 1300, 2.8 miles north on State Road 1300, 150 feet west on a farm road, and 30 feet north of the road:

A—0 to 7 inches; dark gray (10YR 4/1) fine sandy loam; weak medium granular structure; very friable; many fine and medium roots; very strongly acid; abrupt wavy boundary.
Eg—7 to 11 inches; light brownish gray (10YR 6/2) fine sandy loam; common medium distinct brownish yellow (10YR 6/8) and dark gray (10YR 4/1) mottles; weak medium granular structure; very friable; common fine roots; very strongly acid; clear wavy boundary.
BEg—11 to 14 inches; light brownish gray (10YR 6/2) fine sandy loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; very friable; few fine roots; very strongly acid; clear wavy boundary.
Btg—14 to 35 inches; gray (10YR 6/1) sandy clay loam; common medium distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; firm, slightly sticky and slightly plastic; few fine roots; common fine pores; very strongly acid; gradual wavy boundary.
BCg—35 to 54 inches; gray (10YR 6/1) sandy clay loam; common medium distinct yellowish brown (10YR 5/8) and very pale brown (10YR 7/4) mottles and few fine prominent yellowish red (5YR 5/8) mottles; massive; friable, slightly sticky and slightly plastic; very strongly acid; clear wavy boundary.
Cg—54 to 80 inches; gray (10YR 6/1) loamy fine sand; common fine and medium distinct brownish yellow (10YR 6/8) mottles; massive; very friable; common thin lenses of fine sandy loam and sandy clay loam; strongly acid.

The A, E, and B horizons are 40 to 60 inches thick. Reaction ranges from extremely acid to strongly acid unless lime has been added.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 2 to 4, and chroma of 1 or 2; or it is neutral and has value of 2 to 4. It is less than 10 inches thick.

The Eg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2.

The Btg horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2; or it is neutral and has value of 4 to 7. This horizon is sandy clay loam or clay loam.

The Cg horizon has the same colors as those of the Btg horizon and can have hue of 5GY, value of 6, and chroma of 1. It is sandy, loamy, or clayey sediment.

Torhunta Series

The Torhunta series consists of very poorly drained soils on uplands. These soils formed in moderately coarse textured sediment. Slope is less than 2 percent.

Typical pedon of Torhunta mucky fine sandy loam; 4.4 miles east of Newport on State Road 1154, 0.75 mile north on a logging road, and 50 feet east of the road:

A1—0 to 13 inches; black (N 2/0) mucky fine sandy loam; weak medium granular structure; very friable; many fine and medium roots; extremely acid; clear irregular boundary.
A2—13 to 20 inches; black (10YR 2/1) fine sandy loam; weak medium granular structure; very friable; common fine roots; extremely acid; clear wavy boundary.

Bg—20 to 33 inches; dark grayish brown (10YR 4/2) fine sandy loam; many medium and coarse faint very dark grayish brown (10YR 3/2) pockets of organic stained fine sandy loam; weak medium subangular blocky structure; very friable; few fine roots; very strongly acid; clear wavy boundary.
Cg1—33 to 52 inches; light brownish gray (2.5Y 6/2) fine sandy loam; massive; very friable; very strongly acid; abrupt wavy boundary.
Cg2—52 to 80 inches; gray (5Y 5/1) loamy sand; massive; very friable; very strongly acid.

Torhunta soils are loamy to a depth of 20 to 50 inches. Reaction ranges from extremely acid to strongly acid unless lime has been added.

The A horizon has hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 1 or 2; or it is neutral and has value of 2 or 3. It is 10 to 24 inches thick.

The Bg horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2; or it is neutral and has value of 4 to 6. It is sandy loam or fine sandy loam.

The Cg horizon has the same colors as those of the Bg horizon and can have hue of 5GY or 5G, value of 4 to 6, and chroma of 1. It is sandy or loamy sediment.

Wando Series

The Wando series consists of well drained soils on low marine and stream terraces. These soils formed in coarse textured sediment. Slope ranges from 0 to 6 percent.

Typical pedon of Wando fine sand, 0 to 6 percent slopes; at Cape Carteret, 0.3 mile west of the intersection of North Carolina Highway 58 and North Carolina Highway 24, 250 feet south on a private road, and 25 feet east of the road:

Ap—0 to 8 inches; dark brown (10YR 4/3) fine sand; single grained; loose; common fine roots; neutral; abrupt smooth boundary.
C1—8 to 27 inches; strong brown (7.5YR 5/8) fine sand; single grained; loose; few fine roots; neutral; gradual wavy boundary.
C2—27 to 51 inches; yellow (10YR 7/8) fine sand; single grained; loose; slightly acid; gradual wavy boundary.
C3—51 to 66 inches; brownish yellow (10YR 6/8) fine sand; single grained; loose; slightly acid; gradual wavy boundary.
C4—66 to 80 inches; reddish yellow (7.5YR 6/8) fine sand; many medium faint yellow (10YR 7/6) mottles and common fine and medium distinct red (2.5YR 4/8) mottles; single grained; loose; slightly acid.

Wando soils are sandy to a depth of 80 inches or more. Reaction ranges from medium acid to neutral. Some pedons have small, dark reddish brown concretions.

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

The C horizon has hue of 5YR to 10YR, value of 5 to 7, and chroma of 3 to 8; or it has hue of 2.5Y, value of 6 or 7, and chroma of 3 to 8. Many pedons have mottles or base colors that have chroma of 1 or 2 below a depth of 40 inches. The C horizon is fine sand, loamy fine sand, loamy sand, or sand.

Wasda Series

The Wasda series consists of very poorly drained soils on low marine terraces. These soils formed in moderately fine textured sediment overlain by thin organic layers. Slope is less than 2 percent.

Typical pedon of Wasda muck; 4 miles north of Beaufort to the junction of U.S. Highway 70 and State Road 1300, 7.5 miles north on State Road 1300 to Open Grounds Farm office, 3 miles east on a farm road to a shop, 1.5 miles south on a farm road, and 50 feet west of the road:

Op—0 to 10 inches; black (N 2/0) broken face and rubbed muck; 5 percent fiber, less than 1 percent rubbed; moderate medium granular structure; very friable; many fine roots; strongly acid; clear smooth boundary.
Oa—10 to 15 inches; black (10YR 2/1) broken face and rubbed muck; massive; very friable; common fine roots; very strongly acid; gradual wavy boundary.
A—15 to 31 inches; very dark grayish brown (10YR 3/2) loam; massive; friable; common fine roots; very strongly acid; gradual wavy boundary.
Bg—31 to 45 inches; dark grayish brown (10YR 4/2) clay loam; massive; friable, slightly sticky and slightly plastic; few lenses of sandy clay loam; common fine roots; common fine pores; strongly acid; clear wavy boundary.
Cg—45 to 77 inches; gray (5Y 5/1) sand; single grained; loose; neutral.

Reaction ranges from extremely acid to strongly acid in the organic surface layer unless lime has been added. The mineral horizons are very strongly acid or strongly acid in the upper part and range from medium acid to moderately alkaline in the lower part.

The Oa or Op horizon has hue of 10YR to 5YR, value of 2 or 3, and chroma of 1 or 2; or it is neutral and has value of 2 or 3. The Oa or Op horizon is 8 to 16 inches thick.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2; or it is neutral and has value of 2 or 3. It is fine sandy loam, sandy loam, loam, or their mucky counterparts.

The Bg horizon has hue of 10YR to 5Y, value of 2 to 5, and chroma of 1 or 2; or it is neutral and has value of

2 to 5. It is clay loam, loam, sandy clay loam, or fine sandy loam.

The Cg horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2; hue of 5GY or 5G, value of 4 to 6, and chroma of 1; or it is neutral and has value of 5 to 7. This horizon is sandy, loamy, or clayey sediment.

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Glossary

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well-aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

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

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

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

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

	Inches/inch (in tables)
Very low	0.00 to 0.05
Low	0.05 to 0.10
Moderate	0.10 to 0.15
High	0.15 to 0.20
Very high	more than 0.20

Basal area. The cross-sectional area of a tree bole measured at 4.5 feet above ground level. It is usually 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.

Blowout (deflation basin). A breach of the frontal dunes on the Outer Banks from which all or most of the soil material has been removed by wind.

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

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

Clayey. (general soil textural class). A general textural term that includes sandy clay, silty clay, and clay.

Clayey. (taxonomic: family level criteria). A specific textural name referring to fine earth (particles less than 2 mm in size) within the control section, containing 35 percent or more clay by weight; rock fragments are less than 35 percent, by volume.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Compressible (in tables). The volume of soft soil decreases excessively under load.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Iron oxide is 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.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Dbh(diameter at breast height). The diameter of a tree at 4.5 feet above the ground level on the uphill side.

Denitrification. The biochemical reduction of nitrate or nitrite to gaseous nitrogen either as molecular nitrogen or as an oxide of nitrogen.

Dispersion (soils). The breakup of compound particles such as soil aggregates or saprolite into single grains resulting in a highly erosive condition. This phenomenon results from the failure of grains to adhere or bond to one another and generally is associated with a high water content in soils containing high levels of sodium.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

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

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured and free of the mottling related to wetness.
Somewhat excessively drained.—Water is removed from the soil rapidly. Somewhat excessively drained soils are sandy, rapidly pervious, and 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.
Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.
Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.
Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded.

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

Elm-ash-cottonwood. Forests in which elm, ash, or cottonwood, singularly or in combination, constitute a majority of the stocking. (Common associates include willow, sycamore, beech, and maple).

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, such as fire, that exposes the surface.

Erosion classes. Classes that estimate past erosion based on the following:

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. (Soil map units having class 1 erosion typically are not designated in the map unit description.)

Class 2.—Soils that have lost on the average of 25 to 75 percent of the original A horizon or 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 on the average of 75 percent or more of the original A horizon or the uppermost 8 inches (if the original A horizon was less than 8 inches thick). In most areas of class 3 erosion, material below the original A horizon is exposed at the surface in cultivated areas. The plow layer consists entirely or largely of material that was below the original A horizon.

Class 4.—Soils that have lost all of the 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 indentified 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, if inadequately protected. 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):

None	0 t/ha
Slight	less than 2.5 t/ha
Moderate	2.5 to 10 t/ha
Severe	10 to 25 t/ha
Very severe	more than 25 t/ha

Evapotranspiration. The combined loss of water from a given area, and during a specified period of time, by evaporation from the soil surface and from transpiration by plants.

Excess fines (in tables). Excess silt and clay are in the soil. The soil is not a source of gravel or sand for construction purposes.

Excess salts (in tables). Excess water-soluble salts in the soil restrict the growth of most plants.

Fast intake (in tables). The movement of water into the soil is rapid.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fine textured soil. Sandy clay, silty clay, and clay.

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

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

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

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

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 upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An

explanation of the subdivisions is given in the *Soil Survey Manual*. The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is, in part, a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as accumulation of clay, sesquioxides, humus, or a combination of these; prismatic or blocky structure; redder or browner colors than those in the A horizon; or a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Arabic numeral 2 precedes the letter C.

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 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.

Infiltration. The downward entry of water into the immediate surface of soil or other material. This contrasts 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.

Interstream Area. The nearly level land between drainageways in relatively undissected parts of Coastal Plain uplands, low marine terraces, and stream terraces, where the soils are dominantly poorly drained or very poorly drained.

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 (general: soil textural class). 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.

Loamy (taxonomic: family level criteria). A specific textural name referring to fine earth (particles less than 2mm in size) within the control section, of loamy very fine sand or finer that contains less than 35 percent clay by weight; rock fragments are less than 35 percent by volume.

Low strength. The soil is not strong enough to support loads.

Marsh. Periodically wet or continually flooded areas with the surface not deeply submerged. These areas are dominantly covered with sedges, cattails, rushes or other hydrophytic (water loving) plants. Subgroups are:

Freshwater.—Lowland areas bordering rivers, creeks, and lakes that are flooded with fresh water and dominated by halophobic (salt intolerant) plants.

Salt.—Lowland areas bordering coastal islands, sounds, bays, and sloughs that are flooded with salt water and dominated by halophytic (salt tolerant) plants.

Tidal.—Lowland areas bordering rivers, creeks, and sloughs, and traversed by interlacing channels that are periodically inundated by high tides with either saltwater or brackish water and 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.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Sandy loam and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

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

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

Muck. Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

No-till planting. A method of planting crops with no seed bed preparation. A specialized planter opens a slit in the soil surface and places the seed at the desired depth. Weeds are controlled with herbicides.

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.

Organic soil. Soil that is at least 20 percent organic matter, by weight, if the mineral material contains no clay; or at least 30 percent, by weight, if the mineral material contains more than 60 percent clay.

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 affects 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, for example slope, texture, and flooding.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Subsurface tunnels or pipelike cavities are formed by water moving through the soil.

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

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Pocosin. A large, waterlogged, flat interstream area that is elevated slightly above the distant flood plains. Soils are typically high in organic matter and vegetated by high wetness tolerant plants.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor filter (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poor outlets (in tables). In these areas, surface or subsurface drainage outlets are difficult or expensive to install.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

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

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

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

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

Runoff. The precipitation discharged 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 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 (general: soil textural class). 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.

Sandy (taxonomic: family level criteria). A specific textural name referring to fine earth (particles less than 2mm in size) within the control section, of sand or loamy sand that contains less than 50 percent very fine sand by weight; rock fragments are 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 adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

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

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

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

Skeletans. Coatings of light colored, low luster silica flour or silica dust adhering to the natural surfaces in soil materials.

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

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

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

Soil compaction. An alteration of soil structures that ultimately can affect biological and chemical soil properties. Soil compaction decreases voids, increases bulk density, and can restrict root penetration.

Soil puddling. This condition occurs in certain soils when they are driven over while they are wet. Exertion of mechanical force destroys the soil structure by compression and shearing and results in the rearrangement of the soil particles to a massive or nonstructural state.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

	Millimeters
Very coarse sand	2.0 to 1.0

Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind and water erosion.

