United States
Department of
Agriculture

Soil
Conservation
Service

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

Soil Survey of Dare County, North Carolina

How To Use This Soil Survey

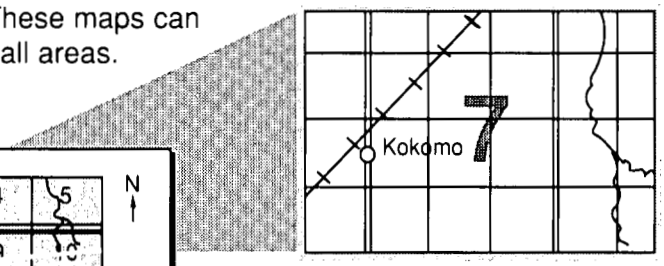
General Soil Map

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

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

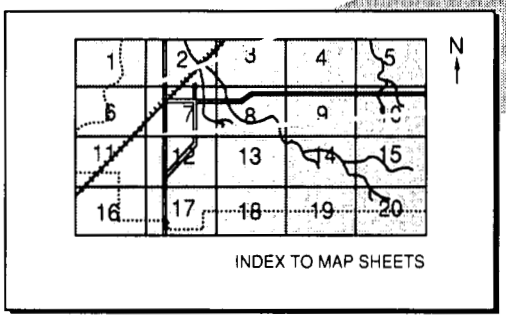
Detailed Soil Maps

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



MAP SHEET

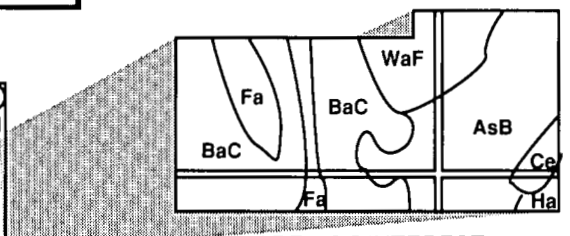
To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



INDEX TO MAP SHEETS

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

MAP SHEET



AREA OF INTEREST

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

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

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

Major fieldwork for this soil survey was completed in 1986. Soil names and descriptions were approved in 1987. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1986. This soil survey was made cooperatively by the Soil Conservation Service, the North Carolina Department of Natural Resources and Community Development, the North Carolina Agricultural Research Service, the North Carolina Agricultural Extension Service, and the Dare County Board of Commissioners. It is part of the technical assistance furnished to the Dare County Soil and Water Conservation District.

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

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

Cover: A saltwater marsh of black needlerush in an area of Carteret sand, 0 to 2 percent slopes, frequently flooded. These marshes are an important part of the coastal ecology of Dare County.

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CaA—Cape Fear loam, 0 to 2 percent slopes, rarely flooded 14
CeA—Carteret sand, 0 to 2 percent slopes, frequently flooded 14
CnA—Conaby muck, 0 to 2 percent slopes, rarely flooded 14
CoB—Corolla fine sand, 0 to 6 percent slopes, rarely flooded 15
CrB—Corolla-Duckston complex, 0 to 6 percent slopes, rarely flooded 15
CuA—Currituck mucky peat, 0 to 1 percent slopes, frequently flooded 16
DtA—Duckston fine sand, 0 to 2 percent slopes, occasionally flooded 16
DuE—Dune land, 2 to 40 percent slopes 17
DwE—Dune land-Newhan complex, 2 to 40 percent slopes 17
FrD—Fripp fine sand, 2 to 30 percent slopes 17
HoA—Hobonny muck, 0 to 1 percent slopes, frequently flooded 18
HyA—Hyde loam, 0 to 2 percent slopes, rarely flooded 18
IcA—Icaria loamy fine sand, 0 to 2 percent slopes, rarely flooded 19
JoA—Johns loamy sand, 0 to 2 percent slopes 20
LeA—Leon fine sand, 0 to 2 percent slopes, rarely flooded 20
NeC—Newhan fine sand, 0 to 10 percent slopes 20
NhC—Newhan-Corolla complex, 0 to 10 percent slopes. 21
NuC—Newhan-Urban land complex, 0 to 10 percent slopes 22
OsA—Osier fine sand, 0 to 2 percent slopes, rarely flooded 23
OuB—Ousley fine sand, 0 to 5 percent slopes, rarely flooded 23
PoA—Ponzer muck, 0 to 2 percent slopes, rarely flooded 23
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Foreword

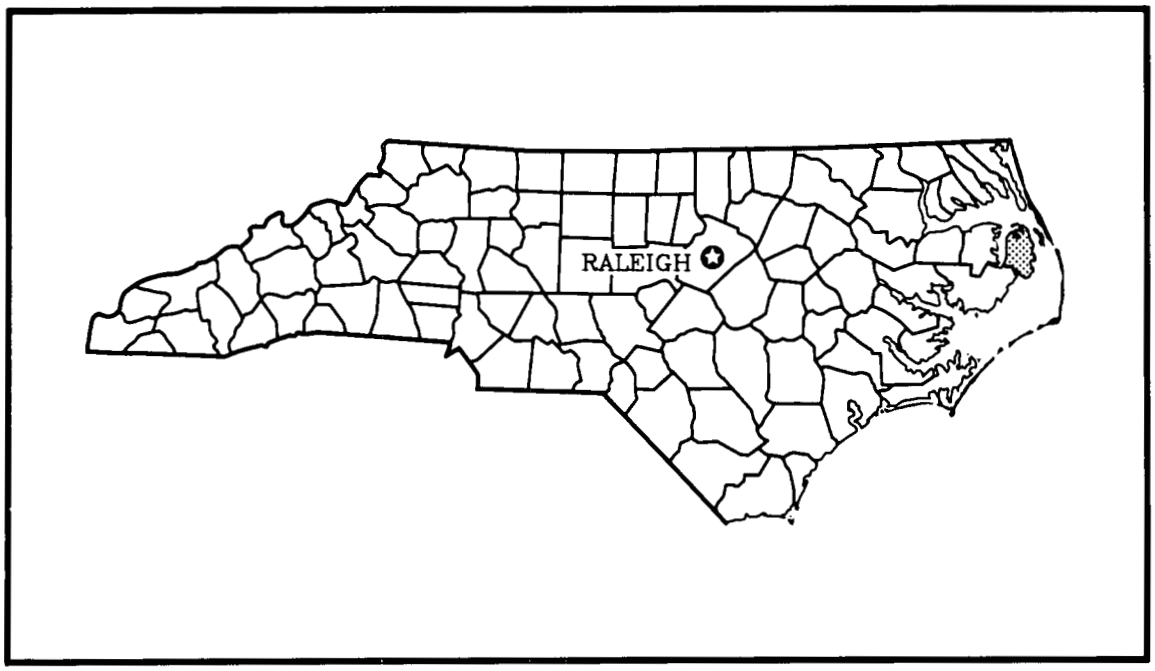
This soil survey contains information that can be used in land-planning programs in Dare County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of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

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

Soil Survey of Dare County, North Carolina

By Phillip L. Tant, Soil Conservation Service

Soils surveyed by Phillip L. Tant and John A. Gagnon, Jr., Soil Conservation Service, and Timothy A. Dilliplane and W. Allen Hayes, Jr., North Carolina Department of Natural Resources and Community Development

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

DARE COUNTY is in the northeastern part of the lower Coastal Plain physiographic region of North Carolina. The total area of the county is 250,105 acres. The 1980 U.S. Census reported a population of 13,377. In 1980, Manteo, the county seat, had a population of 902.

Dare County is a peninsula; that is, water almost totally surrounds it. It is connected to Hyde County for approximately 10 miles and to Currituck County on the Outer Banks. Elevation ranges from about 138 feet above mean sea level at Jockey's Ridge on the Outer Banks to near sea level along the various sounds and the Atlantic Ocean. Jockey's Ridge, the highest sand dune on the East Coast, is located in the town of Nags Head. Its elevation is about 138 feet, although the sand dune is subject to shifting.

Tourism is an important factor in the economy of Dare County. Kill Devil Hills and Nags Head are the largest towns located on the Outer Banks in Dare County. These towns are used for summer and year-round residences.

This survey includes the Dare County part of the *Soil Survey of the Outer Banks of North Carolina*, published in 1977 *(16)*.

General Nature of the County

This section gives general information about some of the cultural and natural factors that affect land use in Dare County and on the Outer Banks.

Early History and Economic Development

As early as 1584, English officers spent 2 months exploring Roanoke Island and its surrounding area. In 1585, a fleet of seven vessels returned to Roanoke Island. A headquarters called "the City of Raleigh" was established. An earthen structure known as Lane's Fort protected it. A band of 15 men stayed with the fort while the commanding officers returned to England. In 1587, a total of 115 men, women, and children landed at Roanoke Island. They found no survivors of the 15 men, yet they went on to rebuild and establish the first English Colony in the New World. Later that year, the first child of English parents was born in America. Her name was Virginia Dare. Shortly thereafter, Governor John White was chosen to return to England for supplies. Unfortunately, problems in England delayed his return. When White finally arrived, he found no trace of the colony he had left, except the words "Croatoan" and "Cro" carved on two trees near the fort. The fate of the "Lost Colony" remains a mystery *(10)*.

The survey area remained unpopulated for more than a half century after the disappearance of the Lost Colony. The first permanent dwelling was established on Colington Island in the winter of 1664-65 by Sir John Colleton. It is thought that the first settlements on the Outer Banks were established by shipwrecked sailors and a few settlers from Virginia. These settlers made an effort to grow tobacco, cultivate grapes for a winery,

and raise hogs. The records show, however, that the only real profit was from the sale of oil extracted from beached whales. Because these barrier islands provided excellent natural grazing lands with no need for fencing, stock raising became an important occupation. Agriculture was limited to small garden patches. Indian corn and sweet potatoes were the main crops *(11)*.

In the early 1700's, pirates moved into the survey area to prey on ships that passed too close to shore. The most famous of these pirates, Blackbeard, made his headquarters on the Outer Banks. His death in 1718 brought an end to this piracy. Around 1726, windmills for grinding corn were built on Roanoke Island and along the Outer Banks. Residents during this time period lived off farming, fishing, hunting, and beachcombing *(17)*.

In 1870, Dare County was established from parts of Hyde, Currituck, and Tyrrell Counties. During this time, most opportunities for work were in the Coast Guard, as lighthouse operators, or as weather station employees. The improvement of inlets and advancements in refrigeration and transportation allowed commercial fishing to become an important part of the economy *(11)*.

Water Supply

Ground water is the main source of the county's water supply. Thousands of feet of sediments underlie the county, but only the upper sandy aquifer contains fresh water. The fresh ground water is generally of good quality, except for excessive hardness and the possibility of excessive iron *(9)*. On the mainland salt water generally is at a depth of 200 feet or more, except near the estuaries, where the depth to salt water may be less than 100 feet. On Roanoke Island the depth to salt water is almost 300 feet in places. On the Outer Banks it is generally less than 100 feet.

Climate

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

Dare County is hot and humid in summer, but sea breezes frequently cool the coast. Winter is cool and has brief, occasional cold spells. Rains occur throughout the year and are fairly heavy. Snowfall is rare. Annual precipitation is adequate for all of the crops commonly grown in the county.