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

Subsidence. A term applied to soils that experience a pronounced reduction in volume when drained because of the removal of water, shrinkage of organic materials, and the oxidation of organic compounds. Usually associated with soils that have a high organic matter content.

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

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

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace (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."

Sand.—Soil material that contains 85 percent or more sand; the percentage of silt plus 1-1/2 times the percentage of clay does not exceed 15.

Loamy sand.—Soil material that contains at the upper limit 85 to 90 percent sand, and the percentage of silt plus 1-1/2 times the percentage of clay is not less than 15; at the lower limit it contains not less than 70 to 85 percent sand, and the percentage of silt plus twice the percentage of clay does not exceed 30.

Sandy loam.—Soil material that contains either 20 percent clay or less and the percentage of silt plus twice the percentage of clay exceeds 30, and 52 percent or more sand; or less than 7 percent clay, less than 50 percent silt, and between 43 and 52 percent sand.

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 percent or more 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 percent or more 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 percent or more 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 percent or more clay and 45 percent or more sand.

Silty clay.—Soil material that contains 40 percent or more clay and 40 percent or more silt.

Clay.—Soil material that contains 40 percent or more 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.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, such as zinc, cobalt, manganese, copper, and iron, are in soils in extremely small amounts. They are essential to plant growth.

Unstable fill (in tables). There is a risk of caving or sloughing on banks of fill material.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Well graded. Refers to soil material consisting of course grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. This contrasts with poorly graded soil.

Wetness. A general term applied to soils that hold water at or near the surface long enough to be a common management problem.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Data recorded in the period 1951-77 at Morehead City, North Carolina]

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average daily	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----	54.3	36.5	45.4	71	15	88	3.68	2.11	4.96	7	.3
February---	56.5	37.9	47.2	71	17	73	4.09	2.37	5.49	6	.9
March------	62.1	43.8	53.0	78	25	169	3.59	2.02	4.86	7	.0
April------	70.3	52.3	61.3	83	34	339	2.93	1.24	4.29	5	.0
May--------	77.8	61.2	69.5	90	42	605	4.37	2.67	5.89	6	.0
June-------	83.4	68.8	76.1	93	53	783	4.66	2.33	6.56	6	.0
July-------	86.4	72.6	79.5	93	61	915	6.37	3.07	9.05	7	.0
August-----	86.5	72.4	79.5	94	60	915	6.61	2.94	9.59	8	.0
September--	82.9	67.5	75.2	91	53	756	5.33	2.89	7.31	6	.0
October----	74.8	57.1	66.0	86	34	496	3.87	1.40	5.85	4	.0
November---	65.8	46.3	56.1	80	25	202	3.28	1.44	4.77	5	.0
December---	57.7	39.0	48.5	72	18	97	3.74	1.77	5.34	6	.1
Yearly:											
Average--	71.5	54.6	63.1	---	---	---	---	---	---	---	---
Extreme--	---	---	---	96	14	---	---	---	---	---	---
Total----	---	---	---	---	---	5,438	52.52	45.03	60.18	73	1.3

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 °F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Data recorded in the period 1951-77
at Morehead City, North Carolina]

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	March 15	March 31	April 12
2 years in 10 later than--	March 6	March 20	April 4
5 years in 10 later than--	February 16	February 27	March 20
First freezing temperature in fall:			
1 year in 10 earlier than--	November 18	November 9	November 2
2 years in 10 earlier than--	November 27	November 16	November 8
5 years in 10 earlier than--	December 14	November 29	November 19

TABLE 3.--GROWING SEASON

[Data recorded in the period 1951-77
at Morehead City, 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	258	230	211
8 years in 10	272	245	222
5 years in 10	299	274	243
2 years in 10	327	302	264
1 year in 10	344	317	275

TABLE 4.--COMMON AND SCIENTIFIC NAMES OF PLANTS

Common name	Scientific name
Alabama supplejack	Berchemia scandens
American beachgrass	Ammophila breviligulata
American beautyberry	Callicarpa americana
American beech	Fagus grandifolia
American elm	Ulmus americana
American holly	Ilex opaca
American hornbeam	Carpinus caroliniana
arrowhead	Sagittaris sp.
Atlantic white-cedar	Chamaecyparis thyoides
baldcypress	Taxodium distichum
bayberry	Myrica heterophylla
big cordgrass	Spartina cynosuroides
bitter gallberry	Ilex glabra
bitter panicum	Panicum amarum
black needlerush	Juncus roemerianus
black willow	Salix nigra
blackgum	Nyssa sylvatica
blackjack oak	Quercus marilandica
blueberry	Vaccinium sp.
bluejack oak	Quercus incana
brackenfern	Pteridium aquilinum
Carolina jessamine	Gelsemium sempervirens
cattail	Typha sp.
cherrybark oak	Quercus falcata var. pagodaefolia
cinnamon fern	Osmunda cinnamomea
climbing hydrangea	Decumaria barbara
devils walking stick	Zanthoxylum clava-herculis
dwarf waxmyrtle	Myrica cerifera var. pumila
eastern baccharis	Baccharis halimifolia
eastern redcedar	Juniperus virginiana
fetterbush	Lyonia lucida
flowering dogwood	Cornus florida
glasswort	Salicornia sp.

TABLE 4.--COMMON AND SCIENTIFIC NAMES OF PLANTS--Continued

Common name	Scientific name
grape	Vitis sp.
green ash	Fraxinus pennsylvanica
greenbrier	Smilax sp.
hickory	Carya sp.
honey cup	Zenobia pulverulenta
honeysuckle	Lonicera sp.
huckleberry	Gaylussacia sp.
large gallberry	Ilex coriacea
largeleaf pennywort	Hydrocotyle bonariensis
laurel oak	Quercus laurifolia
live oak	Quercus Virginiana
lizardstail	Saururus cernuus
loblolly-bay	Gordonia lasianthus
loblolly pine	Pinus taeda
longleaf pine	Pinus palustris
marshelder	Iva frutescens
marshhay cordgrass	Spartina patens
netted chainfern	Woodwardia areolata
partridgeberry	Mitchella repens
Pennsylvania smartweed	Polygonum pensylvanicum
peppervine	Ampelopsis arborea
persimmon	Diospyros virginiana
pitcherplant	Sarracenia sp.
poison-ivy	Rhus radicans
pond pine	Pinus serotina
post oak	Quercus stellata
red chokeberry	Aronia arbutifolia
red maple	Acer rubrum
redbay	Persea borbonia
river birch	Betula nigra
royal fern	Osmunda regalis
saltgrass	Distichlis spicata
saltmarsh bulrush	Scirpus robustus

TABLE 4.--COMMON AND SCIENTIFIC NAMES OF PLANTS--Continued

Common name	Scientific name
saltwort	Batis maritima
sand post oak	Quercus stellata margaretta
sassafras	Sassafras albidum
sawgrass	Cladium jamaicense
sea-oats	Uniola paniculata
sea rocket	Cakile edentula
seacoast bluestem	Schizachyrium scoparius var. littoralis
seashore elder	Iva imbricata
seashore mallow	Kosteletzkya virginica
seaside goldenrod	Solidago sempervirens
sedges	Cyperaceae
Shumard oak	Quercus shumardii
smooth cordgrass	Spartina alterniflora
sourwood	Oxydendrum arboreum
southern redcedar	Juniperus silicicola
southern red oak	Quercus falcata
southern sugar maple	Acer saccharum floridanum
sphagnum moss	Sphagnum
sundew	Drosera sp.
swamp chestnut oak	Quercus michauxii
swamp tupelo	Nyssa sylvatica biflora
sweet pepperbush	Clethra alnifolia
sweetbay	Magnolia virginiana
sweetgum	Liquidambar styraciflua
sweetleaf	Symplocos tinctoria
switchcane	Arundinaria tecta
threeawn grass	Aristida sp.
titi	Cyrilla racemiflora
turkey oak	Quercus laevis
Virginia chainfern	Woodwardia virginica
Virginia creeper	Parthenocissus quinquefolia
Virginia willow	Itea virginica

Table 4.--COMMON AND SCIENTIFIC NAMES OF PLANTS--Continued

Common name	Scientific name
water oak	Quercus nigra
waxmyrtle	Myrica cerifera
white oak	Quercus alba
wild olive	Osmanthus americana
willow oak	Quercus phellos
yaupon holly	Ilex vomitoria
yellow-poplar	Liriodendron tulipfera

TABLE 5.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
AaA	Altavista loamy fine sand, 0 to 2 percent slopes	8,349	2.5
Ag	Augusta loamy fine sand	4,376	1.3
Ap	Arapahoe fine sandy loam	15,366	4.5
AuB	Autryville loamy fine sand, 0 to 6 percent slopes	1,941	0.6
Be	Beaches, coastal	2,870	0.8
Bf	Beaches, storm tidal	2,508	0.7
BH	Belhaven muck	8,684	2.6
Bn	Beaches-Newhan complex, 0 to 30 percent slopes	1,067	0.3
ByB	Baymeade fine sand, 1 to 6 percent slopes	5,108	1.5
Cd	Corolla-Duckston complex	763	0.2
CH	Carteret sand, frequently flooded	5,812	1.7
CL	Carteret sand, low, frequently flooded	3,167	0.9
CnB	Conetoe loamy fine sand, 0 to 5 percent slopes	1,206	0.4
Co	Corolla fine sand	1,203	0.4
CrB	Craven loam, 1 to 4 percent slopes	238	0.1
CT	Croatan muck	20,084	5.9
Cu	Corolla-Urban land complex	462	0.1
DA	Dare muck	4,487	1.3
De	Deloss fine sandy loam	37,139	10.9
Dm	Deloss mucky loam, frequently flooded	894	0.3
DO	Dorovan muck, frequently flooded	1,741	0.5
Du	Duckston fine sand, frequently flooded	2,488	0.7
Fr	Fripp fine sand, 2 to 30 percent slopes	1,228	0.4
GoA	Goldsboro loamy fine sand, 0 to 2 percent slopes	3,221	0.9
HB	Hobucken muck, frequently flooded	15,760	4.6
KuB	Kureb sand, 0 to 6 percent slopes	4,778	1.4
LF	Lafitte muck, frequently flooded	28,078	8.2
Ln	Leon sand	20,285	6.0
Lu	Leon-Urban land complex	321	0.1
Ly	Lynchburg fine sandy loam	3,057	0.9
MA	Masontown mucky loam, frequently flooded	6,068	1.8
Mc	Mandarin-Urban land complex	1,410	0.4
Mn	Mandarin sand	2,999	0.9
Mu	Murville mucky sand	15,828	4.6
Nc	Newhan-Corolla complex, 0 to 30 percent slopes	2,748	0.8
Nd	Newhan fine sand, dredged, 2 to 30 percent slopes	2,165	0.6
Ne	Newhan-Urban land complex, 0 to 8 percent slopes	495	0.1
Nh	Newhan fine sand, 2 to 30 percent slopes	1,296	0.4
NoA	Norfolk loamy fine sand, 0 to 2 percent slopes	362	0.1
NoB	Norfolk loamy fine sand, 2 to 6 percent slopes	1,358	0.4
On	Onslow loamy sand	4,454	1.3
Pa	Pantego fine sandy loam	7,670	2.3
PO	Ponzer muck	17,204	5.1
Ra	Rains fine sandy loam	5,830	1.7
Ro	Roanoke loam	1,519	0.4
Se	Seabrook fine sand	2,365	0.7
StA	State loamy fine sand, 0 to 2 percent slopes	1,964	0.6
Tm	Tomotley fine sandy loam	21,965	6.5
To	Torhunta mucky fine sandy loam	14,396	4.2
WaB	Wando fine sand, 0 to 6 percent slopes	5,299	1.6
Ws	Wasda muck	13,956	4.1
WuB	Wando-Urban land complex, 0 to 6 percent slopes	746	0.2
	Water areas less than 40 acres	1,702	0.5
	Total	340,480	100.0

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management that includes artificial drainage where needed. 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-urban land complex units are not listed in this table because they are not used for the production of crops and pasture.]

Map symbol and soil name	Land capability	Corn	Soybeans	Tobacco	Wheat	Irish Potatoes	Improved bermudagrass	Grass-clover
		Bu	Bu	Lbs	Bu	Cwt	AUM 1/	AUM 1/
AaA---------- Altavista	IIw	125	40	3,000	55	160	---	11.0
Ag---------- Augusta	IIIw	125	40	2,800	55	170	---	11.0
Ap 2/---------- Arapahoe	IIIw	135	45	---	55	250	---	12.0
AuB---------- Autryville	IIs	75	25	2,200	35	---	9.0	---
Be 3/, Bf 3/---- Beaches	VIIIw	---	---	---	---	---	---	---
BH 2/ 3/-------- Belhaven	IVw	135	45	---	55	---	---	12.0
Bn 3/:								
Beaches--------	VIIIw	---	---	---	---	---	---	---
Newhan---------	VIIIs	---	---	---	---	---	---	---
ByB---------- Baymeade	IIIs	60	---	---	---	---	8.0	---
Cd 3/---------- Corolla-Duckston	VIIw	---	---	---	---	---	---	---
CH 3/, CL 3/---- Carteret	VIIIw	---	---	---	---	---	---	---
CnB---------- Conetoe	IIs	75	25	2,200	---	---	9.0	---
Co---------- Corolla	VIIw	---	---	---	---	---	---	---
CrB---------- Craven	IIIe	105	35	2,500	45	---	---	10.0
CT 2/ 3/-------- Croatan	IVw	125	40	---	50	---	---	12.0
DA 2/ 3/-------- Dare	IVw	100	25	---	30	---	---	12.0
De 2/---------- Deloss	IIIw	135	45	---	55	225	---	12.0
Dm---------- Deloss	VIw	---	---	---	---	---	---	---