Table 1 gives data on temperature and precipitation for the survey area as recorded at New Holland, North Carolina, in the period 1951 to 1981. 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 46 degrees F and the average daily temperature is 35 degrees. The lowest temperature on record, which occurred at New Holland on January 13, 1981, is 6 degrees. In summer, the average temperature is 77 degrees and the average daily maximum temperature is 86 degrees. The highest recorded temperature, which occurred at New Holland on July 20, 1977, is 100 degrees.

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

The total annual precipitation is 52.6 inches. Of this, 30 inches, or about 55 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 26 inches. The heaviest 1-day rainfall during the period of record was 10.7 inches at New Holland on September 5, 1979. Thunderstorms occur on about 43 days each year. Every few years, a hurricane or tropical storm crosses the county, bringing 1 to 3 days of intensive rainfall.

The average seasonal snowfall is about 2 inches. The greatest snow depth at any one time during the period of record was 10 inches.

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 55 percent of the time possible in winter. The prevailing wind is from the southwest. Average windspeed is highest, 13 miles per hour, in winter.

Soils, Landscape, and Vegetation of the Outer Banks

The Outer Banks, in the eastern part of Dare County, is part of the barrier island chain that extends from Virginia to South Carolina. This chain is an area of great biological activity and significance *(16)*.

Several factors interact to determine the soil types and vegetation on the Outer Banks. Relief, the major determinant of soil differences, affects drainage, vegetation, and the length of time required for soil development. Relief, drainage, and location near and adjacent to the ocean are major factors affecting vegetation. Wind is an important environmental factor

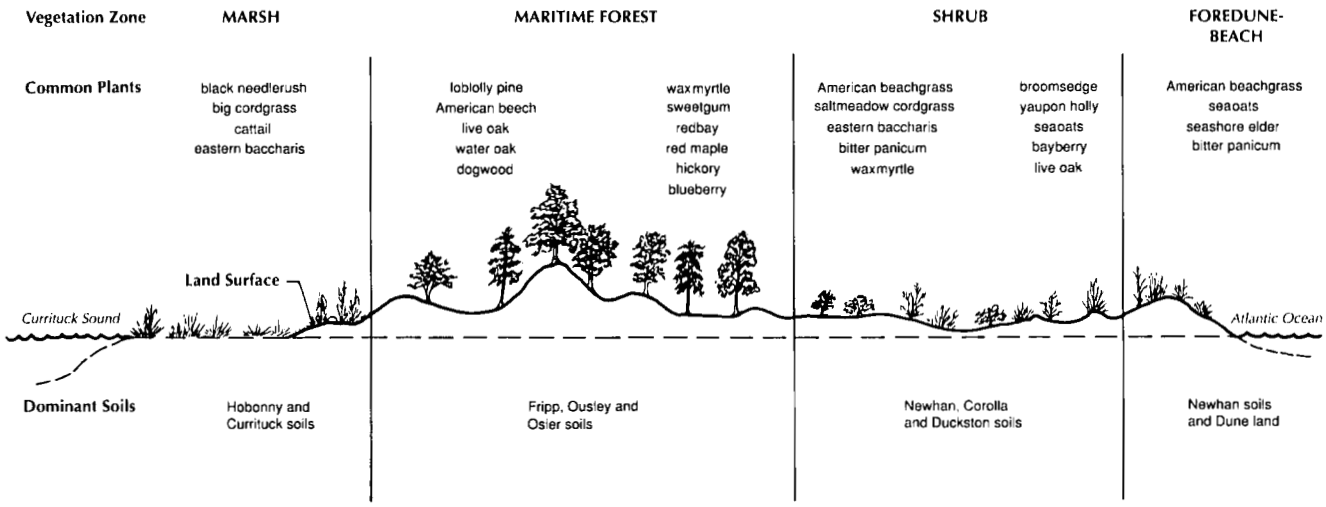


Figure 1.—The relationship of soils, landscape, and dominant plants on the Outer Banks.

influencing coastal vegetation *(7)*. It carries salt spray from the ocean, which kills susceptible plants. It carries sand that abrades plants and can bury them. Wind also causes flooding and water erosion *(6)*.

The Outer Banks can be divided into four vegetative zones: foredune-beach, shrub, maritime forest, and marsh (fig. 1).

The foredune-beach zone is undergoing constant change because of sand deposition and ocean waves. The beach generally does not have vegetation; however, scattered clumps of seaoats, seashore elder, and searocket grow directly above the high tide line. Newhan soils are on foredunes. They formed in sandy wind-deposited material and have little or no profile development. The foredunes are built as grasses trap the windblown sand. The major plants are American beachgrass, seaoats, bitter panicum, and seashore elder. The North Carolina coast serves as a transitional zone between American beachgrass and seaoats. Dare County is the southern limit of the natural range for American beachgrass as well as the northern limit for seaoats. Shore birds, such as the black-bellied plover, ruddy turnshore, and knot and semipalmated sandpipers, are common on the beaches. Rabbits, opossums, and foxes inhibit the dunes.

In the shrub zone, the characteristic grasses and scattered shrubs grade into a shrub thicket with increasing distance from the ocean. Newhan, Corolla, and Duckston soils are in the shrub zone. Drainage is the criterion that differentiates these soils. The well drained Newhan soils are in the higher, drier areas; the moderately well drained Corolla soils are in the intermediate areas; and the poorly drained Duckston soils are in the lower, wet areas. Newhan soils support American beachgrass, seaoats, bitter panicum, live oak, and yaupon holly. Corolla soils support live oak, northern bayberry, waxmyrtle, broom sedge, and saltmeadow cordgrass. Duckston soils support a thick growth of saltmeadow cordgrass, eastern baccharis, and waxmyrtle. Wildlife in the shrub zone includes rabbits, foxes, hawks, and several species of songbirds, such as mockingbirds and wood thrushes.

The maritime forest grows at a greater distance from the ocean, where the effects of salt spray decrease. In the maritime forest, the dominant trees are live oak, loblolly pine, yaupon holly, and redbay. The soils in the forested areas are characterized by more profile development and have more organic matter on the surface than the soils in the first two zones. Fripp fine sand is representative of the higher, drier areas; Osier fine sand, of the nearly level, wet areas; and Ousley fine sand, of the gently sloping areas. The maritime forest provides good habitat for such wildlife species as quail, rabbits, foxes, and songbirds. Snakes, hawks, and rodents also are quite common.

The marsh zone, on the sound side of the Outer Banks, includes many small islands in the sound. Carteret, Currituck, and Hobonny soils are in this zone. Flooding is frequent. The dominant plants are black needlebrush, big cordgrass, and eastern baccharis. Mainly cattails, sawgrass, waxmyrtle, and willow grow in isolated, land-blocked depressions. Furbearers, such as raccoon, muskrat, and nutria, are abundant in these marshes. Also common are waterfowl, rails, and other estuarine and marsh birds.

How This Survey Was Made

This survey was made to provide information about the soils in Dare County. 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 kinds of bedrock. 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 a considerable degree of accuracy the kind of soil at a specific location on the landscape.

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

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

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

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

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

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by several kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic

class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. These latter soils are called inclusions or included soils. In the general soil map units, they are called soils of minor extent.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are identified 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 soil on the landscape.

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

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape (fig. 2). Typically, it 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 another unit 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 association differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Dare County has been divided into seven general soil map units. These map units are grouped according to the following locations in the county: mainland, Outer Banks, marshes, and Roanoke Island.

Nearly Level Soils on the Mainland

These soils make up about 71 percent of the county. They are very poorly drained, organic and mineral soils. The water table is at or near the surface most of the time. Undrained areas are used mainly as woodland and wildlife habitat. In a few areas the soils have been drained and are used as cropland. Wetness and flooding are the main limitations. The organic soils also are limited by low strength, subsidence, and the risk of fire during dry periods.

1. Pungo-Belhaven

Nearly level, very poorly drained soils that have a mucky surface layer underlain dominantly by loamy material; on broad flats

This unit is on broad flats throughout the mainland. It makes up about 51 percent of the county. It is about 69 percent Pungo soils, 29 percent Belhaven soils, and 2 percent soils of minor extent. The minor soils include Ponzer and Roper soils.

The surface of the Pungo soils is covered by partially decomposed needles, leaves, and twigs. The surface layer is dark reddish brown muck. The layer below this also is dark reddish brown muck. The underlying material is gray loam.

The surface of the Belhaven soils is covered by partially decomposed leaves, twigs, and stems. The surface layer is black muck. The layer below this is black and dark reddish brown muck. The underlying material is dark reddish brown mucky loam, very dark grayish brown loam, and gray loam.

The major soils are used almost exclusively as woodland and wildlife habitat. Wetness, flooding, low strength, and seeding mortality are the main limitations affecting woodland.

The major soils have several limitations that affect urban and recreational development and cropland. These limitations are wetness, flooding, low strength, and a high percentage of logs, roots, and stumps in the organic layer.

2. Ponzer-Roper

Nearly level, very poorly drained soils that have a mucky surface layer underlain by loamy material; on broad flats

This unit is on broad flats throughout the mainland. It makes up 9 percent of the county. It is about 44 percent Ponzer soils, 34 percent Roper soils, and 22 percent soils of minor extent. The minor soils include Belhaven, Cape Fear, Hyde, and Pungo soils.

The surface layer of the Ponzer soils is black muck. Below this is very dark brown muck. The underlying material is dark grayish brown loam in the upper part, grayish brown loam in the next part, and gray clay loam in the lower part.

The surface layer of the Roper soils is black muck. The next layer is very dark grayish brown mucky loam. Below this is dark grayish brown loam. The underlying material is gray loamy fine sand in the upper part and gray loam in the lower part.

The major soils are used mainly as woodland. Wetness, flooding, seedling mortality, and low strength are the main management concerns.

The main limitations that affect urban and

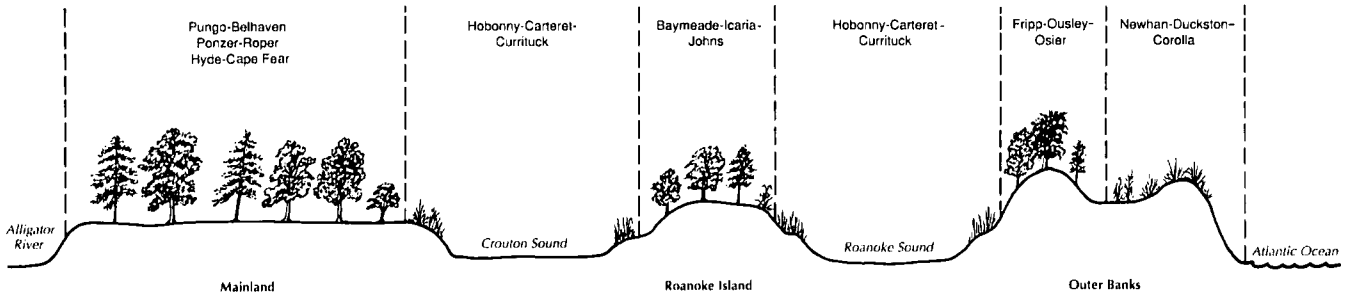


Figure 2.—The relationship of the general soil map units to the landscape of Dare County.

recreational development and cropland are wetness, flooding, excess humus, and low strength. Wetness and flooding are the main concerns affecting cropland.