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Land capability	Corn	Soybeans	Tobacco	Wheat	Irish Potatoes	Improved bermudagrass	Grass-clover
		Bu	Bu	Lbs	Bu	Cwt	AUM [1]	AUM [1]
DO [3]---- Dorovan	VIIw	---	---	---	---	---	---	---
Du---- Duckston	VIIw	---	---	---	---	---	---	---
Fr---- Fripp	VIIs	---	---	---	---	---	---	---
GoA---- Goldsboro	IIw	125	40	3,000	55	---	---	11.0
HB [3]---- Hobucken	VIIIw	---	---	---	---	---	---	---
KuB---- Kureb	VIIs	---	---	---	---	---	3.5	---
LF [3]---- Lafitte	VIIIw	---	---	---	---	---	---	---
Ln---- Leon	IVw	50	---	---	---	---	9.0	---
Ly---- Lynchburg	IIw	125	40	2,800	55	---	---	11.0
MA [3]---- Masontown	VIIw	---	---	---	---	---	---	---
Mn---- Mandarin	VIs	---	---	---	---	---	5.0	---
Mu---- Murville	Vw	---	---	---	---	---	---	---
Nc:								
Newhan----	VIIIs	---	---	---	---	---	---	---
Corolla----	VIIw	---	---	---	---	---	---	---
Nd---- Newhan	VIIIs	---	---	---	---	---	---	---
Nh---- Newhan	VIIIs	---	---	---	---	---	---	---
NoA---- Norfolk	I	115	40	3,000	55	---	---	10.5
NoB---- Norfolk	IIe	110	35	2,900	50	---	---	10.0
On---- Onslow	IIw	115	40	2,700	50	---	---	11.0
Pa [2]---- Pantego	IIIw	135	45	---	55	---	---	12.0

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Land capability	Corn	Soybeans	Tobacco	Wheat	Irish Potatoes	Improved bermudagrass	Grass-clover
		Bu	Bu	Lbs	Bu	Cwt	AUM 1/	AUM 1/
PO 2/ 3/ Ponzer	IVw	135	45	---	55	---	---	12.0
Ra 2/ Rains	IIIw	130	40	---	55	---	---	11.0
Ro 2/ Roanoke	IIIw	110	35	---	50	---	---	9.0
Se Seabrook	IIIs	75	25	2,200	35	---	9.0	---
StA State	I	115	40	3,000	55	---	---	10.5
Tm 2/ Tomotley	IIIw	130	40	---	55	200	---	11.0
To 2/ Torhunta	IIIw	135	45	---	55	---	---	12.0
WaB Wando	IIIs	55	20	---	---	---	8.0	---
Ws 2/ Wasda	IIIw	135	45	---	55	---	---	12.0

1/ Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

2/ Yields shown for this unit are for drained conditions. See the map unit for the undrained capability subclass.

3/ See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available. The indicator tree for rating potential productivity is listed first]

Map symbol and soil name	Ordination symbol	Management concerns			Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Common trees	Site index	Productivity	
							$Ft^3/AC/YR$	
AaA---------- Altavista	9W	Slight	Moderate	Slight	Loblolly pine--------	91	133	Loblolly pine.
					Longleaf pine--------	84	110	
					Sweetgum------------	84	90	
					White oak-----------	---	--	
					Red maple-----------	---	--	
					Yellow-poplar--------	---	--	
					Southern red oak-----	---	--	
					Blackgum------------	---	--	
					Water oak-----------	---	--	
Ag---------- Augusta	9W	Slight	Moderate	Slight	Loblolly pine--------	90	131	Loblolly pine.
					Sweetgum------------	90	106	
					White oak-----------	80	62	
					Southern red oak-----	80	86	
					Water oak-----------	---	--	
					Longleaf pine--------	---	--	
					Yellow-poplar--------	---	--	
					Red maple-----------	---	--	
					Blackgum------------	---	--	
Ap---------- Arapahoe	10W	Slight	Severe [1]	Severe [1]	Loblolly pine [2]-----	95	142	Loblolly pine. [3]
					Sweetgum------------	---	--	
					Red maple-----------	---	--	
					Baldcypress----------	---	--	
					Pond pine-----------	85	120	
					Yellow-poplar--------	---	--	
					Blackgum------------	---	--	
					Willow oak----------	---	--	
					Swamp chestnut oak---	---	--	
					Water oak-----------	---	--	
AuB---------- Autryville	7S	Slight	Moderate	Moderate	Loblolly pine--------	77	105	Loblolly pine, longleaf pine,
					Longleaf pine--------	---	--	
					Southern red oak-----	---	--	
					Shumard oak----------	---	--	
					Hickory-------------	---	--	
					Sweetgum------------	---	--	
					Red maple-----------	---	--	
					White oak-----------	---	--	
					Post oak------------	---	--	
BH [4]---------- Belhaven	4W	Slight	Severe	Severe	Pond pine-----------	60	76	
					Loblolly-bay---------	---	--	
					Red maple-----------	---	--	
					Blackgum------------	---	--	
ByB---------- Baymeade	6S	Slight	Moderate	Moderate	Loblolly pine--------	66	86	Loblolly pine, longleaf pine.
					Longleaf pine--------	63	63	
					Southern red oak-----	---	--	
					Red maple-----------	---	--	
					Sweetgum------------	---	--	
					Post oak------------	---	--	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns			Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Common trees	Site index	Productivity	
							$Ft^3/AC/YR$	
CnB---------- Conetoe	8S	Slight	Moderate	Moderate	Loblolly pine--------	80	110	Loblolly pine.
					Longleaf pine--------	65	67	
					Southern red oak-----	---	--	
					Post oak------------	---	--	
					White oak-----------	---	--	
					Hickory-------------	---	--	
					Sweetgum------------	---	--	
					Red maple-----------	---	--	
					Shumard oak---------	---	--	
CrB---------- Craven	8W	Slight	Moderate	Slight	Loblolly pine--------	85	120	Loblolly pine.
					Longleaf pine--------	67	72	
					Water oak-----------	---	--	
					Sweetgum------------	---	--	
					White oak-----------	---	--	
					Southern red oak-----	---	--	
					Red maple-----------	---	--	
					Blackgum------------	---	--	
					Post oak------------	---	--	
					Yellow-poplar--------	---	--	
CT [4]---------- Croatan	6W	Slight	Severe	Severe	Loblolly pine [2]-----	70	93	Loblolly pine. [3]
					Pond pine-----------	56	86	
					Loblolly-bay---------	---	--	
					Sweetbay------------	---	--	
					Red maple-----------	---	--	
					Sweetgum------------	---	--	
					Blackgum------------	---	--	
					Baldcypress---------	---	--	
DA [4]---------- Dare	4W	Slight	Severe	Severe	Pond pine-----------	60	76	
					Loblolly-bay---------	---	--	
					Sweetbay------------	---	--	
De---------- Deloss	10W	Slight	Severe [1]	Severe [1]	Loblolly pine [2]-----	96	145	Loblolly pine. [3]
					Pond pine-----------	77	105	
					Water oak-----------	---	--	
					Willow oak----------	---	--	
					Swamp chestnut oak---	---	--	
					Red maple-----------	---	--	
					Blackgum------------	---	--	
					Yellow-poplar--------	---	--	
					Sweetgum------------	---	--	
Dm---------- Deloss	4W	Slight	Severe	Severe	Pond pine-----------	60	76	
					Red maple-----------	---	--	
					Atlantic white cedar-	---	--	
					Loblolly pine--------	---	--	
DO [4]---------- Dorovan	7W	Slight	Severe	Severe	Blackgum------------	70	95	
					Baldcypress---------	---	--	
					Swamp tupelo--------	---	--	
					Green ash-----------	---	--	
					American elm--------	---	--	
					Sweetgum------------	---	--	
					Red maple-----------	---	--	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns			Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Common trees	Site index	Productivity	
							$Ft^3/AC/YR$	
Fr Fripp	4S	Slight	Moderate	Moderate	Longleaf pine Loblolly pine Live oak American beech Hickory Blackgum	60 70 --- --- --- ---	56 93 -- -- -- --	Longleaf pine, loblolly pine.
GoA Goldsboro	9W	Slight	Moderate	Slight	Loblolly pine Longleaf pine Sweetgum Southern red oak White oak Water oak Red maple Yellow-poplar Blackgum	90 77 90 --- --- --- --- --- ---	131 94 106 -- -- -- -- -- --	Loblolly pine.
KuB Kureb	3S	Slight	Severe	Severe	Longleaf pine Loblolly pine	52 ---	40 --	Longleaf pine.
Ln Leon	4W	Slight	Moderate	Moderate	Longleaf pine Loblolly pine Pond pine	58 --- ---	52 -- --	Longleaf pine.
Ly Lynchburg	9W	Slight	Moderate	Slight	Loblolly pine Yellow-poplar Sweetgum Southern red oak White oak Blackgum Red maple Water oak Swamp chestnut oak	86 92 90 --- --- --- --- --- ---	123 93 106 -- -- -- -- -- --	Loblolly pine.
MA [4] Masontown	12W	Slight	Severe	Severe	Sweetgum Swamp tupelo Green ash Baldcypress Blackgum Red maple Water oak American elm Willow oak Swamp chestnut oak	111 --- --- --- --- --- 103 --- --- ---	176 -- -- -- -- -- 101 -- -- --	Sweetgum, American sycamore, eastern cottonwood.
Mn Mandarin	4S	Slight	Moderate	Severe	Longleaf pine Loblolly pine Live oak	60 --- ---	56 -- --	Longleaf pine.
Mu Murville	4W	Slight	Severe [1]	Severe [1]	Pond pine Red maple Loblolly-bay Blackgum Sweetbay	50 --- --- --- ---	59 -- -- -- --	Loblolly pine. [3]

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns			Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Common trees	Site index	Productivity	
							$Ft^3/AC/YR$	
NoA, NoB---------- Norfolk	9A	Slight	Slight	Slight	Loblolly pine--------	86	123	Loblolly pine.
					Longleaf pine--------	68	74	
					Southern red oak-----	---	--	
					White oak----------	---	--	
					Shumard oak----------	---	--	
					Hickory----------	---	--	
					American beech-------	---	--	
					Post oak----------	---	--	
					Water oak----------	---	--	
					Yellow-poplar--------	---	--	
On---------- Onslow	7A	Slight	Slight	Slight	Loblolly pine--------	76	103	Loblolly pine.
					Longleaf pine--------	67	72	
					Southern red oak-----	---	--	
					Water oak----------	---	--	
					Sweetgum----------	---	--	
					Red maple----------	---	--	
					Post oak----------	---	--	
					White oak----------	---	--	
					Yellow-poplar--------	---	--	
					Blackgum----------	---	--	
Pa---------- Pantego	10W	Slight	Severe [1]	Severe [1]	Loblolly pine [2]-----	98	148	Loblolly pine. [3]
					Pond pine----------	73	98	
					Water oak----------	---	--	
					Red maple----------	---	--	
					Willow oak----------	---	--	
					Blackgum----------	---	--	
					Swamp chestnut oak---	---	--	
					Yellow-poplar--------	---	--	
					Sweetgum----------	---	--	
PO [4]---------- Ponzer	6W	Slight	Severe	Severe	Loblolly pine [2]-----	70	93	Loblolly pine. [3]
					Pond pine----------	60	76	
					Baldcypress----------	---	--	
					Sweetgum----------	---	--	
					Blackgum----------	---	--	
					Sweetbay----------	---	--	
					Redbay----------	---	--	
					Loblolly-bay---------	---	--	
					Red maple----------	---	--	
Ra---------- Rains	10W	Slight	Severe [1]	Severe [1]	Loblolly pine [2]-----	94	140	Loblolly pine.
					Sweetgum----------	90	106	
					Pond pine----------	---	--	
					Red maple----------	---	--	
					Yellow-poplar--------	---	--	
					Blackgum----------	---	--	
					Water oak----------	---	--	
					Swamp chestnut oak---	---	--	
					Willow oak----------	---	--	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns			Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Common trees	Site index	Productivity	
							$Ft^3/AC/YR$	
Ro---------- Roanoke	9W	Slight	Severe [1]	Severe [1]	Loblolly pine [2]-----	90	131	Loblolly pine. [3]
					Pond pine----------	---	--	
					Blackgum----------	---	--	
					Sweetgum----------	---	--	
					Water oak----------	---	--	
					Swamp chestnut oak---	---	--	
					Red maple----------	---	--	
					Yellow-poplar--------	---	--	
					Willow oak----------	---	--	
Se---------- Seabrook	8S	Slight	Moderate	Moderate	Loblolly pine--------	81	112	Loblolly pine, longleaf pine.
					Longleaf pine--------	70	79	
					Red maple----------	---	--	
					Sweetgum----------	---	--	
					Water oak----------	---	--	
					Southern red oak-----	---	--	
					Blackgum----------	---	--	
					White oak----------	---	--	
StA---------- State	10A	Slight	Slight	Slight	Loblolly pine--------	95	142	Loblolly pine.
					Longleaf pine--------	---	--	
					Southern red oak-----	85	101	
					Laurel oak----------	---	--	
					Hickory----------	---	--	
					Red maple----------	---	--	
					Yellow-poplar--------	100	107	
					White oak----------	---	--	
					Water oak----------	---	--	
Tm---------- Tomotley	10W	Slight	Severe [1]	Severe [1]	Loblolly pine [2]-----	95	142	Loblolly pine. [3]
					Sweetgum----------	91	109	
					Yellow-poplar--------	---	--	
					Red maple----------	---	--	
					Pond pine----------	---	--	
					Blackgum----------	---	--	
					Water oak----------	---	--	
					Swamp chestnut oak---	---	--	
					Willow oak----------	---	--	
To---------- Torhunta	9W	Slight	Severe [1]	Severe [1]	Loblolly pine [2]-----	90	131	Loblolly pine. [3]
					Pond pine----------	70	93	
					Sweetgum----------	90	106	
					Red maple----------	---	--	
					Water oak----------	---	--	
					Yellow-poplar--------	---	--	
					Blackgum----------	---	--	
					Swamp chestnut oak---	---	--	
					Willow oak----------	---	--	
					Baldcypress----------	---	--	
WaB---------- Wando	6S	Slight	Moderate	Moderate	Loblolly pine--------	70	93	Loblolly pine, longleaf pine.
					Longleaf pine--------	70	79	
					Live oak----------	---	--	
					Sweetgum----------	---	--	
					Southern red oak-----	---	--	
					Shumard oak----------	---	--	
					Post oak----------	---	--	
					Blackjack oak--------	---	--	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns			Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Common trees	Site index	Productivity	
							$Ft^3/AC/YR$	
Ws---------- Wasda	10W	Slight	Severe 1/	Severe 1/	Loblolly pine 2/-----	96	145	Loblolly pine. 3/
					Sweetgum----------	---	--	
					Baldcypress----------	---	--	
					Pond pine----------	80	100	
					Red maple----------	---	--	
					Blackgum----------	---	--	