3. Hyde-Cape Fear

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

This unit is on broad flats. It is dominantly in the central and northern parts of the mainland. It makes up 11 percent of the county. It is about 82 percent Hyde soils, 11 percent Cape Fear soils, and 7 percent soils of minor extent. The minor soils include Ponzer and Roper soils.

The surface layer of the Hyde soils is loam. It is black in the upper part and very dark gray in the lower part. The subsoil is clay loam. It is grayish brown in the upper part and dark grayish brown in the lower part. The underlying material is gray fine sandy loam in the upper part and light brownish gray loamy fine sand in the lower part.

The surface layer of the Cape Fear soils is black loam. The subsoil is gray clay in the upper part and gray clay loam in the lower part. The underlying material is gray sandy loam in the upper part and light gray loamy sand in the lower part.

The major soils are used mainly as woodland or cropland. Wetness and flooding are the main management concerns.

The main limitations affecting urban and recreational development are wetness, flooding, and low strength.

Nearly Level to Steep Soils on the Outer Banks

These soils make up about 17 percent of the county. They are excessively drained to poorly drained, sandy soils. They are used mainly for the recreational activities associated with beaches, for woodland, or for wildlife habitat. The sandy texture, seasonal droughtiness and wetness, flooding during high-wind tides, and salt spray are the principal limitations.

4. Newhan-Duckston-Corolla

Nearly level to steep, excessively drained, moderately well drained, somewhat poorly drained, and poorly drained soils that are sandy throughout; on low dunes, on flats, and in depressions between dunes

This unit is on flats, on gently sloping to sloping ridges, and in depressions on the Outer Banks. It makes up about 11 percent of the county. It is about 34 percent Newhan soils, 25 percent Duckston soils, 22 percent Corolla soils, and 19 percent areas of minor extent. The minor areas include Beaches, Dune land, and Conaby, Currituck, Osier, and Ousley soils.

The nearly level to steep Newhan soils are excessively drained. The surface layer is light brownish gray fine sand. The underlying material is fine sand. It is light yellowish brown in the upper part and very pale brown in the lower part.

The nearly level Duckston soils are poorly drained. The surface layer is very dark grayish brown or dark grayish brown fine sand. The underlying material is sand. It is light brownish gray in the upper part, dark gray in the next part, and gray in the lower part.

The nearly level to gently sloping Corolla soils are somewhat poorly drained and moderately well drained. The surface layer is dark grayish brown fine sand. The underlying material is sand. It is yellowish brown in the upper part, brown in the next part, and grayish brown in the lower part.

The major soils are used mainly for the recreational activities associated with beaches or for wildlife habitat. The sandy texture, seasonal droughtiness and wetness, and flooding of low areas during high-wind tides are the main limitations.

The major soils generally are not used as cropland or woodland because of the seasonal droughtiness and wetness and the flooding during high-wind tides. The urban and recreational uses in areas of this unit are

those associated with beach activities.

5. Fripp-Ousley-Osier

Nearly level to steep, excessively drained, moderately well drained, and poorly drained soils that are sandy throughout; on dunes and flats and in depressions between dunes

This unit commonly is on gently sloping or sloping ridges, on flats, and in depressions on the sound side of the Outer Banks. It makes up 6 percent of the county. It is about 42 percent Fripp soils, 15 percent Ousley soils, 9 percent Osier soils, and 34 percent soils of minor extent. The minor soils include Psamments and Baymeade, Carteret, Conaby, Corolla, Currituck, Duckston, Hobonny, Icaria, Johns, and Newhan soils.

The gently sloping to steep Fripp soils are excessively drained. The surface layer is grayish brown fine sand. The underlying material is fine sand. It is yellow in the upper part and very pale brown in the lower part.

The nearly level to gently sloping Ousley soils are moderately well drained. The surface layer is grayish brown fine sand. The underlying material is fine sand. It is yellowish brown and light olive brown in the upper part, dark grayish brown in the next part, and dark gray in the lower part.

The nearly level Osier soils are poorly drained. The surface layer is very dark grayish brown fine sand. The underlying material is fine sand. It is light brownish gray in the upper part and gray in the lower part.

The major soils are used as woodland. The slope, the sandy texture, seasonal droughtiness and wetness, and flooding are the main management concerns.

The major soils generally are not used as cropland. The main limitations that affect urban and recreational uses are the slope, the sandy texture, wetness, seepage, and flooding.

Nearly Level Soils in Marshes

These soils make up about 10 percent of the county. They are very poorly drained soils in marshes. They generally are used only as habitat for wildlife because of frequent flooding, extreme wetness, and exposure to salt spray.

6. Hobonny-Carteret-Currituck

Nearly level, very poorly drained soils that have a mucky or sandy surface layer and a mucky or sandy substratum; on broad flats in marshes

This unit is on broad flats in marshes on Roanoke Island, the eastern shore of the mainland, and the sound side of the Outer Banks. It makes up about 10 percent of the county. It is about 43 percent Hobonny soils, 29 percent Carteret soils, and 28 percent Currituck soils.

The surface layer of the Hobonny soils is very dark grayish brown muck. Below this is muck that is very dark grayish brown in the upper part and dark gray in the lower part.

The surface layer of the Carteret soils is dark grayish brown sand. The underlying material is sand. It is gray in the upper part and grayish brown in the lower part.

The surface layer of the Currituck soils is dark brown muck. Below this is muck that is very dark brown in the upper part and black in the lower part. The underlying material is sand. It is black in the upper part and dark grayish brown in the lower part.

These soils generally are used only as habitat for wildlife because of the landscape position, wetness, and frequent flooding by tides for long periods. The wildlife includes certain fur-bearing animals, marsh birds, some migrating waterfowl, and snakes.

Nearly Level to Sloping Soils on Roanoke Island

These soils make up about 2 percent of the county. They are mostly well drained to poorly drained soils. They are used mainly for urban or recreational development. A sandy texture, seasonal droughtiness and wetness, seepage, and flooding during high-wind tides are the principal limitations.

7. Baymeade-Icaria-Johns

Nearly level to sloping, well drained, moderately well drained, somewhat poorly drained, and very poorly drained soils that have a sandy surface layer and a loamy subsoil; on low ridges, on flats, and in depressions

This unit is on flats, on gently sloping, smooth ridges, and in depressions on Roanoke Island and in Manns Harbor. It makes up 2 percent of the county. It is 36 percent Baymeade soils, 29 percent Icaria soils, 18 percent Johns soils, and 17 percent soils of minor extent. The minor soils include Belhaven, Hobonny, Fripp, Leon, and Ponzer soils.

The nearly level to sloping Baymeade soils are well drained. The surface is covered by partially decomposed needles, leaves, and twigs. The surface layer is dark gray fine sand. The subsurface layer is light brownish gray fine sand. Below this is fine sand that is dark brown in the upper part and light yellowish brown in the lower part. The subsoil is yellowish brown sandy clay loam in the upper part and strong brown sandy loam in the lower part. The underlying material is fine sand. It is strong brown in the upper part and yellowish brown in the lower part.

The nearly level Icaria soils are very poorly drained. The surface is covered by partially decomposed

needles, leaves, and twigs. The surface layer is black loamy fine sand. The upper part of the subsoil is light brownish gray sandy clay loam. The lower part is dark brown and dark reddish brown sand.

The nearly level Johns soils are moderately well drained and somewhat poorly drained. The surface is covered by partially decomposed needles, leaves, and twigs. The surface layer is very dark gray loamy sand. The subsurface layer is gray loamy sand. The subsoil is very dark brown loamy sand in the upper part, yellowish brown sandy loam in the next part, and yellowish brown sandy clay loam in the lower part. The underlying material is sand. It is light yellowish brown in the upper part, very pale brown in the next part, and light brownish gray in the lower part.

The major soils are used mainly for urban or recreational development and to a lesser extent as woodland. The sandy texture, seasonal droughtiness and wetness, seepage, and flooding during high-wind tides are the main management concerns.

The major soils generally are not used for agriculture. The main limitations that affect urban and recreational development are the slope, the sandy texture, seepage, wetness, and the flooding of low areas during high-wind tides.

Detailed Soil Map Units

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

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

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

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

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, 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, Newhan fine sand, 0 to 10 percent slopes, is a phase of the Newhan series.

Some map units are made up of two or more major soils. These map units are called soil complexes. A *soil complex* consists of two or more soils, or one or more soils and a miscellaneous 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. Corolla-Duckston complex, 0 to 6 percent slopes, rarely flooded, 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. Dune land is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

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

Soil Descriptions

BaC—Baymeade fine sand, 1 to 10 percent slopes. This nearly level to sloping, well drained soil is on sandy and loamy ridges in Manns Harbor and on Roanoke Island. Mapped areas are irregular in shape and range from 25 to 100 acres in size.

Typically, the surface is covered with about 2 inches of partially decomposed needles, leaves, and twigs. The surface layer is dark gray fine sand about 8 inches thick. The subsurface layer is light brownish gray fine sand about 6 inches thick. Below this to a depth of 32 inches is fine sand that is dark brown in the upper part and light yellowish brown in the lower part. The subsoil extends from a depth of 32 to 46 inches. It is yellowish brown sandy clay loam in the upper part and strong brown sandy loam in the lower part. The underlying material to a depth of 80 inches is fine sand. It is strong brown in the upper part and yellowish brown in the lower part.

Permeability is moderately rapid. The soil ranges from very strongly acid to slightly acid unless limed. The seasonal high water table is 4 to 5 feet below the surface.

Included with this soil in mapping are small areas of Fripp, Johns, and Leon soils. The sandy Fripp soils are commonly on the higher parts of the landscape. Johns

and Leon soils are in low, wet troughs or depressions. The included soils make up about 10 percent of the map unit.

Most areas are used for urban development. The areas of this soil in Dare County generally are not used for agriculture because of the lack of active farming on Roanoke Island and in Manns Harbor. Leaching of plant nutrients, soil blowing, and droughtiness are the main limitations affecting farming.

The dominant native trees are loblolly pine, longleaf pine, live oak, hickory, sweetgum, southern red oak, white oak, and post oak. The understory includes mainly dogwood, sassafras, American holly, and sourwood. A low available water capacity resulting from the sandy surface layer and the susceptibility of the surface layer to compaction are the main limitations affecting woodland. Compaction reduces the productivity of the soil. It can be minimized by using suitable logging systems, laying out skid trails in advance, and harvesting timber when the soil is least susceptible to compaction.

No major limitations affect some urban uses, such as dwellings without basements and local roads and streets. The caving of cutbanks, wetness, and slope are limitations on sites for other urban uses. The thick sandy material provides a good support base for most structures. In unprotected areas, however, this material is subject to soil blowing and is droughty when rainfall is limited. Recreational development is severely limited by the sandy texture. A poor filtering capacity is a severe limitation on sites for sanitary facilities.

The capability subclass is IIIs. Based on loblolly pine as the indicator species, the woodland ordination symbol is 6S.

BeA—Beaches, 0 to 2 percent slopes, storm tidal. This nearly level map unit is on small islands and on the northern side of the inlets on the Outer Banks. In some areas it extends from the ocean to the sound. The unit is sandy throughout and has few to many shell fragments.

Vegetation is sparse on this unit. It is restricted to scattered small hummocks of seaoats and American beachgrass. The plant cover is limited because of a high salt content and flooding.

Occasional tidal and storm flooding is the main hazard affecting all uses other than beach-related recreational activities.

No capability subclass or woodland ordination symbol is assigned.

BnD—Beaches-Newhan complex, 0 to 25 percent slopes. This map unit consists of long, narrow areas of coastal beaches and areas of an excessively drained Newhan soil on foredunes on the higher parts of the landscape. The unit occurs between the ocean and 35 feet above mean sea level. A typical area is about 55 percent Beaches, 40 percent Newhan soil, and 5 percent other soils. The areas typically are on the ocean side of the Outer Banks (fig. 3) and are commonly on inlets and islands. The areas that parallel the ocean range from 100 to about 400 feet in width and are several miles long. The areas on the islands and inlets are smaller and not so long.

The Beaches consist of sand that ranges from fine to very coarse in size but is chiefly fine. The content of shell fragments varies widely. The back portion of the beach, or berm, has shell fragments and various sizes of sand. The berm varies in size and in places is practically nonexistent.

The Beaches are low and are flooded daily by tidal action. The berm is slightly higher and is less affected by normal tidal action. The soft, fluffy, loose sand is susceptible to severe soil blowing, particularly in the broader areas. The Beaches support no vegetation.

Typically, the surface layer of the Newhan soil is light brownish gray fine sand about 2 inches thick. The underlying material to a depth of 80 inches is fine sand. It is light yellowish brown in the upper part and very pale brown in the lower part.

Permeability is very rapid in the Newhan soil. The soil ranges from moderately acid to mildly alkaline because it is exposed to large amounts of salt spray. Most areas of this soil are covered with vegetation, mainly American beachgrass, seaoats, coastal panicgrass, and bitter panicum. The seasonal high water table is more than 6 feet below the surface.

Included in mapping are the poorly drained Duckston and somewhat poorly drained Corolla soils in narrow depressions and troughs within the foredunes. These soils make up about 5 percent of the map unit.

The map unit is not used for agricultural purposes or commercial woodland. The Beaches are used as recreation areas and as habitat for coastal birds and some marine species. They do not support vegetation because of tidal flooding and severe soil blowing. The areas of the Newhan soil on the frontal dunes help to stabilize the barrier islands because they provide protection from ocean storms. Soil blowing can be controlled by planting American beachgrass, bitter panicgrass, or other grasses and shrubs adapted to extreme droughtiness and tolerant of salt spray. Sand fences also are effective in controlling soil blowing.

The capability subclass assigned to the Newhan soil is VIIIs. No woodland ordination symbol is assigned to this unit.

Figure 3.—An area of Beaches-Newhan complex, 0 to 25 percent slopes. The Newhan soil has a vegetative cover.

BvA—Belhaven muck, 0 to 2 percent slopes, rarely flooded. This nearly level, very poorly drained soil is primarily on the mainland, but a few acres are on Roanoke Island. Mapped areas are irregular in shape and range from 100 to about 4,500 acres in size.

Typically, the surface is covered with about 4 inches of partially decomposed leaves, twigs, and stems. The surface layer is black muck about 12 inches thick. Below this to a depth of 38 inches is muck that is black in the upper part and dark reddish brown in the lower part. The upper part of the underlying mineral soil is dark reddish brown mucky loam. The next part is very dark grayish brown loam. The lower part to a depth of 72 inches is gray loam.

The surface layer is highly decomposed organic material. Permeability is moderately slow to moderately rapid. The organic layers are extremely acid unless limed. The underlying mineral layer ranges from extremely acid to slightly acid. Few to many logs, roots, and stumps are throughout the profile in most areas. The seasonal high water table is at or near the surface. This soil is subject to rare flooding.

Included with this soil in mapping are scattered small areas of Pungo and Roper soils. Pungo soils have an organic layer more than 51 inches thick, and Roper soils have one less than 15 inches thick. Also included are scattered areas of soils in which the underlying mineral soil is sand. The included soils are in landscape positions similar to those of the Belhaven soil. They make up about 15 percent of the map unit.

The main limitations affecting agricultural uses are wetness; flooding; the large percentage of logs, roots, and stumps in the organic layer; and soil blowing in cultivated areas.

Most areas are used as woodland. The dominant native trees are loblolly pine, red maple, Atlantic white cedar, pond pine, sweetgum, baldcypress, and blackgum. The understory is mainly inkberry, fetterbush lyonia, huckleberry, greenbrier, waxmyrtle, and switchcane. Wetness is the main limitation affecting

woodland. This organic soil has a poor load-supporting capacity. Installation of a drainage system and bedding of rows help to overcome excessive wetness. Using wheeled or tracked equipment when the soil is wet results in deep ruts and damages tree roots.

The main limitations affecting urban and recreational uses are wetness, flooding, excess humus, and low strength.

The capability subclass is IVw in drained areas, VIIw in undrained areas. Based on loblolly pine as the indicator species, the woodland ordination symbol is 6W.

CaA—Cape Fear loam, 0 to 2 percent slopes, rarely flooded. This nearly level, very poorly drained soil is on the mainland, predominantly in the northern part of the county. Mapped areas are irregular in shape and range from 10 to 1,000 acres in size.

Typically, the surface layer is black loam about 13 inches thick. The subsoil is about 35 inches thick. It is gray clay in the upper part and gray clay loam in the lower part. The upper part of the underlying material is gray sandy loam. The lower part to a depth of 72 inches is light gray loamy sand.

Permeability is slow. The shrink-swell potential is moderate. The soil ranges from very strongly acid to moderately acid throughout unless the surface layer has been limed. The seasonal high water table is at or near the surface. This soil is subject to rare flooding.

Included with this soil in mapping are small areas of the loamy Hyde soils and small areas of Roper soils, which have an organic surface layer. The included soils generally are near the outer edge of the mapped areas. They make up about 10 percent of the map unit.

Most of the acreage is cultivated. The major crops are corn, small grain, and soybeans. Wetness and flooding are the main limitations. Conservation tillage, cover crops, and a cropping system that includes grasses and legumes help to maintain tilth and crop production. Spring tillage and fall harvest may be delayed because of the wetness. A scarcity of suitable outlets and the slow permeability limit the installation of drainage systems. Pasture species, such as fescue and ladino clover, are grown on this soil.

The dominant native trees are baldcypress, pond pine, loblolly pine, red maple, Atlantic white cedar, sweetgum, swamp white oak, water tupelo, water oak, and willow oak. The understory includes mainly American holly, sweetbay, sourwood, reeds, and waxmyrtle. Wetness, flooding, and seedling mortality are the main limitations affecting woodland. A drainage system that lowers the water table and bedding of rows help to remove excessive rainwater at a rapid rate. Using standard wheeled and tracked equipment when the soil is wet results in deep ruts, compacts the soil, and damages the roots of trees. The use of equipment should be limited to dry periods from midsummer through early fall, when the water table is lowest.

The main limitations affecting urban and recreational uses are wetness, flooding, and low strength. The wetness can be reduced by a drainage system.

The capability subclass is IIIw in drained areas, VIw in undrained areas. Based on loblolly pine as the indicator species, the woodland ordination symbol is 11W.

CeA—Carteret sand, 0 to 2 percent slopes, frequently flooded. This nearly level, very poorly drained soil is in broad marshes on the sound side of the Outer Banks. Mapped areas are irregular in shape and range from 5 to 400 acres in size.

Typically, the surface layer is dark grayish brown sand about 4 inches thick. The underlying material to a depth of 80 inches is sand. It is gray in the upper part and grayish brown in the lower part.

Permeability is rapid or very rapid. The soil ranges from moderately acid to moderately alkaline. The seasonal high water table is 3 feet above to 1 foot below the surface. This soil is frequently flooded by tides.

Included with this soil in mapping are scattered small areas of the organic Currituck and Hobonny soils. These soils are in landscape positions similar to those of the Carteret soil. They make up about 10 percent of the map unit.

The Carteret soil is used as habitat for wildlife. The dominant vegetation is black needlerush or saltmeadow cordgrass. Other vegetation includes scattered patches of bullrush, sea oxeye, marshelder, saltgrass, eastern baccharis, and three-square rush.

This soil generally is not used for agricultural purposes, commercial woodland, or urban or recreational development. Flooding, wetness, the sandy material, and exposure to salt water are the main limitations.

The capability subclass is VIIIw. No woodland ordination symbol is assigned.

CnA—Conaby muck, 0 to 2 percent slopes, rarely flooded. This nearly level, very poorly drained soil is on low flats and in troughs and depressions, typically between forested dunes on the Outer Banks. The areas on flats are irregular in shape and range from 10 to 150 acres in size. The areas in troughs and depressions are long and narrow and range from 5 to 100 acres in size.

Typically, the surface layer is muck about 14 inches thick. It is black in the upper part and very dark gray in the lower part. The underlying mineral soil to a depth of

60 inches is sand. It is grayish brown in the upper part, dark yellowish brown in the next part, and gray in the lower part.

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

Included with this soil in mapping are small areas of Currituck and Duckston soils, which commonly are on the slightly higher parts of the landscape. Currituck soils have layers of muck that are thicker than those of the Conaby soil. Duckston soils do not have an organic surface layer. The included soils make up 10 to 15 percent of the map unit.

Most of the acreage supports natural vegetation. The type of vegetation is determined by the proximity to salt water. Salt meadow cordgrass, black needlerush, and waxmyrtle are in areas affected by salt water. The areas at a greater distance from salt water support the less salt-tolerant grasses and sedges as well as greenbrier, eastern baccharis, black willow, redbay, three-square rush, cattail, sawgrass, blueberry, wild olive, and Virginia creeper.

This soil is used mainly as habitat for coastal wildlife. It generally is not used as cropland or commercial woodland because of wetness, a lack of adequate drainage outlets, and a limited exposure to salt water and salt spray.

The main limitations affecting to most urban and recreation uses are the wetness and the flooding.

The capability subclass is VIw. No woodland ordination symbol is assigned.

CoB—Corolla fine sand, 0 to 6 percent slopes, rarely flooded. This nearly level and gently sloping, moderately well drained or somewhat poorly drained soil is in troughs and on flats between dunes on the Outer Banks. Mapped areas are long, vary in width, and range from 5 to 500 acres in size.

Typically, the surface layer is dark grayish brown fine sand about 3 inches thick. The underlying material to a depth of 75 inches is sand. It is yellowish brown in the upper part, brown in the next part, and grayish brown in the lower part.

Permeability is very rapid. The soil ranges from moderately acid to moderately alkaline. The seasonal high water table is 1.5 to 3.0 feet below the surface. The soil is subject to rare flooding, which occurs during periods of strong-wind tides or hurricanes. The soil is exposed to varying amounts of salt spray, depending on the proximity to the ocean.

Included with this soil in mapping are small areas of Duckston, Newhan, and Ousley soils. The poorly drained Duckston soils are in troughs and depressional areas. The excessively drained Newhan soils are on small hummocks. Ousley soils are on the outer edge of the mapped areas, near the sound side of the Outer Banks. The included soils make up about 15 percent of the map unit.