1/ Equipment use is moderately restricted and seedling mortality is moderate in areas that have been adequately drained.
2/ Potential productivity is attainable only in areas that have been adequately drained.
3/ Trees named are suitable for planting only in areas that have been adequately drained.
4/ See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
AaA---------- Altavista	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
Ag---------- Augusta	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Ap---------- Arapahoe	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
AuB---------- Autryville	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, too sandy.	Moderate: too sandy.	Moderate: droughty.
Be*, Bf*. Beaches					
BH---------- Belhaven	Severe: flooding, ponding, excess humus.	Severe: excess humus, ponding.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: excess humus, ponding.
Bn*: Beaches.					
Newhan----------	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Severe: droughty, slope.
ByB---------- Baymeade	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
Cd*: Corolla----------	Severe: flooding, too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
Duckston----------	Severe: flooding, wetness, too sandy.	Severe: too sandy.	Severe: too sandy, wetness, flooding.	Severe: too sandy.	Severe: droughty, flooding.
CH, CL---------- 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.
CnB---------- Conetoe	Slight----------	Slight----------	Moderate: slope.	Slight----------	Moderate: droughty.
Co---------- Corolla	Severe: flooding, too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
CrB---------- Craven	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Slight----------	Slight.
CT---------- Croatan	Severe: ponding, excess humus.	Severe: excess humus, too acid, ponding.	Severe: excess humus, ponding.	Severe: excess humus, ponding.	Severe: too acid, ponding.
Cu*: Corolla----------	Severe: flooding, too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
Urban land.					
DA---------- Dare	Severe: flooding, ponding, excess humus.	Severe: excess humus, ponding.	Severe: excess humus, ponding.	Severe: excess humus, ponding.	Severe: excess humus, ponding.
De---------- Deloss	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Dm---------- Deloss	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
DO---------- Dorovan	Severe: flooding, ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding, flooding.	Severe: ponding, excess humus.	Severe: ponding, flooding, excess humus.
Du---------- Duckston	Severe: flooding, wetness, too sandy.	Severe: too sandy.	Severe: too sandy, wetness, flooding.	Severe: too sandy.	Severe: droughty, flooding.
Fr---------- Fripp	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Severe: droughty, slope.
GoA---------- Goldsboro	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Slight----------	Slight.
HB---------- Hobucken	Severe: flooding, ponding.	Severe: ponding.	Severe: flooding, ponding.	Severe: ponding.	Severe: flooding, ponding.
KuB---------- Kureb	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
LF---------- Lafitte	Severe: flooding, ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding, flooding.	Severe: ponding, excess humus.	Severe: excess humus, ponding, flooding.
Ln---------- Leon	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Lu*:					
Leon	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
Urban land.					
Ly--- Lynchburg	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Severe: wetness.
MA--- Masontown	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
Mc*:					
Mandarin	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty, too sandy.
Urban land.					
Mn--- Mandarin	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty, too sandy.
Mu--- Murville	Severe: ponding.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding.
Nc*:					
Newhan	Severe: 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.
Nd--- Newhan	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Severe: droughty, slope.
Ne*:					
Newhan	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
Urban land.					
Nh--- Newhan	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Severe: droughty, slope.
NoA--- Norfolk	Slight	Slight	Slight	Slight	Slight
NoB--- Norfolk	Slight	Slight	Moderate: slope.	Slight	Slight
On--- Onslow	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Pa---------- Pantego	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
PO---------- Ponzer	Severe: flooding, ponding, excess humus.	Severe: excess humus, ponding.	Severe: excess humus, ponding.	Severe: excess humus, ponding.	Severe: excess humus, ponding.
Ra---------- Rains	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Ro---------- Roanoke	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Se---------- Seabrook	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
StA---------- State	Slight----------	Slight----------	Slight----------	Slight----------	Slight.
Tm---------- Tomotley	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
To---------- Torhunta	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
WaB---------- Wando	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty.
Ws---------- Wasda	Severe: flooding, ponding, excess humus.	Severe: excess humus, ponding.	Severe: excess humus, ponding.	Severe: excess humus, ponding.	Severe: excess humus, ponding
WuB*: Wando----------	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty.
Urban land.					

* 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." The ratings are based on the undrained condition for poorly drained and very poorly drained soils. Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
AaA---------- Altavista	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Ag---------- Augusta	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Ap**---------- Arapahoe	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
AuB---------- Autryville	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Be*, Bf*. Beaches										
BH**---------- Belhaven	Very Poor.	Very Poor.	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Bn*: Beaches.										
Newhan----------	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
ByB---------- Baymeade	Poor	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
Cd*: Corolla----------	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.
Duckston----------	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Poor.
CH, CL---------- Carteret	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
CnB---------- Conetoe	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
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	Very poor.	Good	Good	Very poor.
CT**---------- Croatan	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Cu*: Corolla----------	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.
Urban land.										

See footnotes at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
DA---- Dare	Very poor.	Very poor.	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
De**---- Deloss	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Dm---- Deloss	Very poor.	Very poor.	Very poor.	Poor	Poor	Good	Good	Very poor.	Poor	Good.
DO---- Dorovan	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
Du---- Duckston	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Poor.
Fr---- Fripp	Very poor.	Very poor.	Poor	Poor	Poor	Very poor.	Very poor.	Very poor.	Poor	Very poor.
GoA---- Goldsboro	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
HB---- Hobucken	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
KuB---- Kureb	Very poor.	Poor	Poor	Very poor.	Poor	Very poor.	Very poor.	Poor	Very poor.	Very poor.
LF---- Lafitte	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
Ln---- Leon	Poor	Fair	Good	Poor	Fair	Fair	Poor	Fair	Fair	Poor.
Lu*: Leon----	Poor	Fair	Good	Poor	Fair	Fair	Poor	Fair	Fair	Poor.
Urban land.										
Ly---- Lynchburg	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
MA---- Masontown	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Mc*: Mandarin----	Very poor.	Poor	Poor	Poor	Fair	Very poor.	Very poor.	Poor	Poor	Very poor.
Urban land.										
Mn---- Mandarin	Very poor.	Poor	Poor	Poor	Fair	Very poor.	Very poor.	Poor	Poor	Very poor.
Mu---- Murville	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Nc*: Newhan----	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.

See footnotes at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Nc*: Corolla	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.
Nd--- Newhan	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
Ne*: Newhan	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
Urban land.										
Nh--- 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	Fair	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Pa**--- Pantego	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
PO**--- Ponzer	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Ra**--- Rains	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
Ro**--- Roanoke	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
Se--- Seabrook	Fair	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
StA--- State	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Tm**--- Tomotley	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
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.
Ws**--- Wasda	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
WuB*: Wando	Poor	Poor	Fair	Poor	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Urban land.										

* See description of the map unit for composition and behavior characteristics of the map unit.
** Artificially drained areas of these soils have a higher potential for openland and woodland wildlife habitat than shown in this table. The potential for wetland habitat is lower.

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]

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
AaA---------- Altavista	Severe: wetness, cutbanks cave.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
Ag---------- Augusta	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: low strength, wetness.	Moderate: wetness.
Ap---------- Arapahoe	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.
AuB---------- Autryville	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Moderate: droughty.
Be*, Bf*. Beaches						
BH---------- Belhaven	Severe: excess humus, ponding.	Severe: flooding, ponding, low strength.	Severe: flooding, ponding.	Severe: flooding, ponding, low strength.	Severe: ponding, low strength.	Severe: ponding, excess humus.
Bn*: Beaches.						
Newhan----------	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.
ByB---------- Baymeade	Severe: cutbanks cave.	Slight---------	Moderate: wetness.	Slight---------	Slight---------	Severe: droughty.
Cd*: Corolla----------	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Moderate: flooding, wetness.	Severe: droughty.
Duckston---------	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding.	Severe: droughty, flooding.
CH, CL---------- Carteret	Severe: cutbanks cave, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: ponding, flooding.	Severe: excess salt, ponding, droughty.
CnB---------- Conetoe	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Moderate: droughty.
Co---------- Corolla	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Moderate: flooding, wetness.	Severe: droughty.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
CrB---------- Craven	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: low strength.	Slight.
CT---------- Croatan	Severe: excess humus, ponding.	Severe: ponding, low strength.	Severe: ponding.	Severe: ponding, low strength.	Severe: ponding.	Severe: ponding.
Cu*: Corolla----------	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Moderate: flooding, wetness.	Severe: droughty.
Urban land.						
DA---------- Dare	Severe: excess humus, ponding.	Severe: flooding, ponding, low strength.	Severe: flooding, ponding.	Severe: flooding, ponding, low strength.	Severe: ponding, low strength.	Severe: excess humus, ponding.
De---------- Deloss	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Dm---------- Deloss	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe wetness, flooding.
DO---------- Dorovan	Severe: excess humus, ponding.	Severe: flooding, ponding, low strength.	Severe: flooding, ponding.	Severe: flooding, ponding, low strength.	Severe: ponding, flooding.	Severe: ponding, flooding, excess humus.
Du---------- Duckston	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding.	Severe: droughty, flooding.
Fr---------- Fripp	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.
GoA---------- Goldsboro	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Slight.
HB---------- Hobucken	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.
KuB---------- Kureb	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Severe: droughty.
LF---------- Lafitte	Severe: excess humus, ponding.	Severe: flooding, ponding, low strength.	Severe: flooding, ponding.	Severe: flooding, ponding, low strength.	Severe: ponding, flooding.	Severe: excess humus, ponding, flooding.
Ln---------- Leon	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
Lu*: Leon----------	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Lu*: Urban land.						
Ly---------- Lynchburg	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
MA---------- Masontown	Severe: cutbanks cave, ponding.	Severe: flooding, ponding, low strength.	Severe: flooding, ponding.	Severe: flooding, ponding, low strength.	Severe: ponding, flooding.	Severe: ponding, flooding.
Mc*: Mandarin---------	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: droughty, too sandy.
Urban land.						
Mn---------- Mandarin	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: droughty, too sandy.
Mu---------- Murville	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
Nc*: Newhan----------	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.
Corolla----------	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Moderate: flooding, wetness.	Severe: droughty.
Nd---------- Newhan	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.
Ne*: Newhan----------	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Slight---------	Severe: droughty.
Urban land.						
Nh---------- Newhan	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.
NoA---------- Norfolk	Moderate: wetness.	Slight---------	Moderate: wetness.	Slight---------	Slight---------	Slight
NoB---------- Norfolk	Moderate: wetness.	Slight---------	Moderate: wetness.	Moderate: slope.	Slight---------	Slight
On---------- Onslow	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
Pa---------- Pantego	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
PO---------- Ponzer	Severe: excess humus, ponding.	Severe: flooding, ponding, low strength.	Severe: flooding, ponding.	Severe: flooding, ponding, low strength.	Severe: ponding, low strength.	Severe: ponding, excess humus.
Ra---------- Rains	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Ro---------- Roanoke	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness.	Severe: wetness.
Se---------- Seabrook	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Severe: droughty.
StA---------- State	Severe: cutbanks cave.	Slight---------	Moderate: wetness.	Slight---------	Moderate: low strength.	Slight.
Tm---------- Tomotley	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
To---------- Torhunta	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
WaB---------- Wando	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Moderate: droughty.
Ws---------- Wasda	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, excess humus.
WuB*: Wando----------	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Moderate: droughty.
Urban land.						

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation]

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AaA---------- Altavista	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: seepage, wetness.	Fair: wetness.
Ag---------- Augusta	Severe: wetness.	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness.	Fair: wetness.
Ap---------- Arapahoe	Severe: wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: wetness.
AuB---------- Autryville	Slight----------	Severe: seepage.	Severe: wetness, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
Be*, Bf*. Beaches					
BH---------- Belhaven	Severe: ponding, percs slowly.	Severe: seepage, flooding, ponding, excess humus.	Severe: seepage, ponding.	Severe: seepage, ponding.	Poor: ponding.
Bn*: Beaches.					
Newhan----------	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, slope.
ByB---------- Baymeade	Severe: poor filter.	Severe: seepage.	Severe: seepage, wetness, too sandy.	Severe: seepage.	Poor: too sandy.
Cd*: Corolla----------	Severe: wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: wetness, seepage.	Severe: seepage, wetness.	Poor: seepage, too sandy.
Duckston----------	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, wetness.
CH, CL---------- Carteret	Severe: flooding, ponding, poor filter.	Severe: seepage, flooding, ponding.	Severe: flooding, seepage, ponding.	Severe: flooding, seepage, ponding.	Poor: seepage, too sandy, ponding.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
CnB---------- Conetoe	Slight----------	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: seepage.
Co---------- Corolla	Severe: wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: wetness, seepage.	Severe: seepage, wetness.	Poor: seepage, too sandy.
CrB---------- Craven	Severe: wetness, percs slowly.	Moderate: slope.	Severe: seepage, wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.
CT---------- Croatan	Severe: ponding, percs slowly.	Severe: seepage, ponding, excess humus.	Severe: ponding, excess humus, seepage.	Severe: seepage, ponding.	Poor: ponding, excess humus.
Cu*: Corolla----------	Severe: wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: wetness, seepage.	Severe: seepage, wetness.	Poor: seepage, too sandy.
Urban land.					
DA---------- Dare	Severe: ponding, percs slowly.	Severe: flooding, excess humus, ponding.	Severe: seepage, ponding, excess humus.	Severe: ponding.	Poor: excess humus, ponding.
De---------- Deloss	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Dm---------- Deloss	Severe: wetness, flooding.	Severe: wetness, flooding, seepage.	Severe: wetness, flooding.	Severe: wetness, flooding.	Poor: wetness.
DO---------- Dorovan	Severe: flooding, ponding.	Severe: flooding, excess humus, ponding.	Severe: flooding, seepage, ponding.	Severe: flooding, ponding.	Poor: ponding, excess humus.
Du---------- Duckston	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, wetness.
Fr---------- Fripp	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, slope.
GoA---------- Goldsboro	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
HB---------- Hobucken	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding.
KuB---------- Kureb	Severe: poor filter.	Severe: seepage.	Severe: too sandy.	Severe: seepage.	Poor: seepage, too sandy.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
LF Lafitte	Severe: flooding, ponding.	Severe: seepage, flooding, excess humus.	Severe: flooding, ponding, seepage, excess humus.	Severe: flooding, seepage, ponding.	Poor: ponding, excess humus.
Ln Leon	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
Lu*: Leon	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
Urban land.					
Ly Lynchburg	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
MA Masontown	Severe: flooding, ponding, poor filter.	Severe: seepage, flooding, ponding.	Severe: flooding, seepage, ponding.	Severe: flooding, seepage, ponding.	Poor: seepage, too sandy, ponding.
Mc*: Mandarin	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: wetness, too sandy.	Severe: wetness, seepage.	Poor: seepage, too sandy.
Urban land.					
Mn Mandarin	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: wetness, too sandy.	Severe: wetness, seepage.	Poor: seepage, too sandy.
Mu Murville	Severe: ponding, poor filter.	Severe: seepage, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
Nc*: Newhan	Severe: poor filter, slope.	Severe: seepage, 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.
Nd Newhan	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Ne*: Newhan	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
Urban land.					
Nh--- Newhan	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, slope.
NoA, NoB--- Norfolk	Moderate: wetness.	Moderate: seepage.	Severe: wetness.	Slight---	Slight.
On--- Onslow	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: seepage, wetness.	Fair: wetness.
Pa--- Pantego	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
PO--- Ponzer	Severe: ponding, percs slowly.	Severe: flooding, excess humus, ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
Ra--- Rains	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, seepage.	Poor: wetness.
Ro--- Roanoke	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: seepage, wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Se--- Seabrook	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
StA--- State	Moderate: wetness.	Severe: seepage.	Severe: seepage, wetness.	Moderate: wetness.	Fair: too clayey, thin layer.
Tm--- Tomotley	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
To--- Torhunta	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: wetness.
WaB--- Wando	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Ws---------- Wasda	Severe: ponding.	Severe: flooding, excess humus, ponding.	Severe: ponding, seepage.	Severe: ponding.	Poor: ponding, excess humus.
WuB*: Wando----------	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
Urban land.					

* 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]

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
AaA---- Altavista	Fair: wetness, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
Ag---- Augusta	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
Ap---- Arapahoe	Poor: wetness.	Improbable: excess fines.	Improbable: too sandy.	Poor: wetness.
AuB---- Autryville	Good----	Improbable: thin layer.	Improbable: too sandy.	Fair: too sandy.
Be*, Bf*. Beaches				
BH---- Belhaven	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.
Bn*: Beaches.				
Newhan----	Fair: slope.	Probable----	Improbable: too sandy.	Poor: too sandy, slope.
ByB---- Baymeade	Good----	Probable----	Improbable: too sandy.	Poor: too sandy.
Cd*: Corolla----	Fair: wetness.	Probable----	Improbable: too sandy.	Poor: too sandy.
Duckston----	Fair: wetness.	Probable----	Improbable: too sandy.	Poor: too sandy.
CH, CL---- Carteret	Poor: wetness.	Probable----	Improbable: too sandy.	Poor: too sandy, excess salt, wetness.
CnB---- Conetoe	Good----	Probable----	Improbable: too sandy.	Fair: too sandy.
Co---- Corolla	Fair: wetness.	Probable----	Improbable: too sandy.	Poor: too sandy.
CrB---- Craven	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
CT---- Croatan	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness, too acid.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
Cu*: Corolla	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
Urban land.				
DA--- Dare	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.
De, Dm--- Deloss	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
DO--- Dorovan	Poor: wetness.	Probable	Improbable: too sandy.	Poor: excess humus, wetness.
Du--- Duckston	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
Fr--- Fripp	Fair: slope.	Probable	Improbable: too sandy.	Poor: too sandy, slope.
GoA--- Goldsborq	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
HB--- Hobucken	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
KuB--- Kureb	Good	Probable	Improbable: too sandy.	Poor: too sandy.
LF--- Lafitte	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.
Ln--- Leon	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
Lu*: Leon	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
Urban land.				
Ly--- Lynchburg	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good
MA--- Masontown	Poor: wetness.	Probable	Improbable: too sandy.	Poor: wetness.
Mc*: Mandarin	Fair: wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy.
Urban land.				

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
Mn---------- Mandarin	Fair: wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy.
Mu---------- Murville	Poor: wetness.	Probable----------	Improbable: too sandy.	Poor: too sandy, wetness.
Nc*: Newhan----------	Fair: slope.	Probable----------	Improbable: too sandy.	Poor: too sandy, slope.
Corolla----------	Fair: wetness.	Probable----------	Improbable: too sandy.	Poor: too sandy.
Nd---------- Newhan	Fair: slope.	Probable----------	Improbable: too sandy.	Poor: too sandy, slope.
Ne*: Newhan----------	Good----------	Probable----------	Improbable: too sandy.	Poor: too sandy.
Urban land.				
Nh---------- Newhan	Fair: slope.	Probable----------	Improbable: too sandy.	Poor: too sandy, slope.
NoA, NoB---------- Norfolk	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
On---------- Onslow	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
Pa---------- Pantego	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
PO---------- Ponzer	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.
Ra---------- Rains	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Ro---------- Roanoke	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness.
Se---------- Seabrook	Fair: wetness.	Probable----------	Improbable: too sandy.	Poor: too sandy.
StA---------- State	Good----------	Probable----------	Improbable: too sandy.	Fair: too sandy.
Tm---------- Tomotley	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
To---------- Torhunta	Poor: wetness.	Probable----------	Improbable: too sandy.	Poor: wetness.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
WaB---------- Wando	Good----------	Probable----------	Improbable: too sandy.	Poor: too sandy.
Ws---------- Wasda	Poor: wetness.	Improbable: excess fines.	Improbable: too sandy.	Poor: excess humus, wetness.
WuB*: Wando----------	Good----------	Probable----------	Improbable: too sandy.	Poor: too sandy.
Urban land.				

* 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]

Map symbol and soil name	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
AaA---------- Altavista	Moderate: seepage.	Moderate: wetness.	Moderate: deep to water.	Favorable------	Wetness--------	Favorable.
Ag---------- Augusta	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Favorable------	Wetness--------	Wetness.
Ap---------- Arapahoe	Severe: seepage.	Severe: piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness--------	Wetness.
AuB---------- Autryville	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Too sandy: soil blowing.	Droughty.
Be*, Bf*. Beaches						
BH---------- Belhaven	Moderate: seepage.	Severe: piping, ponding.	Slight---------	Ponding, subsides, percs slowly.	Ponding--------	Ponding.
Bn*: Beaches.						
Newhan----------	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, too sandy, soil blowing.	Slope, droughty.
ByB---------- Baymeade	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Deep to water	Too sandy: soil blowing.	Droughty, rooting depth.
Cd*: Corolla----------	Severe: seepage.	Severe: seepage, wetness, piping.	Severe: cutbanks cave.	Slope, cutbanks cave.	Wetness, too sandy, soil blowing.	Droughty.
Duckston---------	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Flooding, cutbanks cave.	Wetness, too sandy.	Wetness, droughty.
CH, CL---------- Carteret	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: salty water, cutbanks cave.	Ponding, flooding, cutbanks cave.	Ponding, too sandy.	Wetness, excess salt, droughty.
CnB---------- Conetoe	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Too sandy, soil blowing.	Droughty.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
Co---------- Corolla	Severe: seepage.	Severe: seepage, wetness, piping.	Severe: cutbanks cave.	Slope, cutbanks cave.	Wetness, too sandy, soil blowing.	Droughty.
CrB---------- Craven	Moderate: seepage.	Moderate: hard to pack, wetness.	Severe: slow refill.	Percs slowly---	Erodes easily, wetness.	Erodes easily, percs slowly.
CT---------- Croatan	Severe: seepage.	Severe: piping, ponding.	Severe: slow refill.	Percs slowly, subsides, ponding.	Ponding--------	Ponding, percs slowly.
Cu*: Corolla----------	Severe: seepage.	Severe: seepage, wetness, piping.	Severe: cutbanks cave.	Slope, cutbanks cave.	Wetness, too sandy, soil blowing.	Droughty.
Urban land.						
DA---------- Dare	Slight---------	Severe: excess humus, ponding.	Slight---------	Percs slowly, subsides, ponding.	Percs slowly, ponding.	Ponding, percs slowly.
De---------- Deloss	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Favorable------	Wetness--------	Wetness.
Dm---------- Deloss	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Flooding-------	Wetness--------	Wetness.
DO---------- Dorovan	Moderate: seepage.	Severe: excess humus, ponding.	Severe: cutbanks cave.	Ponding, flooding, subsides.	Ponding--------	Wetness.
Du---------- Duckston	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Flooding, cutbanks cave.	Wetness, too sandy.	Wetness, droughty.
Fr---------- Fripp	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, too sandy, soil blowing.	Slope, droughty.
GoA---------- Goldsboro	Moderate: seepage.	Moderate: piping, wetness.	Moderate: slow refill, deep to water.	Favorable------	Wetness--------	Favorable.
HB---------- Hobucken	Moderate: seepage.	Severe: piping, ponding.	Moderate: salty water.	Ponding, flooding.	Ponding--------	Wetness, excess salt.
KuB---------- Kureb	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Too sandy: soil blowing	Droughty.
LF---------- Lafitte	Severe: seepage.	Severe: excess humus, ponding.	Moderate: salty water.	Ponding, flooding, subsides.	Ponding--------	Wetness, excess salt.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
Ln---------- Leon	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, too sandy, soil blowing.	Wetness, droughty.
Lu*: Leon----------	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, too sandy, soil blowing.	Wetness, droughty.
Urban land.						
Ly---------- Lynchburg	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Favorable------	Wetness--------	Wetness.
MA---------- Masontown	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, flooding, cutbanks cave.	Ponding, too sandy.	Wetness.
Mc*: Mandarin---------	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Cutbanks cave	Too sandy, soil blowing, wetness.	Droughty.
Urban land.						
Mn---------- Mandarin	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Cutbanks cave	Too sandy, soil blowing, wetness.	Droughty.
Mu---------- Murville	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, cutbanks cave.	Ponding, too sandy.	Wetness, droughty.
Nc*: Newhan----------	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, too sandy, soil blowing.	Slope, droughty.
Corolla----------	Severe: seepage.	Severe: seepage, wetness, piping.	Severe: cutbanks cave.	Slope, cutbanks cave.	Wetness, too sandy, soil blowing.	Droughty.
Nd---------- Newhan	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, too sandy, soil blowing.	Slope, droughty.
Ne*: Newhan----------	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Too sandy, soil blowing.	Droughty.
Urban land.						

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
Nh---------- Newhan	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, too sandy, soil blowing.	Slope, droughty.
NoA---------- Norfolk	Moderate: seepage.	Moderate: piping.	Moderate: deep to water, slow refill	Deep to water	Favorable------	Favorable.
NoB---------- Norfolk	Moderate: seepage, slope.	Moderate: piping.	Moderate: deep to water, slow refill.	Deep to water	Favorable------	Favorable.
On---------- Onslow	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Favorable------	Wetness--------	Favorable.
Pa---------- Pantego	Moderate: seepage.	Severe: wetness.	Moderate: slow refill.	Favorable------	Wetness--------	Wetness.
PO---------- Ponzer	Moderate: seepage.	Severe: ponding.	Slight---------	Percs slowly, subsides.	Ponding, percs slowly.	Ponding, percs slowly.
Ra---------- Rains	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Favorable------	Wetness--------	Wetness.
Ro---------- Roanoke	Moderate: seepage.	Severe: wetness.	Severe: slow refill.	Percs slowly---	Wetness, percs slowly.	Wetness, percs slowly.
Se---------- Seabrook	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Cutbanks cave	Wetness, too sandy, soil blowing.	Droughty.
StA---------- State	Moderate: seepage.	Moderate: thin layer, piping.	Severe: cutbanks cave.	Deep to water	Favorable------	Favorable.
Tm---------- Tomotley	Moderate: seepage.	Severe: piping, wetness.	Severe: slow refill.	Favorable------	Wetness--------	Wetness.
To---------- Torhunta	Severe: seepage.	Severe: piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness--------	Wetness.
WaB---------- Wando	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Too sandy, soil blowing.	Droughty.
Ws---------- Wasda	Moderate: seepage.	Severe: ponding.	Slight---------	Subsides-------	Ponding--------	Ponding.
WuB*: Wando----------	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Too sandy, soil blowing.	Droughty.
Urban land.						