The Corolla soil generally supports native vegetation, which varies, depending on the amount of exposure to salt. The most common plants in areas that receive high amounts of salt spray are saltmeadow cordgrass, bitter panicum, and silverlead croton. The plants in areas less affected by salt spray include largelead pennywort, seaside goldenrod, waxmyrtle, yaupon holly, northern bayberry, eastern baccharis, stunted live oak, blueberry, wild olive, stunted pine, seacoast bluestem, seashore elder, and searocket.

This soil is not used as cropland or commercial woodland because of exposure to salt spray, flooding by salt water, seasonal droughtiness and wetness, and very rapid permeability.

The seasonal wetness and flooding limit the use of this soil for building site development and sanitary facilities. A poor filtering capacity and seepage are additional limitations on sites for sanitary facilities. Adequate outlets for an artificial drainage system are not available in many places because of the low elevation. Maintaining a drainage system is difficult because ditchbanks in areas of this sandy soil can cave in. The wetness and the sandy texture are limitations affecting recreation uses.

The capability subclass is VIIs. No woodland ordination symbol is assigned.

CrB—Corolla-Duckston complex, 0 to 6 percent slopes, rarely flooded. This map unit is on the Outer Banks. A typical area is 60 percent Corolla soil, 25 percent Duckston soil, and 15 percent other soils. The areas commonly are directly inland from some of the frontal dunes. The Corolla soil is on flats and small hummocks. The Duckston soil is in the wetter, slightly lower, depressional areas where slopes range from 0 to 2 percent. Areas are irregular in shape and range from 5 to 100 acres in size.

The Corolla soil is moderately well drained and somewhat poorly drained. Typically, the surface layer is dark grayish brown fine sand about 3 inches thick. The underlying material to a depth of 75 inches is sand. It is yellowish brown in the upper part, brown in the next part, and grayish brown in the lower part.

Permeability is very rapid in the Corolla soil. The soil is moderately acid to moderately alkaline. The seasonal high water table is 1.5 to 3.0 feet below the surface.

The soil is subject to rare flooding. Flooding occurs only during periods of strong-wind tides or hurricanes.

The Duckston soil is poorly drained. Typically, the surface layer is very dark grayish brown fine sand about 3 inches thick. The upper part of the underlying material is dark grayish brown fine sand and light brownish gray sand. The next part is dark gray sand. The lower part to a depth of 80 inches is gray sand.

Permeability is very rapid above the water table in the Duckston soil. The soil ranges from extremely acid to moderately alkaline. The seasonal high water table is between the surface and 1 foot below the surface. This soil is subject to rare flooding for brief periods.

Included with these soils in mapping are small areas of Newhan soils. These included soils are in the higher positions on dunes, commonly near the ocean side. They make up about 15 percent of the map unit.

The Corolla and Duckston soils are used mainly as habitat for coastal wildlife. The native vegetation varies, depending on the location within mapped areas and on the amount of exposure to salt. The natural vegetation on the Corolla soil consists of sparse stands of saltmeadow cordgrass, northern bayberry, eveningprimose, largeleaf pennywort, scrubby live oak, blueberry, wild olive, persimmon, ragweed, and Virginia creeper. In areas affected by salt spray, the natural vegetation on the Duckston soil consists of dense stands of saltmeadow cordgrass, waxmyrtle, and northern bayberry. The areas at a greater distance from the salt spray support greenbrier, eastern baccharis, scattered black willow, blueberry, wild olive, and persimmon.

These soils are not used as cropland or woodland because of exposure to salt spray and flooding by salt water.

Wetness, the hazard of flooding, and the lack of adequate outlets for a drainage system are the major limitations affecting the use of these soils for building site development, sanitary facilities, and recreational development. A poor filtering capacity and seepage are additional limitations on sites for sanitary facilities.

The Corolla and Duckston soils are in capability subclass VIIs and VIIw, respectively. No woodland ordination symbol is assigned.

CuA—Currituck mucky peat, 0 to 1 percent slopes, frequently flooded. This nearly level, very poorly drained soil is in broad marshes on the sound side of the Outer Banks north of Collington Island. It also is in depressions between the forested dunes near Buxton. Mapped areas generally are long and narrow and range from 10 to 700 acres in size.

Typically, the surface layer is dark brown muck about 17 inches thick. Below this to a depth of 40 inches is muck that is very dark brown in the upper part and black in the lower part. The underlying material to a depth of 65 inches is sand. It is black in the upper part and dark grayish brown in the lower part.

Permeability is moderate or moderately rapid. The soil ranges from very strongly acid to moderately acid in the upper organic layers and extremely acid to moderately acid in the lower organic and mineral layers. The seasonal high water table is 1 foot above to 1 foot below the surface. This soil is frequently flooded by changing tides for very long periods.

Included with this soil in mapping are small areas of Carteret and Hobonny soils. Carteret soils are sandy throughout. Hobonny soils are organic throughout. The included soils generally are near the outer edge of the mapped areas. They make up about 10 percent of the map unit.

The dominant native vegetation is black needlerush, maindencane, sawgrass, eastern baccharis, waxmyrtle, willow, and cattail. This soil is used as habitat for wildlife. It is not used for agricultural purposes, commercial tree production, or urban or recreational development because of the frequent flooding, extreme wetness, poor trafficability, and exposure to salt water.

The capability subclass is VIIIw. No woodland ordination symbol is assigned.

DtA—Duckston fine sand, 0 to 2 percent slopes, occasionally flooded. This nearly level, poorly drained soil is on flats and in slight depressions on the Outer Banks. Areas are irregular in shape and range from 5 to 50 acres in size.

Typically, the surface layer is fine sand about 8 inches thick. It is very dark grayish brown in the upper part and dark grayish brown in the lower part. Below this to a depth of 80 inches is sand that is light brownish gray in the upper part and dark gray and gray in the lower part.

Permeability is very rapid above the water table. The soil ranges from extremely acid to moderately alkaline. The seasonal high water table is at or near the surface and fluctuates somewhat in relation to the tides. This soil is occasionally flooded by storm tides for brief periods. It is exposed to varying amounts of salt spray, depending on the proximity to the ocean.

Included with this soil in mapping are small areas of Conaby, Corolla, Newhan, and Osier soils, which are near the outer edge of the mapped areas. Corolla soils are on low knolls, and Newhan soils are on the higher knolls. Conaby soils are on flats and in troughs and depressions, and Osier soils are along marshes and in depressions. Included soils make up 10 to 15 percent of the map unit.

The Duckston soil is used mainly as habitat for

wildlife. The native vegetation varies, depending on the amount of exposure to salt spray. Saltmeadow cordgrass and waxmyrtle are in areas affected by salt spray. The areas at a greater distance from the ocean spray support the less salt-tolerant grasses and sedges as well as greenbrier, eastern baccharis, black willow, redbay, three-square rush, cattail, sawgrass, blueberry, wild olive, and Virginia creeper.

This soil is generally not used as cropland or woodland because of exposure to salt spray, the hazard of flooding, and the lack of adequate drainage outlets. It generally is not used for urban or recreational development because of wetness, the sandy texture, and flooding.

The capability subclass is VIIw. No woodland ordination symbol is assigned.

DuE—Dune land, 2 to 40 percent slopes. This miscellaneous area consists of sand dunes on the Outer Banks. The sand dunes are devoid of vegetative cover and are subject to severe soil blowing and shifting. They range in height from a few feet to more than 100 feet. Some are elongated mounds, and others are oval or crescent-shaped hills. The water table is at a depth of more than 6 feet. Dune land is extremely droughty.

Included in mapping are small areas of Newhan soils, which have a vegetative cover on less than 15 percent of the surface.

The capability subclass is VIIIe. No woodland ordination symbol is assigned.

DwE—Dune land-Newhan complex, 2 to 40 percent slopes. This map unit is on the Outer Banks. Most areas lie parallel to the ocean. A typical area is about 60 percent Dune land and 35 percent Newhan soil. Areas are irregular in shape and range from 10 to 100 acres in size.

The Dune land is devoid of vegetation. It typically is in the steeper areas. It consists of sandy material that is subject to severe soil blowing and shifting with the wind. Water moves very rapidly through the sand. The capacity of the sand to hold water for plant growth is very low.

The excessively drained Newhan soil supports salt-tolerant vegetation, but plant density varies. This soil is in areas where slopes range from 2 to 30 percent. Typically, the surface layer is light brownish gray fine sand about 2 inches thick. The underlying material to a depth of 80 inches is fine sand. It is light yellowish brown in the upper part and very pale brown in the lower part.

Permeability and the available water capacity are very low in the Newhan soil. The soil is moderately acid to mildly alkaline. It is exposed to varying amounts of salt spray, depending on the proximity to the ocean. The seasonal high water table is more than 6 feet below the surface.

Included in mapping are Duckston and Corolla soils. These included soils are in narrow depressions and troughs between the foredunes. They make up about 5 percent of the map unit.

The Dune land and the Newhan soil are used mainly as habitat for coastal wildlife and as open space. They are not used as cropland or woodland because of exposure to salt spray, extreme droughtiness, and very rapid leaching of plant nutrients.

Windblown sand and the slope are the main limitations affecting urban and recreational uses. Structures and plants are likely to be either undermined or covered by the sand. Plants also are subject to salt spray. The Dune land and the Newhan soil should be stabilized before they are used as homesites or recreational areas. The Dune land can be stabilized through a combination of structures and salt-tolerant vegetation. Only the most drought-tolerant plants should be used to stabilize these areas. American beachgrass, panicgrass, and bitter panicum are suited to this purpose. After the Dune land has been stabilized, shrubs can be planted in areas protected from salt spray. The adapted species are waxmyrtle, northern bayberry, yaupon holly, and flameleaf sumac. The shrubs provide a more permanent cover than the grasses and also help to provide an environment in which other native plants can become established.

The capability subclass assigned to the Newhan soil is VIIIs. No woodland ordination symbol is assigned to this unit.

FrD—Fripp fine sand, 2 to 30 percent slopes. This nearly level to steep, excessively drained soil is on dune ridges on Roanoke Island and the sound side of the Outer Banks. The soil generally is protected from salt spray. Mapped areas are oblong and range from 5 to 1,000 acres in size.

Typically, the surface layer is grayish brown fine sand about 4 inches thick. The underlying material to a depth of 80 inches is fine sand. It is yellow in the upper part and very pale brown in the lower part.

Permeability is rapid. The soil is strongly acid to mildly alkaline throughout. The seasonal high water table is more than 6 feet below the surface.

Included with this soil in mapping are small areas of Conaby, Newhan, and Ousley soils. Conaby and Ousley soils are in depressions and troughs. Newhan soils are along the edges of the mapped areas. The included soils make up about 10 percent of the map unit.

The Fripp soil supports a maritime forest of loblolly

pine, live oak, cherrybark oak, hickory, black cherry, and eastern redcedar. The understory consists mainly of American holly, waxmyrtle, yaupon holly, devilwood, and muscadine grape. The sandy texture, droughtiness, and the slope are the main limitations affecting woodland.