* 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]

Map symbol and soil name	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
AaA----------	0-14	Loamy fine sand	SM	A-2	0	95-100	90-100	50-99	15-35	---	NP
Altavista	14-55	Clay loam, sandy clay loam, sandy loam.	CL, CL-ML, SC, SM-SC	A-4, A-6, A-7	0	95-100	95-100	60-99	45-75	20-45	5-28
	55-72	Variable---------	---	---	---	---	---	---	---	---	---
Ag----------	0-10	Loamy fine sand	SM	A-2-4	0	95-100	90-100	50-98	15-35	---	NP
Augusta	10-36	Sandy clay loam, clay loam, loam.	CL, CL-ML, SC	A-4, A-6, A-7	0	95-100	95-100	75-100	40-80	20-45	5-25
	36-55	Fine sandy loam, sandy loam.	SM, SM-SC	A-2, A-4,	0	95-100	95-100	70-99	20-49	<25	NP-5
	55-80	Variable---------	---	---	---	---	---	---	---	---	---
Ap----------	0-23	Fine sandy loam	SM	A-2, A-4	0	100	100	80-100	20-49	<30	NP-4
Arapahoe	23-36	Fine sandy loam, loam, sandy loam.	SM	A-2, A-4	0	100	100	70-100	20-49	---	NP
	36-72	Stratified sand to loamy sand.	SM, SP-SM	A-2, A-3, A-4	0	100	100	65-100	5-45	<30	NP-4
AuB----------	0-36	Loamy fine sand	SP-SM, SM	A-2, A-3	0	100	100	50-100	5-20	---	NP
Autryville	36-48	Sandy loam, sandy clay loam, fine sandy loam.	SM	A-2	0	100	100	50-100	15-30	<25	NP-3
	48-72	Sand, loamy sand, loamy fine sand.	SP-SM, SM	A-2, A-3	0	100	100	50-100	5-20	---	NP
	72-80	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
Be*, Bf*. Beaches											
BH----------	0-26	Muck----------	PT	---	---	---	---	---	---	---	---
Belhaven	26-30	Sandy loam, fine sandy loam.	SM, SC, SM-SC	A-2, A-4	0	100	100	60-85	30-49	<30	NP-10
	30-38	Loam, clay loam, sandy clay loam.	CL, CL-ML, SC, SM-SC	A-4, A-6	0	100	100	80-100	36-95	16-36	4-15
	38-80	Variable---------	---	---	---	---	---	---	---	---	---
Bn*: Beaches.											
Newhan----------	0-80	Fine sand, sand.	SP, SP-SM	A-3	0	95-100	95-100	60-75	0-5	---	NP
ByB----------	0-24	Fine sand---------	SM, SP-SM	A-2, A-3	0	100	100	51-100	5-20	---	NP
Baymeade	24-60	Fine sandy loam, sandy clay loam, sandy loam.	SC, SM, SM-SC	A-2, A-4	0	100	100	60-100	30-49	<25	NP-10
	60-80	Variable---------	---	---	---	---	---	---	---	---	---
Cd*:											
Corolla---------	0-80	Fine sand, sand.	SW, SP-SM, SP	A-2, A-3	0	80-100	75-100	60-95	1-12	---	NP

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Cd*:											
Duckston	0-60	Fine sand, sand.	SP-SM, SP	A-2, A-3	0	100	95-100	60-75	3-12	---	NP
CH, CL Carteret	0-80	Sand, loamy sand.	SP, SP-SM	A-2, A-3	0-3	95-100	90-100	60-90	4-25	---	NP
CnB	0-30	Loamy fine sand	SM, SP-SM	A-2, A-3	0	100	100	50-95	5-30	---	NP
Conetoe	30-40	Sandy loam, sandy clay loam, fine sandy loam.	SM, SC, SM-SC	A-2, A-4	0	100	100	50-95	20-40	<30	NP-10
	40-80	Loamy sand, sand, loamy fine sand.	SM, SP, SP-SM	A-2, A-3, A-1	0	100	100	40-95	4-30	---	NP
Co Corolla	0-80	Fine sand, sand.	SW, SP-SM, SP	A-2, A-3	0	80-100	75-100	60-95	1-12	---	NP
CrB Craven	0-7	Loam	ML, CL-ML, SM, SM-SC	A-4	0	100	100	75-100	45-90	<35	NP-7
	7-40	Clay, silty clay, sandy clay.	CH	A-7	0	100	100	90-100	65-98	51-70	24-43
	40-72	Variable	---	---	---	---	---	---	---	---	---
CT	0-38	Muck	PT	---	---	---	---	---	---	---	---
Croatan	38-65	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
Cu*:											
Corolla	0-80	Fine sand, sand.	SW, SP-SM, SP	A-2, A-3	0	80-100	75-100	60-95	1-12	---	NP
Urban land.											
DA	0-64	Muck	PT	---	0	---	---	---	---	---	NP
Dare	64-80	Stratified mucky sand to loamy sand.	SM, SP-SM	A-2, A-3	0	100	90-100	60-80	5-30	---	NP
De Deloss	0-15	Fine sandy loam	SM, SM-SC, ML, CL-ML	A-2, A-4	0	100	100	70-95	30-65	<35	NP-7
	15-45	Sandy clay loam, clay loam, fine sandy loam.	SM-SC, SC, CL-ML, CL	A-4, A-6, A-7	0	100	100	75-98	36-70	18-45	4-22
	45-80	Variable	---	---	---	---	---	---	---	---	---
Dm Deloss	0-15	Mucky loam	SM, SM-SC, ML, CL-ML	A-2, A-4	0	100	100	70-95	40-65	<35	NP-7
	15-45	Sandy clay loam, clay loam, fine sandy loam.	SM-SC, SC, CL-ML, CL	A-4, A-6, A-7	0	100	100	75-98	36-70	18-45	4-22
	45-60	Variable	---	---	---	---	---	---	---	---	---
DO	0-12	Muck	PT	---	0	---	---	---	---	---	---
Dorovan	12-80	Muck	PT	---	0	---	---	---	---	---	---
Du Duckston	0-60	Fine sand, sand.	SP-SM, SP	A-2, A-3	0	100	95-100	60-75	3-12	---	NP

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Fr	0-7	Fine sand	SP, SP-SM	A-3	0	100	98-100	85-99	0-5	---	NP
Fripp	7-80	Fine sand, sand	SP, SP-SM	A-3	0	100	98-100	85-99	0-5	---	NP
GoA	0-12	Loamy fine sand	SM	A-2	0	95-100	95-100	50-95	13-30	---	NP
Goldsboro	12-63	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
	63-80	Variable	---	---	---	---	---	---	---	---	---
HB	0-6	Muck	PT	---	0	---	---	---	---	---	---
Hobucken	6-16	Mucky fine sandy loam.	SM, SM-SC, ML, CL-ML	A-2, A-4	0	100	95-100	70-95	30-65	<30	NP-7
	16-55	Sandy loam, loam, silt loam.	SM, SM-SC, ML, CL-ML	A-2, A-4	0	100	95-100	60-95	39-90	<30	NP-10
	55-78	Variable	---	---	---	---	---	---	---	---	---
KuB	0-80	Sand	SP, SP-SM	A-3	0	100	100	60-100	0-7	---	NP
Kureb											
LF	0-60	Muck	PT	---	0	---	---	---	---	---	---
Lafitte	60-72	Variable	---	---	---	---	---	---	---	---	---
Ln	0-22	Sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	2-12	---	NP
Leon	22-58	Sand, fine sand.	SM, SP-SM, SP	A-3, A-2-4	0	100	100	80-100	3-20	---	NP
	58-80	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	2-12	---	NP
Lu*:											
Leon	0-22	Sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	2-12	---	NP
	22-58	Sand, fine sand.	SM, SP-SM, SP	A-3, A-2-4	0	100	100	80-100	3-20	---	NP
	58-80	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	2-12	---	NP
Urban land.											
Ly	0-14	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
Lynchburg	14-65	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
	65-80	Variable	---	---	---	---	---	---	---	---	---
MA	0-27	Mucky loam	ML, CL-ML	A-4	0	100	95-100	90-100	60-75	<35	NP-7
Masontown	27-32	Fine sandy loam, loam, silt loam.	SM, SM-SC, ML	A-4	0	100	95-100	70-100	40-90	<30	NP-7
	32-80	Loamy sand, sand, sandy loam.	SM, SP-SM	A-2, A-3, A-5	0	100	95-100	50-75	5-40	---	NP
Mc*:											
Mandarin	0-27	Sand	SP, SP-SM, SW-SM	A-3	0	100	100	90-100	2-10	---	NP
	27-49	Fine sand, sand	SP-SM, SM	A-3, A-2-4	0	100	100	90-100	5-15	---	NP
	49-60	Fine sand, sand	SP, SP-SM, SW-SM	A-3	0	100	100	90-100	2-7	---	NP
	60-80	Fine sand, sand	SP, SP-SM	A-3, A-2-4	0	100	100	90-100	3-12	---	NP
Urban land.											

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Mn---------- Mandarin	0-27	Sand----------	SP, SP-SM, SW-SM	A-3	0	100	100	90-100	2-10	---	NP
	27-49	Fine sand, sand	SP-SM, SM	A-3, A-2-4	0	100	100	90-100	5-15	---	NP
	49-60	Fine sand, sand	SP, SP-SM, SW-SM	A-3	0	100	100	90-100	2-7	---	NP
	60-80	Fine sand, sand	SP, SP-SM	A-3, A-2-4	0	100	100	90-100	3-12	---	NP
Mu---------- Murville	0-10	Mucky sand-------	SM, SP-SM	A-2-4, A-3	0	100	100	85-100	5-30	---	NP
	10-61	Fine sand, sand, loamy fine sand.	SM, SP-SM	A-2, A-3	0	100	100	85-100	5-20	---	NP
	61-80	Loamy sand, sand.	SP-SM, SP	A-2, A-3	0	100	100	80-100	3-20	---	NP
Nc*:											
Newhan----------	0-80	Fine sand--------	SP, SP-SM	A-3	0	95-100	95-100	60-75	0-5	---	NP
Corolla---------	0-80	Fine sand--------	SW, SP-SM, SP	A-2, A-3	0	80-100	75-100	60-95	1-12	---	NP
Nd---------- Newhan	0-80	Fine sand, sand.	SP, SP-SM	A-3	0	95-100	95-100	60-75	0-5	---	NP
Ne*:											
Newhan----------	0-80	Fine sand, sand.	SP, SP-SM	A-3	0	95-100	95-100	60-75	0-5	---	NP
Urban land.											
Nh---------- Newhan	0-80	Fine sand, sand.	SP, SP-SM	A-3	0	95-100	95-100	60-75	0-5	---	NP
NoA, NoB--------- Norfolk	0-13	Loamy fine sand	SM	A-2	0	95-100	92-100	50-95	13-30	---	NP
	13-68	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
	68-80	Variable---------	---	---	---	---	---	---	---	---	---
On---------- Onslow	0-11	Loamy sand-------	SM, SP-SM	A-2, A-3, A-4	0	100	95-100	60-100	5-38	---	NP
	11-65	Sandy clay loam, sandy loam, clay loam.	SC, CL, SC, ML	A-2, A-4, A-6	0	100	95-100	60-100	30-55	<30	NP-17
	65-80	Variable---------	---	---	---	---	---	---	---	---	---
Pa---------- Pantego	0-14	Fine sandy loam	SM, SM-SC, CL, ML	A-2, A-4	0	100	95-100	60-95	25-75	<35	NP-10
	14-62	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
	62-80	Variable---------	---	---	---	---	---	---	---	---	---
PO---------- Ponzer	0-26	Muck----------	PT	---	---	---	---	---	---	---	---
	26-54	Loam, sandy clay loam, mucky fine sandy loam.	SM, ML, SC, CL	A-2, A-4, A-6	0	100	100	60-95	30-95	<40	NP-20
	54-66	Variable---------	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Ra----------	0-8	Fine sandy loam	SM, ML	A-2, A-4	0	100	95-100	50-85	25-56	<35	NP-10
Rains	8-42	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
	42-66	Sandy loam, sandy clay loam.	SM, SC, ML, CL	A-2, A-4, A-6	0	100	95-100	60-95	30-60	16-40	3-18
	66-80	Variable----------	---	---	---	---	---	---	---	---	---
Ro----------	0-8	Loam----------	SM-SC, CL-ML, CL, SC	A-4, A-6	0	95-100	85-100	60-100	35-90	20-35	5-16
Roanoke	8-13	Clay loam, loam.	CL	A-6, A-7	0	95-100	85-100	80-100	80-95	35-45	14-20
	13-51	Clay, silty clay, clay loam.	CH, CL	A-7	0	90-100	85-100	85-100	65-95	45-70	22-40
	51-80	Variable----------	---	---	---	---	---	---	---	---	---
Se----------	0-8	Fine sand--------	SM, SP-SM	A-2, A-3	0	95-100	90-100	85-99	5-25	---	NP
Seabrook	8-80	Loamy fine sand, fine sand, sand.	SM, SP-SM	A-2, A-3	0	95-100	90-100	85-100	5-25	---	NP
StA----------	0-11	Loamy fine sand	SM, SM-SC	A-2, A-1	0	95-100	95-100	45-75	15-30	<18	NP-6
State	11-40	Sandy clay loam.	CL, SC	A-4, A-6	0	95-100	95-100	75-100	35-80	24-40	8-22
	40-80	Stratified sand to fine sandy loam.	SM, SM-SC, SP-SM	A-1, A-2, A-3, A-4	0	85-100	75-100	40-90	5-50	<25	NP-7
Tm----------	0-11	Fine sandy loam	SM, SM-SC	A-2, A-4	0	98-100	95-100	75-99	25-50	<30	NP-7
Tomotley	11-54	Fine sandy loam, sandy clay loam, clay loam.	SM-SC, SC, CL-ML, CL	A-2, A-4, A-6	0	98-100	95-100	75-98	30-70	20-40	6-23
	54-80	Variable----------	---	---	---	---	---	---	---	---	---
To----------	0-13	Mucky fine sandy loam.	SM	A-2-4, A-4	0	100	95-100	70-85	20-49	<25	NP-4
Torhunta	13-52	Sandy loam, fine sandy loam.	SM, SM-SC	A-2, A-4	0	100	95-100	70-92	20-40	<25	NP-7
	52-80	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
WaB----------	0-8	Fine sand--------	SP-SM, SM	A-2, A-3	0	96-100	95-100	60-98	5-25	---	NP
Wando	8-80	Sand, fine sand, loamy fine sand.	SP, SP-SM, SM	A-2, A-3	0	98-100	98-100	51-98	2-20	---	NP
Ws----------	0-15	Muck----------	PT	---	0	---	---	---	---	---	NP
Wasda	15-31	Loam, fine sandy loam, sandy loam.	ML, SM	A-4, A-6	0	98-100	95-100	75-99	45-70	<20	NP-3
	31-45	Clay loam, sandy clay loam, loam.	ML, CL, CL-ML	A-2, A-4, A-6	0	98-100	95-100	75-99	50-80	20-40	6-18
	45-77	Variable----------	---	---	---	---	---	---	---	---	---
WuB*:											
Wando----------	0-8	Fine sand--------	SP-SM, SM	A-2, A-3	0	96-100	95-100	60-98	5-25	---	NP
	8-80	Sand, fine sand, loamy fine sand.	SP, SP-SM, SM	A-2, A-3	0	98-100	98-100	51-98	2-20	---	NP
WuB*:											
Urban land.											