This 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. Grading can create more favorable slopes for building, but it destroys the native vegetation and causes severe soil blowing. Also, the dune ridges should not be graded because they provide protection from ocean storms and improve the stability of the barrier islands. Soil blowing can be controlled and stability increased by additional plantings of adapted grasses and shrubs. The sandy texture and the excessive slope are the main limitations affecting recreational development.

The capability subclass is VIIs. Based on loblolly pine as the indicator species, the woodland ordination symbol is 6S.

HoA—Hobonny muck, 0 to 1 percent slopes, frequently flooded. This nearly level, very poorly drained soil generally is in marshes on Roanoke Island and the eastern shore of the mainland. It also is on the sound side of the Outer Banks. Mapped areas are irregular in shape and range from 10 to several hundred acres in size.

Typically, the surface layer is very dark grayish brown muck about 16 inches thick. Below this to a depth of 72 inches is muck that is very dark grayish brown in the upper part and dark gray in the lower part.

Permeability is moderate. The soil ranges from extremely acid to strongly acid throughout the organic layers. At least one of the organic layers is very strongly acid or strongly acid. The mineral layers, if they occur, are extremely acid to moderately acid. The seasonal high water table is commonly at or slightly above the surface. The soil is frequently flooded for very long periods.

Included with this soil in mapping are scattered areas of Currituck soils, which have sandy sediments at a depth of 16 to 51 inches. These soils are in landscape positions similar to those of the Hobonny soil. They make up about 10 percent of the map unit.

Most of the acreage of the Hobonny soil supports natural vegetation and is used as habitat for wildlife. The natural vegetation is primarily black needlerush, big cordgrass, maidencane, sawgrass, and cattail (fig. 4).

This soil is not used for cropland, woodland, or urban or recreational development because of excessive wetness, flooding, excess humus, low strength, and exposure to salt water.

The capability subclass is VIIw. No woodland ordination symbol is assigned.

HyA—Hyde loam, 0 to 2 percent slopes, rarely flooded. This nearly level, very poorly drained soil is on broad flats on the mainland. It is mainly in the central part of the county, around East Lake Community. Mapped areas are irregular in shape and range from 50 to 500 acres in size.

Typically, the surface layer is 13 inches thick. It is black loam in the upper part and very dark gray loam in the lower part. The subsoil is clay loam about 27 inches thick. It is grayish brown in the upper part and dark grayish brown in the lower part. The upper part of the underlying material is gray fine sandy loam. The lower part to a depth of 70 inches is light brownish gray loamy fine sand.

The organic matter content in the surface layer is high. Permeability is moderately slow. The soil is extremely acid to neutral. The seasonal high water table is at or near the surface. This soil is subject to rare flooding.

Included with this soil in mapping are small areas of the clayey Cape Fear soils and the organic Ponzer soils and small areas of Roper soils, which have an organic surface layer. The included soils are mostly in landscape positions similar to those of the Hyde soil. They are near the outer edge of the mapped areas. They make up about 10 percent of the map unit.

The Hyde soil is used mainly as woodland. In places it is used as cropland.

In cultivated areas the principal crops are corn, small grain, and soybeans. Wetness and flooding are the main limitations. Conservation tillage, cover crops, and a cropping system that includes grasses and legumes help to maintain tilth and crop production. Spring tillage and fall harvest can be delayed because of wetness. A scarcity of suitable outlets and the moderately slow permeability limit the installation of drainage systems.

In areas of woodland, loblolly pine, red maple, green ash, sweetgum, elm, pond pine, water oak, and willow oak are the dominant species. The understory includes mainly American holly, sweetbay, sourwood, reeds, and southern waxmyrtle. Wetness and flooding are the main limitations affecting woodland. Installation of a drainage system and bedding of rows help to overcome the excessive wetness. Using standard wheeled and tracked equipment when the soil is wet results in deep ruts, compacts the soil, and damages the roots of trees. The use of equipment should be limited to dry periods from midsummer through early fall, when the water table is lowest.

Figure 4.—Blackneedle rush on Hobonny muck, 0 to 1 percent slopes, frequently flooded. The wooded area in the background is Osier fine sand, 0 to 2 percent slopes, rarely flooded.

Wetness and flooding are the main limitations affecting urban and recreational uses. The severity of these limitations can be reduced by a drainage system.

The capability subclass is IIIw in drained areas, VIw in undrained areas. Based on loblolly pine as the indicator species, the woodland ordination symbol is 10W.

IcA—Icaria loamy fine sand, 0 to 2 percent slopes, rarely flooded. This nearly level, very poorly drained soil is on flats and in depressions on Roanoke Island and in Manns Harbor. Mapped areas are irregular in shape and range from 5 to 100 acres in size.

Typically, the surface is covered with 3 inches of partially decomposed needles, leaves, and twigs. The surface layer is black loamy fine sand about 12 inches thick. The upper part of the subsoil is light brownish gray sandy clay loam about 21 inches thick. The lower part to a depth of 72 inches is dark brown and dark reddish brown sand.

Permeability is moderate in the subsoil. The soil ranges from extremely acid to strongly acid. The seasonal high water table is at or near the surface. This soil is subject to rare flooding by strong-wind tides and hurricanes.

Included with this soil in mapping are small areas of Hobonny, Ponzer, Belhaven, and Leon soils. These soils are along the outer edge of the mapped areas. They make up 10 to 15 percent of the map unit.

The Icaria soil is used mainly as woodland. The dominant trees are loblolly pine, sweetgum, red maple, water oak, and willow oak. The understory includes mainly American holly, sweetbay, greenbrier, and reeds. Wetness and flooding are the main limitations affecting woodland. Installation of a drainage system and bedding of rows help to overcome excessive wetness.

The Icaria soil in Dare County generally is not used for agricultural purposes. Wetness and flooding are the main limitations.

The main limitation affecting urban and recreational uses is wetness. In some areas flooding is a hazard during hurricanes and strong-wind tides.

The capability subclass is VIw. Based on loblolly pine as the indicator species, the ordination symbol is 9W.

JoA—Johns loamy sand, 0 to 2 percent slopes. This nearly level, moderately well drained and somewhat poorly drained soil is on low, smooth ridges on Roanoke Island and in Manns Harbor. The smaller mapped areas are commonly oval, and the larger areas are irregular in shape. The size of the areas ranges from 3 to about 100 acres.

Typically, the surface is covered with 3 inches of partially decomposed needles, leaves, and twigs. The surface layer is very dark gray loamy sand about 4 inches thick. The subsurface layer is gray loamy sand about 4 inches thick. The upper part of the subsoil is very dark brown loamy sand about 5 inches thick. The rest is about 13 inches thick. It is yellowish brown sandy loam in the upper part and yellowish brown sandy clay loam in the lower part. The underlying material to a depth of 72 inches is sand. It is light yellowish brown in the upper part, very pale brown in the next part, and light brownish gray in the lower part.

Permeability is moderate to rapid. The soil is very strongly acid or strongly acid. The seasonal high water table is 1.5 to 3.0 feet below the surface.

Included with this soil in mapping are small areas of Baymeade and Icaria soils. Baymeade soils are on the slightly higher knolls. Icaria soils are in slight depressions. The included soils make up about 10 percent of the map unit.

The Johns soil is used mainly as woodland. The dominant vegetation is loblolly pine, sweetgum, persimmon, live oak, and water oak. Wetness is the main limitation affecting woodland.

The Johns soil in Dare County generally is not used for agriculture because of the lack of active farming on Roanoke Island and in Manns Harbor. Wetness is the main limitation affecting farming.

The main limitation affecting urban and recreational uses is wetness. Also, the soil is too sandy for some urban uses. The wetness can be reduced by installing perforated drain tile, drainage ditches, or a combination of the two systems.

The capability subclass is IIw. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9W.

LeA—Leon fine sand, 0 to 2 percent slopes, rarely flooded. This nearly level, poorly drained soil is on Roanoke Island and in Manns Harbor. It is on flats and in slight depressions. Mapped areas are irregular in shape and range from 5 to 50 acres in size.

Typically, the surface layer is dark gray fine sand about 7 inches thick. The subsurface layer is light gray sand about 8 inches thick. The subsoil is sand about 8 inches thick. It is dark brown in the upper part and dark reddish brown in the lower part. The underlying material to a depth of 72 inches is gray sand.

Permeability is moderate to rapid. This soil ranges from extremely acid to strongly acid throughout. The seasonal high water table is at or near the surface. The soil is subject to rare flooding.

Included with this soil in mapping are small areas of Icaria soils and areas of soils that have a dark surface layer more than 10 inches thick. The included soils are in landscape positions similar to those of the Leon soil. They make up about 10 percent of the map unit.

The Leon soil in Dare County generally is not used for agricultural purposes. Wetness, flooding, and a scarcity of adequate drainage outlets are the primary limitations affecting agricultural uses.

This soil is used as woodland. Loblolly pine, live oak, and water oak are the dominant species. The most common understory plants are waxmyrtle, fetterbush lyonia, gallberry, and American holly. Wetness in winter is a limitation; however, this soil is droughty during the growing season.

The main limitations affecting urban and recreational uses are wetness, flooding, seepage, and the sandy texture.

The capability subclass is IVw. Based on loblolly pine as the indicator species, the woodland ordination symbol is 7W.

NeC—Newhan fine sand, 0 to 10 percent slopes. This excessively drained soil is on dunes on the Outer Banks. It commonly is adjacent to the Beaches-Newhan complex. It is within the salt-spray zone and supports salt-tolerant vegetation. Mapped areas are elongated and range from 2 to 1,300 acres in size.

Typically, the surface layer is light brownish gray fine sand about 2 inches thick. The underlying material to a depth of 80 inches is fine sand. It is light yellowish brown in the upper part and very pale brown in the lower part.

Permeability is very rapid. The soil ranges from moderately acid to mildly alkaline. The seasonal high water table is more than 6 feet below the surface.

Included with this soil in mapping are small areas of Duckston and Corolla soils. These soils are in the lower, wetter troughs or depressions. They are common throughout the map unit. They make up 10 to 15 percent of the map unit.

Most areas of the Newhan soil are covered with salt-tolerant grasses and shrubs. Some areas are used as sites for beach cottages, for recreational development, or as wildlife habitat.

This soil is not used for farming or commercial tree

Figure 5.—An area of Newhan fine sand, 0 to 10 percent slopes. The common plants are panicgrass, bitter panicum, and northern bayberry.

production. The landscape position, salt spray, and droughtiness are the main limitations.

The dominant vegetation is American beachgrass, waxmyrtle, yaupon holly, live oak, panicgrass, northern bayberry, seaoats, seashore elder, searocket, smooth cordgrass, bitter panicum, seacoast bluestem, and other species adapted to the effects of salt spray, windblown sand, and droughtiness (fig. 5).

Urban and recreational uses are limited by the sandy texture, seepage, and the slope. Areas that do not have a vegetative cover are subject to severe soil blowing. A properly maintained vegetative cover helps to stabilize the site. Some areas may be eroded by ocean waves. Ground water can be contaminated by poorly filtered effluent from a septic tank.

The capability subclass is VIIIs. No woodland ordination symbol is assigned.

NhC—Newhan-Corolla complex, 0 to 10 percent slopes. This complex consists of gently sloping to sloping Newhan and Corolla soils on low dunes separated by flat basins on the Outer Banks. In many places these soils are in a transitional zone between the soils along the ocean and the flat, wet soils along the sound side of the Outer Banks. A typical area is about 60 percent Newhan soil, 30 percent Corolla soil,

and 10 percent other soils. The Newhan soil is on low dunes where slopes range to as much as 10 percent. The Corolla soil is in basins where slopes range from 0 to 6 percent. Mapped areas are irregular in shape and range from 5 to 100 acres in size.

The Newhan soil is excessively drained. Typically, the surface layer is light brownish gray fine sand 2 inches thick. The underlying material to a depth of 80 inches is fine sand. It is light yellowish brown in the upper part and very pale brown in the lower part.

Permeability is very rapid in the Newhan soil. The soil ranges from moderately acid to mildly alkaline. The seasonal high water table is more than 6 feet below the surface.

The Corolla soil is moderately well drained or somewhat poorly drained. Typically, the surface layer is dark grayish brown fine sand about 3 inches thick. The underlying material to a depth of 75 inches is sand. It is yellowish brown in the upper part, brown in the next part, and grayish brown in the lower part.

Permeability is very rapid in the Corolla soil. The soil is moderately acid to moderately alkaline. The seasonal high water table is 1.5 to 3.0 feet below the surface. This soil is subject to rare flooding.

Included with these soils in mapping are small areas of Duckston soils and soils on short side slopes that have slopes of more than 10 percent. Duckston soils are in slightly depressional areas. The included soils make up about 10 percent of the map unit.

The Newhan and Corolla soils are not used as cropland or commercial woodland because of exposure to salt spray, the rare flooding by salt water in low areas, and droughtiness.

These soils generally support native vegetation and are used as habitat for coastal wildlife. The vegetation common on the Newhan soil includes American beachgrass, seacoast bluestem, coastal panicgrass, bitter panicum, largeleaf pennywort, and ragweed. The vegetation common on the Corolla soil includes saltmeadow cordgrass, live oak, waxmyrtle, seashore elder, searocket, evening primrose, and largeleaf pennywort. In places the exposure to salt spray causes these plants to have a sheared appearance.

Urban and recreational uses are limited by the sandy texture, seepage, and the flooding in low areas. Areas that do not have a sufficient protective plant cover are subject to soil blowing. A properly maintained vegetative cover helps to stabilize the site. American beachgrass and bitter panicum are suitable for this purpose. Shrubs can be planted in areas that have been stabilized and protected from salt spray. Suitable species are waxmyrtle, northern bayberry, yaupon holly, ragweed, flameleaf sumac, and seacoast bluestem. The shrubs provide not only a more permanent cover than the grasses but also an environment in which other plants can become established. Ground water can be contaminated by poorly filtered effluent from a septic tank.

The Newhan soil is in capability subclass VIIIs. The Corolla soil is in capability subclass VIIs. No woodland ordination symbol is assigned to either soil.

NuC—Newhan-Urban land complex, 0 to 10 percent slopes. This map unit is in the developed areas of Nags Head and Kitty Hawk. The Newhan soil is on dune ridges. A typical area is about 60 percent Newhan soil, 30 percent Urban land, and 10 percent included soils. Mapped areas are elongated and range from 10 to 100 acres in size.

The Newhan soil is excessively drained. Typically, the surface layer is light brownish gray fine sand about 2 inches thick. The underlying material to a depth of 80 inches is fine sand. It is light yellowish brown in the upper part and very pale brown in the lower part.

Permeability is very rapid in the Newhan soil. The soil ranges from moderately acid to mildly alkaline. The seasonal high water table is more than 6 feet below the surface.

The Urban land consists of areas where the original soil has been cut, filled, graded, paved, or otherwise modified. Most of the soil properties have been so altered that a soil series is not recognizable. These areas are used as sites for shopping centers, parking lots, paved roads, homes, motels, or other closely spaced buildings. The extent of site modification varies greatly. Many areas have been subject to little disturbance, and other areas have been extensively graded or filled.

Included in mapping are small areas of Duckston and Corolla soils. These soils are in depressions and on small flats. They make up about 10 percent of the map unit.

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

Soil blowing, seepage, and a poor filtering capacity limit the use of the Newhan soil for building site development and sanitary facilities. Development should conform to the natural topography, thus minimizing site disturbance. Soil blowing can be controlled by additional plantings of grasses and shrubs that are adapted to extreme droughtiness and are tolerant of salt spray. The sandy texture is the main limitation affecting recreational uses.

The capability subclass assigned to the Newhan soil is VIIIs. No woodland ordination symbol is assigned to this unit.

OsA—Osier fine sand, 0 to 2 percent slopes, rarely flooded. This nearly level, poorly drained soil is on low flats along the edge of freshwater marshes and in small depressions on the sound side of the Outer Banks. The soil is dominantly out of the salt-spray zone, and it supports trees. Areas are irregular in shape and range from 5 to 75 acres in size.

Typically, the surface layer is very dark grayish brown fine sand 3 inches thick. The underlying material to a depth of 80 inches is fine sand. It is light brownish gray in the upper part and gray in the lower part.

Permeability is very rapid. The soil ranges from extremely acid to moderately acid. The seasonal high water table is at or near the surface. This soil is subject to rare flooding for brief periods. It generally is protected from salt spray and windblown sand.

Included with this soil in mapping are small areas of Conaby, Duckston, and Ousley soils. Conaby and Duckston soils are in troughs and depressions. Ousley soils are on small knolls. The included soils make up about 10 percent of the map unit.

The Osier soil is used mainly as woodland. Loblolly pine and water oak are the dominant species, but sweetgum, red maple, and blackgum also grow on this soil. The most common understory plants are redbay, greenbrier, and waxmyrtle. Wetness and flooding are the main limitations affecting woodland.

The Osier soil in Dare County is not used for agricultural purposes because of wetness and flooding.

The main limitations affecting urban and recreational uses are wetness, flooding, and the sandy texture. The wetness can be reduced by installation of perforated drain tile, drainage ditches, or a combination of the two systems.

The capability subclass is Vw. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9W.

OuB—Ousley fine sand, 0 to 5 percent slopes, rarely flooded. This moderately well drained soil is on low dunes near the sound side of the Outer Banks. It is farther away from the ocean and out of the main salt-spray zone. Areas are irregular in shape and range from 5 to 135 acres in size.

Typically, the surface layer is grayish brown fine sand about 3 inches thick. The underlying material to a depth of 80 inches is fine sand. It is yellowish brown and light olive brown in the upper part, dark grayish brown in the next part, and dark gray in the lower part.

Permeability is rapid. The soil is very strongly acid or strongly acid. The seasonal high water table is 1.5 to 3.0 feet below the surface. This soil is subject to rare flooding during hurricanes or exceptionally strong wind tides.

Included with this soil in mapping are small areas of Conaby, Corolla, and Osier soils. Conaby and Osier soils are in the wetter troughs and depressional areas. The nearly level Corolla soils are on the slightly higher, nearly level parts of the landscape. The included soils make up about 10 percent of the map unit.

The Ousley soil is used mainly as woodland. Loblolly pine, live oak, water oak, and sweetgum are the dominant species. The most common understory plants are waxmyrtle, grapevine, persimmon, yaupon holly, Virginia creeper, and blueberry. Wetness is the main limitation affecting woodland.

This soil generally is not used as cropland, mainly because of its location on the Outer Banks and the wetness.

The main limitations affecting urban and recreational uses are wetness, flooding, seepage, and the sandy texture. The wetness can be reduced by installation of perforated drain tile, drainage ditches, or a combination of the two systems.

The capability subclass is IIIw. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8W.

PoA—Ponzer muck, 0 to 2 percent slopes, rarely flooded. This nearly level, very poorly drained soil is predominantly on broad flats on the mainland. Small areas, however, are on Roanoke Island. Mapped areas are irregular in shape and range from 10 to 100 acres in size.

Typically, the surface layer is black muck about 11 inches thick. Below this to a depth of 24 inches is very dark brown muck. The upper part of the underlying material is dark grayish brown loam, the next part is grayish brown loam, and the lower part to a depth of 72 inches is gray clay loam.

The surface layer is highly decomposed organic material. Permeability is slow to moderate. The organic layers are extremely acid unless limed. The underlying mineral layers range from extremely acid to mildly alkaline. Logs, stumps, and fragments of wood are in some areas. The seasonal high water table is at or near the surface. This soil is subject to rare flooding.

Included with this soil in mapping are scattered small areas of Belhaven and Pungo soils. The included soils are in landscape positions similar to those of the Ponzer soil. They make up about 10 percent of the map unit.

The Ponzer soil is used mainly as woodland. The dominant native species are loblolly pine, pond pine, red maple, sweetbay, and Altantic white cedar. The understory includes loblolly pine, sweetbay, sweet gallberry, bitter gallberry, sweet pepperbush, fetterbush lyonia, waxmyrtle, and switchcane. Wetness, flooding,

and low strength are the main limitations affecting woodland. This soil has a poor load-supporting capacity.

In cultivated areas the principal crops are corn and soybeans. Wetness and flooding are the major limitations affecting cultivation. Spring tillage and fall harvest may be delayed because of the wetness. Large initial applications of lime are necessary for crop production. During spring planting, soil blowing may occur. Conservation practices, such as conservation tillage, field borders, and windbreaks, help to control soil blowing.

The main limitations affecting urban and recreational uses are wetness, flooding, excess humus, and low strength.

The capability subclass is VIIw in undrained areas, IVw in drained areas. Based on loblolly pine as the indicator species, the woodland ordination symbol is 6W.

PsB—Psamments, 0 to 6 percent slopes. This map unit consists of areas where the surface layer and most of the subsoil have been removed. It includes borrow pits, fill and dredged areas, and areas of landfill. Most or all of the natural soil has been disturbed or covered.

The borrow pits are excavated areas from which the soil material has been removed for use as fill for construction. The cuts are 3 to 15 feet deep. The base slope in these cuts is level to gently sloping. Most cuts have two or more short, nearly vertical side slopes. The exposed surface layer consists mainly of sandy marine deposits. The borrow pits range from 3 to about 25 acres in size. Borrow pits less than 3 acres in size are shown on the detailed maps by a special symbol.

Some of the borrow pits have been reclaimed and seeded to grass. A few areas are naturally reseeded to wild grasses, weeds, and loblolly pine. The pits are poorly suited to plant growth because of low fertility.

The fill and dredged areas are commonly near building sites. The fill areas generally are elevated by additions of sandy material, which help to prepare them for more intensive uses, such as building sites. Slopes are nearly level and gently sloping. Most areas are suitable for plant growth. Natural fertility, the available water capacity, and other soil properties vary. The dredged spoils commonly have a poor filtering capacity. As a result, the effluent from septic tanks can pollute ground water and marshes.

The natural soil in landfill areas has been altered. The excavated trenches are filled with alternating layers of solid refuse and sandy soil material. A final cover of about 2 feet of sandy soil is on the surface. After the final cover is added, the surface ranges from nearly level to gently sloping.