* 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]

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cc	In/hr	In/in	pH				Pct
AaA----------	0-14	5-10	1.40-1.60	6.0-20	0.07-0.12	4.5-6.0	Low----------	0.17	5	.5-3
Altavista	14-55	18-35	1.30-1.50	0.6-2.0	0.12-0.20	4.5-6.0	Low----------	0.24		
	55-72	---	---	---	---	---	----------	----		
Ag----------	0-10	3-10	1.40-1.60	6.0-20.0	0.06-0.12	4.5-6.0	Low----------	0.17	5	.5-2
Augusta	10-36	20-35	1.30-1.50	0.6-2.0	0.12-0.18	4.5-6.0	Low----------	0.24		
	36-55	3-18	1.35-1.55	2.0-6.0	0.06-0.12	4.5-6.0	Low----------	0.24		
	55-80	---	---	---	---	---	----------	----		
Ap----------	0-23	8-18	1.45-1.60	2.0-6.0	0.11-0.15	3.6-5.5	Low----------	0.15	5	5-10
Arapahoe	23-36	8-18	1.45-1.60	2.0-6.0	0.10-0.14	3.6-7.8	Low----------	0.15		
	36-72	3-18	1.40-1.65	2.0-20	0.05-0.14	5.6-7.8	Low----------	0.10		
AuB----------	0-36	2-10	1.60-1.70	>6.0	0.04-0.09	4.5-5.5	Low----------	0.10	5	.5-1
Autryville	36-48	10-25	1.40-1.60	2.0-6.0	0.08-0.13	4.5-5.5	Low----------	0.10		
	48-72	2-8	1.60-1.70	>6.0	0.03-0.08	4.5-5.5	Low----------	0.10		
	72-80	10-35	1.40-1.60	0.6-2.0	0.10-0.15	4.5-5.5	Low----------	0.17		
Be*, Bf*.										
Beaches										
BH----------	0-26	---	0.40-0.65	0.06-6.0	0.20-0.26	<4.5	Low----------	----	---	20-80
Belhaven	26-30	5-15	1.45-1.65	2.0-6.0	0.10-0.15	3.6-5.5	Low----------	0.24		
	30-38	10-35	1.30-1.45	0.2-0.6	0.12-0.20	3.6-6.5	Low----------	0.24		
	38-80	---	---	---	---	---	----------	----		
Bn*:										
Beaches.										
Newhan----------	0-80	---	1.60-1.75	>20	<0.05	6.6-7.8	Low----------	0.10	5	---
ByB----------	0-24	0-8	1.60-1.75	6.0-20	0.02-0.06	4.5-6.5	Low----------	0.10	5	.5-1
Baymeade	24-60	8-26	1.45-1.60	2.0-6.0	0.10-0.14	4.5-6.5	Low----------	0.10		
	60-80	---	---	---	---	---	----------	----		
Cd*:										
Corolla----------	0-80	0-3	1.60-1.70	>20	0.01-0.03	5.6-7.8	Low----------	0.10	5	<.5
Duckston---------	0-60	0-4	1.60-1.70	>20	0.02-0.05	5.6-8.4	Low----------	0.10	5	.5-1
CH, CL----------	0-80	5-12	1.45-1.60	>6.0	0.02-0.10	6.1-8.4	Low----------	0.15	5	.5-2
Carteret										
CnB----------	0-30	2-10	1.60-1.75	6.0-20	0.05-0.10	4.5-6.0	Low----------	0.15	5	.5-2
Conetoe	30-40	10-22	1.40-1.60	2.0-6.0	0.10-0.15	4.5-6.0	Low----------	0.15		
	40-80	2-10	1.60-1.75	6.0-20	0.05-0.10	4.5-6.0	Low----------	0.10		
Co----------	0-80	0-3	1.60-1.70	>20	0.01-0.03	5.6-7.8	Low----------	0.10	5	<.5
Corolla										
CrB----------	0-7	6-20	1.30-1.55	0.6-2.0	0.12-0.18	3.6-5.5	Low----------	0.37	5	.5-2
Craven	7-40	35-60	1.30-1.45	0.06-0.2	0.12-0.15	3.6-5.5	Moderate-----	0.32		
	40-72	---	---	---	---	---	----------	----		
CT----------	0-38	---	0.40-0.65	0.06-6.0	0.35-0.45	<4.5	Low----------	----	---	25-60
Croatan	38-65	8-20	1.40-1.60	0.2-6.0	0.10-0.15	3.6-6.5	Low----------	----		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cc	In/hr	In/in	pH				Pct
Cu*:										
Corolla	0-80	0-3	1.60-1.70	>20	0.01-0.03	5.6-7.8	Low	0.10	5	<.5
Urban land.										
DA	0-64	---	0.40-0.65	0.06-0.2	0.20-0.26	3.6-4.4	Low	---	---	20-95
Dare	64-80	2-12	1.60-1.70	6.0-20	0.04-0.09	3.6-6.0	Low	0.15		
De	0-15	5-20	1.30-1.50	2.0-6.0	0.10-0.16	3.6-5.5	Low	0.24	5	2-9
Deloss	15-45	18-35	1.30-1.60	0.6-2.0	0.12-0.18	3.6-6.5	Low	0.24		
	45-80	---	---	---	---	---	---	---		
Dm	0-15	7-20	1.20-1.40	2.0-6.0	0.15-0.20	3.6-5.5	Low	0.15	5	10-20
Deloss	15-45	18-35	1.30-1.60	0.6-2.0	0.12-0.18	3.6-6.5	Low	0.24		
	45-60	---	---	---	---	---	---	---		
DO	0-12	---	0.25-0.40	0.6-2.0	0.25-0.50	3.6-5.5	Low	---	---	20-80
Dorovan	12-80	---	0.35-0.55	0.6-2.0	0.25-0.50	3.6-5.5	Low	---		20-80
Du	0-60	0-4	1.60-1.70	>20	0.02-0.05	5.6-8.4	Low	0.10	5	.5-1
Duckston										
Fr	0-7	<5	1.30-1.70	6.0-20	0.02-0.08	5.1-7.8	Low	0.10	5	<1
Fripp	7-80	<5	1.30-1.70	6.0-20	0.01-0.03	5.6-7.8	Low	0.10		
GoA	0-12	2-8	1.55-1.75	6.0-20.0	0.06-0.11	4.5-5.5	Low	0.17	5	.5-2
Goldsboro	12-63	18-35	1.30-1.50	0.6-2.0	0.11-0.15	4.5-5.5	Low	0.24		
	63-80	---	---	---	---	---	---	---		
HB	0-6	---	---	0.6-6.0	0.25-0.45	6.1-8.4	Low	---	---	30-50
Hobucken	6-16	10-18	---	0.6-6.0	0.20-0.26	6.1-8.4	Low	0.10	5	8-20
	16-55	10-18	---	0.6-6.0	0.12-0.20	6.1-8.4	Low	0.10		
	55-78	---	---	---	---	---	---	---		
KuB	0-80	0-3	1.60-1.80	6.0-20	<0.05	4.5-7.3	Low	0.10	5	<.5
Kureb										
LF	0-60	---	0.05-0.25	2.0-6.0	0.18-0.45	6.1-8.4	Low	---	---	30-70
Lafitte	60-72	---	---	---	---	---	---	---		
Ln	0-22	1-6	1.40-1.65	6.0-20	0.02-0.05	3.6-5.5	Low	0.10	5	.5-4
Leon	22-58	2-8	1.50-1.70	0.6-6.0	0.05-0.10	3.6-5.5	Low	0.15		
	58-80	1-6	1.40-1.65	0.6-6.0	0.02-0.05	3.6-5.5	Low	0.10		
Lu*:										
Leon	0-22	1-6	1.40-1.65	6.0-20	0.02-0.05	3.6-5.5	Low	0.10	5	.5-4
	22-58	2-8	1.50-1.70	0.6-6.0	0.05-0.10	3.6-5.5	Low	0.15		
	58-80	1-6	1.40-1.65	0.6-6.0	0.02-0.05	3.6-5.5	Low	0.10		
Urban land.										
Ly	0-14	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	14-65	18-35	1.30-1.50	0.6-2.0	0.12-0.16	3.6-5.5	Low	0.20		
	65-80	---	---	---	---	---	---	---		
MA	0-27	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	27-32	10-18	1.20-1.50	2.0-6.0	0.12-0.20	5.6-7.8	Low	0.20		
	32-80	2-18	1.40-1.60	2.0-20	0.02-0.12	5.6-7.8	Low	0.10		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cc	In/hr	In/in	pH				Pct
Mc*:										
Mandarin--------	0-27	<3	1.35-1.45	6.0-20	0.03-0.07	3.6-6.0	Low----------	0.10	5	<3
	27-49	2-9	1.45-1.60	0.6-2.0	0.10-0.15	3.6-6.0	Low----------	0.15		
	49-60	<3	1.35-1.45	6.0-20	0.03-0.07	4.5-7.3	Low----------	0.10		
	60-80	2-9	1.45-1.60	0.6-2.0	0.10-0.15	5.6-7.3	Low----------	0.15		
Urban land.										
Mn----------	0-27	<3	1.35-1.45	6.0-20	0.03-0.07	3.6-6.0	Low----------	0.10	5	<3
Mandarin	27-49	2-9	1.45-1.60	0.6-2.0	0.10-0.15	3.6-6.0	Low----------	0.15		
	49-60	<3	1.35-1.45	6.0-20	0.03-0.07	4.5-7.3	Low----------	0.10		
	60-80	2-9	1.45-1.60	0.6-2.0	0.10-0.15	5.6-7.3	Low----------	0.15		
Mu----------	0-10	2-8	1.20-1.40	6.0-20	0.15-0.20	3.6-5.5	Low----------	0.10	5	9-20
Murville	10-61	2-8	1.60-1.75	2.0-6.0	0.05-0.09	3.6-5.5	Low----------	0.10		
	61-80	2-8	1.60-1.75	6.0-20	0.04-0.17	3.6-5.5	Low----------	0.10		
Nc*:										
Newhan----------	0-80	---	1.60-1.75	>20	<0.05	6.6-7.8	Low----------	0.10	5	---
Corolla---------	0-80	0-3	1.60-1.70	>20	0.01-0.03	5.6-7.8	Low----------	0.10	5	<.5
Nd----------	0-80	---	1.60-1.75	>20	<0.05	6.6-7.8	Low----------	0.10	5	---
Newhan										
Ne*:										
Newhan----------	0-80	---	1.60-1.75	>20	<0.05	6.6-7.8	Low----------	0.10	5	---
Urban land.										
Nh----------	0-80	---	1.60-1.75	>20	<0.05	6.6-7.8	Low----------	0.10	5	---
Newhan										
NoA, NoB---------	0-13	2-8	1.55-1.75	6.0-20	0.06-0.11	4.5-5.5	Low----------	0.20	5	.5-2
Norfolk	13-68	18-35	1.30-1.45	0.6-2.0	0.10-0.20	4.5-5.5	Low----------	0.24		
	68-80	---	---	---	---	---	----------	----		
On----------	0-11	2-8	1.60-1.75	>6.0	0.07-0.11	3.6-5.5	Low----------	0.17	4	.5-2
Onslow	11-65	15-35	1.30-1.50	0.6-2.0	0.12-0.17	3.6-5.5	Low----------	0.24		
	65-80	---	---	---	---	---	----------	----		
Pa----------	0-14	5-15	1.40-1.60	2.0-6.0	0.10-0.20	3.6-5.5	Low----------	0.15	5	4-10
Pantego	14-62	18-35	1.30-1.40	0.6-2.0	0.12-0.20	3.6-5.5	Low----------	0.28		
	62-80	---	---	---	---	---	----------	----		
PO----------	0-26	---	0.40-0.65	0.06-6.0	0.35-0.45	3.6-4.4	Low----------	----	---	20-80
Ponzer	26-54	5-25	1.30-1.60	0.2-6.0	0.10-0.24	3.6-7.8	Low----------	0.24		
	54-66	---	---	---	---	---	----------	----		
Ra----------	0-8	5-20	1.30-1.60	2.0-6.0	0.10-0.14	3.6-5.5	Low----------	0.20	5	1-6
Rains	8-42	18-35	1.30-1.50	0.6-2.0	0.11-0.15	3.6-5.5	Low----------	0.24		
	42-66	15-35	1.30-1.60	0.6-2.0	0.10-0.15	3.6-5.5	Low----------	0.28		
	66-80	---	---	---	---	---	----------	----		
Ro----------	0-8	10-27	1.20-1.50	0.6-2.0	0.14-0.20	3.6-5.5	Low----------	0.37	4	.5-2
Roanoke	8-13	20-35	1.20-1.50	0.2-0.6	0.16-0.19	3.6-5.5	Moderate-----	0.24		
	13-51	35-60	1.35-1.65	0.06-0.2	0.10-0.19	3.6-5.5	Moderate-----	0.24		
	51-80	---	---	---	---	---	----------	----		
Se----------	0-8	2-8	1.30-1.60	6.0-20	0.05-0.11	4.5-6.5	Low----------	0.10	5	.5-2
Seabrook	8-80	2-10	1.30-1.60	6.0-20	0.02-0.09	4.5-6.5	Low----------	0.10		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cc	In/hr	In/in	pH				Pct
StA	0-11	2-8	1.35-1.45	2.0-6.0	0.06-0.09	4.5-5.5	Low	0.28	5	<1
State	11-40	18-35	1.35-1.50	0.6-2.0	0.14-0.19	4.5-5.5	Low	0.28		
	40-80	2-15	1.35-1.50	>2.0	0.02-0.10	4.5-6.0	Low	0.17		
Tm	0-11	5-20	1.30-1.60	2.0-6.0	0.10-0.15	3.6-5.5	Low	0.20	5	1-6
Tomotley	11-54	18-35	1.30-1.50	0.6-2.0	0.12-0.18	3.6-5.5	Low	0.20		
	54-80	---	---	---	---	---	---	---		
To	0-13	5-18	1.20-1.40	0.6-2.0	0.20-0.30	3.6-5.5	Low	0.10	5	10-20
Torhunta	13-52	5-18	1.35-1.60	2.0-6.0	0.10-0.15	3.6-5.5	Low	0.15		
	52-80	2-18	1.45-1.65	6.0-20	<0.05	3.6-5.5	Low	0.10		
WaB	0-8	2-8	1.30-1.60	6.0-20	0.05-0.08	5.6-7.3	Low	0.10	5	<1
Wando	8-80	1-10	1.30-1.60	6.0-20	0.03-0.07	5.6-7.3	Low	0.10		
Ws	0-15	---	0.40-0.65	0.2-0.6	0.20-0.25	3.6-5.5	Low	---	---	20-50
Wasda	15-31	15-25	1.20-1.50	0.6-2.0	0.14-0.20	4.5-5.5	Low	0.20		2-8
	31-45	18-35	1.35-1.60	0.6-2.0	0.12-0.18	4.5-5.5	Low	0.20		
	45-77	2-8	1.60-1.70	6.0-20	0.02-0.06	5.6-8.4	Low	0.15		
WuB*:										
Wando	0-8	2-8	1.30-1.60	6.0-20	0.05-0.08	5.6-7.3	Low	0.10	5	<1
	8-80	1-10	1.30-1.60	6.0-20	0.03-0.07	5.6-7.3	Low	0.10		
Urban land.										

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated]

Map symbol and soil name	Hydrologic group	Flooding			High water table			Subsidence		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Initial	Total	Uncoated steel	Concrete
					Ft			In	In		
AaA---------- Altavista	C	None-------	---	---	1.5-2.5	Apparent	Dec-Mar	---	---	Moderate	Moderate.
Ag---------- Augusta	C	None-------	---	---	1.0-2.0	Apparent	Dec-Mar	---	---	High-----	Moderate.
Ap---------- Arapahoe	B/D	Rare-------	---	---	0-1.0	Apparent	Dec-Apr	---	---	High-----	High.
AuB---------- Autryville	A	None-------	---	---	>5.0	---	---	---	---	Low------	High.
Be*, Bf*. Beaches											
BH---------- Belhaven	D	Rare-------	---	---	+.5-1.0	Apparent	Jan-Dec	10-20	20-48	High-----	High.
Bn*: Beaches.											
Newhan--------	A	None-------	---	---	>6.0	---	---	---	---	High-----	Low.
ByB---------- Baymeade	A	None-------	---	---	4.0-5.0	Apparent	Dec-Mar	---	---	Low------	Moderate.
Cd*: Corolla-------	D	Rare-------	---	---	1.5-3.0	Apparent	Nov-May	---	---	Low------	Low.
Duckston------	A/D	Frequent---	Brief	Jan-Dec	1.0-2.0	Apparent	Jan-Dec	---	---	Low------	Low.
CH, CL--------- Carteret	D	Frequent---	Very brief.	Jan-Dec	+3-1.0	Apparent	Jan-Dec	---	---	High-----	High.
CnB---------- Conetoe	A	None-------	---	---	>6.0	---	---	---	---	Low------	High.
Co---------- Corolla	D	Rare-------	---	---	1.5-3.0	Apparent	Nov-May	---	---	Low------	Low.
CrB---------- Craven	C	None-------	---	---	2.0-3.0	Apparent	Dec-Apr	---	---	High-----	High.
CT---------- Croatan	D	Rare-------	---	---	+.5-1.0	Apparent	Jan-Dec	4-10	18-24	High-----	High.
Cu*: Corolla-------	D	Rare-------	---	---	1.5-3.0	Apparent	Nov-May	---	---	Low------	Low.
Urban land.											
DA---------- Dare	D	Rare-------	---	---	+.5-1.0	Apparent	Jan-Dec	6-20	36-60	High-----	High.
De---------- Deloss	B/D	None-------	---	---	0-1.0	Apparent	Dec-Apr	---	---	High-----	High.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table			Subsidence		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Initial	Total	Uncoated steel	Concrete
					Ft			In	In		
Dm---------- Deloss	D	Frequent---	Brief	Jan-Dec	0-1.0	Apparent	Nov-May	---	---	High-----	High.
DO---------- Dorovan	D	Frequent---	Very long.	Jan-Dec	+1-0.5	Apparent	Jan-Dec	4-10	10-30	High-----	High.
Du---------- Duckston	A/D	Frequent---	Brief	Jan-Dec	1.0-2.0	Apparent	Jan-Dec	---	---	Low------	Low.
Fr---------- Fripp	A	None-------	---	---	>6.0	---	---	---	---	Low------	Low.
GoA---------- Goldsboro	B	None-------	---	---	2.0-3.0	Apparent	Dec-Mar	---	---	Moderate	High.
HB---------- Hobucken	D	Frequent---	Very brief.	Jan-Dec	+1-1.0	Apparent	Jan-Dec	---	---	High-----	High.
KuB---------- Kureb	A	None-------	---	---	>6.0	---	---	---	---	Low------	Low.
LF---------- Lafitte	D	Frequent---	Brief to very long.	Jan-Dec	+1-0.5	Apparent	Jan-Dec	15-30	>51	High-----	Moderate.
Ln---------- Leon	B/D	None-------	---	---	0-1.0	Apparent	Nov-Apr	---	---	High-----	High.
Lu*: Leon----------	B/D	None-------	---	---	0-1.0	Apparent	Nov-Apr	---	---	High-----	High.
Urban land.											
Ly---------- Lynchburg	C	None-------	---	---	1.0-1.5	Apparent	Dec-Mar	---	---	High-----	High.
MA---------- Masontown	D	Frequent---	Long---	Nov-Apr	+1-0.5	Apparent	Nov-Apr	---	---	Moderate	Moderate.
Mc*: Mandarin------	B/D	None-------	---	---	1.5-3.5	Apparent	Dec-Mar	---	---	Moderate	High.
Urban land.											
Mn---------- Mandarin	B/D	None-------	---	---	1.5-3.5	Apparent	Dec-Mar	---	---	Moderate	High.
Mu---------- Murville	A/D	None-------	---	---	+1-1.0	Apparent	Jan-Dec	---	---	High-----	Moderate.
Nc*: Newhan--------	A	None-------	---	---	>6.0	---	---	---	---	High-----	Low.
Corolla-------	D	Rare-------	---	---	1.5-3.0	Apparent	Nov-May	---	---	Low------	Low.
Nd---------- Newhan	A	None-------	---	---	>6.0	---	---	---	---	High-----	Low.
Ne*: Newhan--------	A	None-------	---	---	>6.0	---	---	---	---	High-----	Low.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table			Subsidence		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Initial	Total	Uncoated steel	Concrete
					Ft			In	In		
Ne*: Urban land.											
Nh---------- Newhan	A	None-------	---	---	>6.0	---	---	---	---	High-----	Low.
NoA, NoB------- Norfolk	B	None-------	---	---	4.0-6.0	Apparent	Jan-Mar	---	---	Moderate	High.
On---------- Onslow	B	None-------	---	---	1.5-3.0	Apparent	Dec-Mar	---	---	High-----	High.
Pa---------- Pantego	B/D	None-------	---	---	0-1.0	Apparent	Dec-Apr	---	---	High-----	High.
PO---------- Ponzer	D	Rare-------	---	---	+.5-1.0	Apparent	Jan-Dec	9-12	18-24	High-----	High.
Ra---------- Rains	B/D	None-------	---	---	0-1.0	Apparent	Dec-Mar	---	---	High-----	High.
Ro---------- Roanoke	D	None-------	---	---	0-1.0	Apparent	Nov-Apr	---	---	High-----	High.
Se---------- Seabrook	C	None-------	---	---	2.0-4.0	Apparent	Dec-Mar	---	---	Low------	Moderate.
StA---------- State	B	None-------	---	---	4.0-6.0	Apparent	Dec-Mar	---	---	Moderate	High.
Tm---------- Tomotley	B/D	None-------	---	---	0-1.0	Apparent	Dec-Mar	---	---	High-----	High.
To---------- Torhunta	C	None-------	---	---	0-1.0	Apparent	Dec-Apr	---	---	High-----	High.
WaB---------- Wando	A	None-------	---	---	>5.0	---	---	---	---	Low------	Moderate.
Ws---------- Wasda	B/D	Rare-------	---	---	+.5-1.0	Apparent	Nov-Jun	3-7	7-14	High-----	High.
WuB*: Wando--------- Urban land.	A	None-------	---	---	>5.0	---	---	---	---	Low------	Moderate.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--ENGINEERING INDEX TEST DATA

[Dashes indicate data were not available. NP means nonplastic]

Soil name, report number, horizon, and depth in inches *	Classification		Grain-size distribution							Liquid limit	Plasticity index	Moisture density	
			Percentage passing sieve--				Percentage smaller than--						
	AASHTO	Unified	No. 4	No. 10	No. 40	No. 200	.02 mm	.005 mm	.002 mm			Maximum dry density	Optimum moisture
										Pct		Lb/ft^3	Pct
Augusta loamy fine sand: (S77NC-31-37)													
Ap - - - 0 to 6	A-2-4(0)	SM	100	100	91	33	25	12	7	---	NP	111	15
Btg - - - 16 to 36	A-6(2)	SC	100	100	88	42	34	27	23	31	15	114	14
Cg - - - 55 to 80	A-2-4(0)	SM	100	100	94	21	17	13	11	---	NP	118	12
Baymeade fine sand: (S77NC-31-33)													
A - - - - 0 to 5	A-2-4(0)	SM	100	100	99	15	6	2	1	---	NP	96	18
E/Bh - - - 12 to 24	A-2-4(0)	SM	100	100	100	19	8	5	3	---	NP	104	14
Bt - - - - 24 to 48	A-2-4(0)	SM	100	100	100	31	20	16	15	---	NP	115	13
C - - - - 60 to 80	A-2-4(0)	SP-SM	100	100	100	12	8	7	6	---	NP	---	---
Corolla fine sand: (S77NC-31-9)													
AC - - - - 4 to 10	A-3(0)	SP	100	100	93	1	1	1	1	---	NP	---	---
Cg1 - - - 18 to 42	A-3(0)	SP	82	75	60	1	1	1	1	---	NP	---	---
Cg2 - - - 42 to 80	A-3(0)	SP	91	82	76	1	1	1	1	---	NP	---	---
Tomotley fine sandy loam: (S77NC-31-25)													
A - - - - 0 to 7	A-4(0)	SM	100	100	93	40	27	14	9	---	NP	107	15
Btg - - - 14 to 35	A-6(4)	SC	100	100	92	44	35	29	25	32	18	117	13
Cg - - - 54 to 80	A-2-4(0)	SM	100	100	99	31	17	12	9	---	NP	114	13
Wasda muck: (S77NC-31-42)													
A - - - - 15 to 31	A-4(0)	ML	100	100	99	63	47	28	20	---	NP	88	27
Bg - - - - 31 to 45	A-6(6)	CL	100	100	99	68	54	37	30	28	13	110	15
Cg - - - - 45 to 77	A-3(0)	SP-SM	100	100	97	9	6	5	3	---	NP	---	---

* Locations of all soils are the same as that described for the series in the section "Soil Series and Their Morphology."

TABLE 18.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Altavista	Fine-loamy, mixed, thermic Aquic Hapludults
Arapahoe	Coarse-loamy, mixed, nonacid, thermic Typic Humaquepts
Augusta	Fine-loamy, mixed, thermic Aeric Ochraquults
Autryville	Loamy, siliceous, thermic Arenic Paleudults
Baymeade	Loamy, siliceous, thermic Arenic Hapludults
Belhaven	Loamy, mixed, dysic, thermic Terric Medisaprists
Carteret	Mixed, thermic Typic Psammaquents
Conetoe	Loamy, mixed, thermic Arenic Hapludults
Corolla	Thermic, uncoated Aquic Quartzipsamments
Craven	Clayey, mixed, thermic Aquic Hapludults
Croatan	Loamy, siliceous, dysic, thermic Terric Medisaprists
Dare	Dysic, thermic Typic Medisaprists
Deloss	Fine-loamy, mixed, thermic Typic Umbraquults
*Dorovan	Dysic, thermic Typic Medisaprists
Duckston	Siliceous, thermic Typic Psammaquents
Fripp	Thermic, uncoated Typic Quartzipsamments
*Goldsboro	Fine-loamy, siliceous, thermic Aquic Paleudults
Hobucken	Coarse-loamy, mixed, nonacid, thermic Typic Hydraquents
Kureb	Thermic, uncoated Spodic Quartzipsamments
Lafitte	Euic, thermic Typic Medisaprists
Leon	Sandy, siliceous, thermic Aeric Haplaquods
Lynchburg	Fine-loamy, siliceous, thermic Aeric Paleaquults
Mandarin	Sandy, siliceous, thermic Typic Haplohumods
Masontown	Coarse-loamy, siliceous, nonacid, thermic Cumulic Humaquepts
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
*Pantego	Fine-loamy, siliceous, thermic Umbric Paleaquults
Ponzer	Loamy, mixed, dysic, thermic Terric Medisaprists
Rains	Fine-loamy, siliceous, thermic Typic Paleaquults
Roanoke	Clayey, mixed, thermic Typic Ochraquults
Seabrook	Mixed, thermic Aquic Udipsamments
State	Fine-loamy, mixed, thermic Typic Hapludults
Tomotley	Fine-loamy, mixed, thermic Typic Ochraquults
Torhunta	Coarse-loamy, siliceous, acid, thermic Typic Humaquepts
Wando	Siliceous, thermic Typic Udipsamments
Wasda	Fine-loamy, mixed, acid, thermic Histic Humaquepts

*The soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series.

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