Included in mapping is a small area of undisturbed soil. This soil is suited to plant growth. Natural fertility is generally low. A permanent vegetative cover protects the soil from erosion.

The characteristics of the soil material within the mapped areas vary, and the soils commonly require onsite examination for most interpretations.

No capability subclass or woodland ordination symbol is assigned.

PuA—Pungo muck, 0 to 2 percent slopes, rarely flooded. This nearly level, very poorly drained soil is on broad flats throughout the mainland. Mapped areas are irregular in shape and range from 100 to several thousand acres in size.

Typically, the surface is covered with 2 inches of partially decomposed needles, leaves, and twigs. The surface layer is dark reddish brown muck about 10 inches thick. Below this to a depth of 65 inches is dark reddish brown muck. The underlying material to a depth of 72 inches is gray loam.

The surface layer consists of highly decomposed, pastelike organic material. Permeability is moderately slow. The soil is extremely acid in the organic layers unless limed. The underlying mineral layers range from extremely acid to neutral. Logs, roots, and stumps are common throughout the profile. The seasonal high water table is at or near the surface. This soil is subject to rare flooding.

Included with this soil in mapping are scattered small areas of Belhaven and Ponzer soils. These soils are very poorly drained. Belhaven soils have organic layers less than 51 inches thick. Ponzer soils do not have pastelike organic layers. Also included are soils in which the underlying mineral soil is sand. The included soils are in landscape positions similar to those of the Pungo soil. They make up about 10 percent of the map unit.

The Pungo soil is used mainly as woodland (fig. 6). A few areas are used as cropland.

In areas of woodland, the dominant native trees are loblolly pine, pond pine, Altantic white cedar, red maple, swamp tupelo, baldcypress, and sweetbay. The understory includes mainly inkberry, fetterbush lyonia, greenbrier, and huckleberry. Wetness, flooding, and low strength are the main limitations affecting woodland. This organic soil has a poor load-supporting capacity.

In cultivated areas this soil has been intensively drained and is used for corn or soybeans. The main limitations affecting agricultural uses are wetness, flooding, and the high percentage of logs, stumps, and roots in the soil. The pastelike organic layers may harden when the soil is overdrained. They are slow to rewet unless they are pulverized.

Figure 6.—Harvesting Atlantic white cedar on Pungo muck, 0 to 2 percent slopes, rarely flooded.

The main limitations affecting urban and recreational uses are wetness, flooding, excess humus, and low strength.

The capability subclass is IVw in drained areas, VIIw in undrained areas. Based on loblolly pine as the indicator species, the woodland ordination symbol is 5W.

RpA—Roper muck, 0 to 2 percent slopes, rarely flooded. This nearly level, very poorly drained soil is on broad flats, mainly in the northern part of the county. Mapped areas are irregular in shape and range from 10 to 300 acres in size.

Typically, the surface layer is black muck about 13 inches thick. The next layer is very dark grayish brown mucky loam about 5 inches thick. Below this to a depth of 34 inches is dark grayish brown loam. The upper part of the underlying material is gray loamy fine sand. The lower part to a depth of 72 inches is gray loam.

The surface layer is highly decomposed organic material. Permeability is moderately slow in the subsoil. The soil ranges from extremely acid to slightly acid in the upper part and from extremely acid to mildly alkaline in the lower part. The seasonal high water table is at or near the surface. This soil is subject to rare flooding.

Included with this soil in mapping are scattered small areas of Cape Fear, Hyde, Belhaven, and Ponzer soils. Cape Fear and Hyde soils have a mineral surface layer. Belhaven and Ponzer soils have an organic layer that is thicker than that of the Roper soil. The included soils are in landscape positions similar to those of the Roper soil. They make up about 15 percent of the map unit.

The Roper soil is used mainly as woodland. In some areas it is used as cropland.

In the areas of woodland, the dominant native trees are loblolly pine, red maple, sweetbay, baldcypress, blackgum, water tupelo, water oak, and sweetgum. The understory species are mainly swamp cyrilla, waxmyrtle, pawpaw, fetterbush lyonia, and switchcane. Wetness, flooding, and seedling mortality are limitations affecting woodland. Installation of a drainage system and bedding of rows help to overcome excessive wetness. Using standard wheeled and tracked equipment when the soil is wet results in deep ruts, compacts the soil, and damages the roots of trees. The use of equipment should be limited to dry periods from midsummer through early fall, when the water table is lowest.

In cultivated areas this soil has been drained and is used mainly for corn or soybeans. Wetness and flooding are the main limitations affecting cultivation. Spring tillage and fall harvest may be delayed because of wetness. Large initial applications of lime are necessary for crop production. During spring planting, soil blowing may damage young plants.

The main limitations affecting urban and recreational uses are wetness, flooding, and low strength.

The capability subclass is IIIw in drained areas, VIw in undrained areas. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8W.

Prime Farmland

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

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

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

Prime farmland soils usually receive an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The acidity or alkalinity level of the soils is acceptable. The soils have few or no rocks and are permeable to water and air. They are not excessively erodible or saturated with water for long periods and are not frequently flooded during the growing season. The slope ranges mainly from 0 to 2 percent. About 37,083 acres, or 15 percent of the total land area in the county, meets the requirements for prime farmland if the soil is drained.

The map units in Dare County that are considered prime farmland are listed in table 5. The location of each map unit is shown on the detailed soil maps at the back of this publication. The extent of each unit is given in table 4. The soil qualities that affect use and management are described in the section "Detailed Soil Map Units." This list does not constitute a recommendation for a particular land use.

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

Use and Management of the Soils

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

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

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

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

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

Bobby G. Brock, agronomist, Soil Conservation Service, and J. David Hodges, Jr., district conservationist, Soil Conservation Service, assisted in preparing 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 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.

In Dare County more than 5,500 acres was used for crops or pasture in 1985. About 300 acres was used for pasture, and 5,200 acres was used for crops. The acreage used for pasture has been constant for the past 20 years. The major crops are corn, soybeans, and small grain. The dominant pasture grasses and legumes are tall fescue and bermuda and annual grasses, particularly rye and ryegrass.

Many of the soils in the county are well suited to vegetable crops. The latest information about growing specialty crops can be obtained from the local office of the North Carolina Agricultural Extension Service or the Soil Conservation Service.

The soils used for farming are most extensive on the mainland. Some of the soils on Roanoke Island are suitable for farming, but no active farms are on the island.

On the mainland, the soils that are farmed have a black surface layer. Some are very poorly drained, mineral soils, for example, Hyde and Cape Fear soils; some are organic soils, for example, Belhaven, Ponzer, and Pungo soils; and some have an organic surface layer and a mineral subsoil, for example, Roper soils (fig. 7). The very poorly drained, mineral soils are generally the first to be farmed. A small acreage of the deep, organic soils is used for farming.

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

Field Drainage

Such soils as Hyde and Roper soils are easiest to farm if drainage canals are installed. These soils require

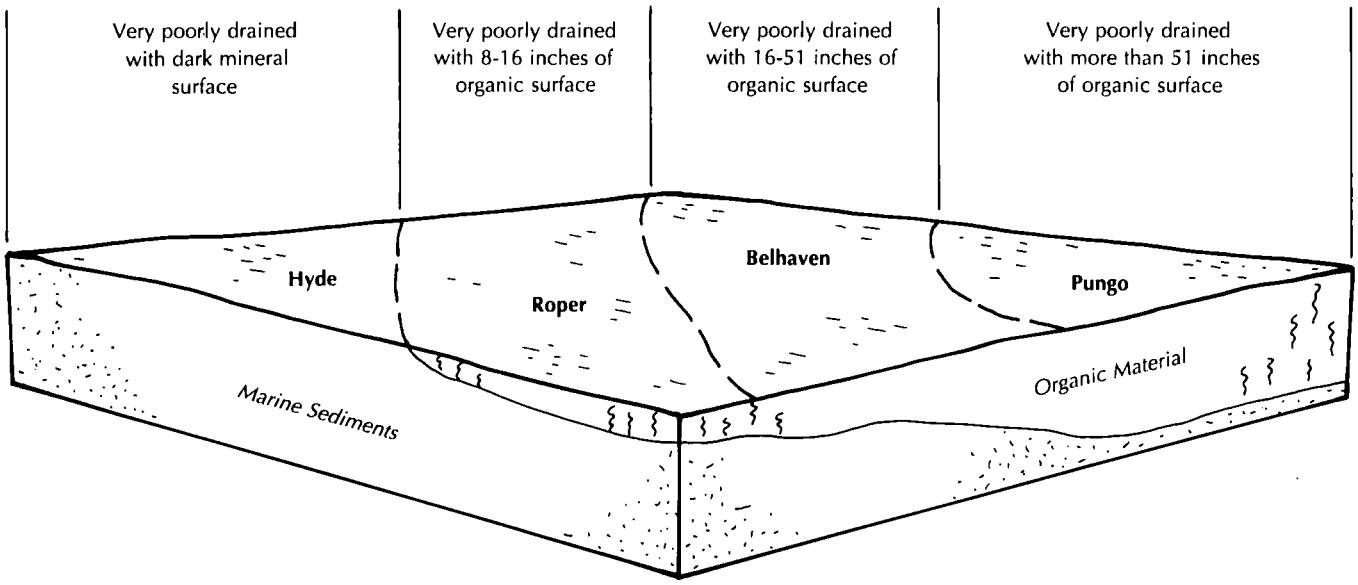


Figure 7.—Landscape relationship among some mineral and organic soils on the mainland of Dare County.

an extensive drainage system to provide at least a minimum of aeration in the upper part of the profile for plant roots. Draining areas of cropland requires a primary system of canals, a secondary system of field ditches, and surface shaping and leveling. Field ditches are generally 0.5 mile long and 200 to 300 feet apart in areas of cropland and about 600 feet or more apart in areas of woodland (fig. 8).

Because of low elevations, pumps generally are necessary in canals to adequately remove water. The rate of waterflow in canals is generally less than 1.8 feet per second because of the low elevations and gentle relief throughout the county. The slow flow rate allows most of the sand- and silt-sized sediments that erode from the fields to settle in ditches and canals. The sand and silt do not reach the outlets and estuaries. The ditches and canals require frequent cleaning.

Surface drains are necessary to remove much of the excess water in mineral and organic soils characterized by very poor internal drainage. A workable surface drainage system includes a surface that has less than 0.5 percent slope from the ditch to the center of the crown. This "crowning" is locally called "turtlebacking." Smoothing the fields removes slopes of more than 0.5 percent and fills depressions that pocket excess surface water.

Erosion Control

Surface runoff from high-intensity rains may cause soil loss even on fields that are nearly level. Most of the runoff occurs around "hoe drains," or drains that cross fields from ditch to ditch. The bulk of the eroded soil settles in the field ditches and canals, closing outlets and necessitating frequent and costly cleaning. The hazard of erosion can be reduced by field shaping and leveling to reduce the number of cross drains, by minimizing tillage, by leaving crop residue on the surface, and by establishing a plant cover to stabilize ditch and canal banks.

Soil blowing is a hazard if the soils are bare or do not have a rough surface or if the surface layer is dry. Soils that are subject to soil blowing are high in organic matter content and have a loose, very friable surface layer. In some areas windblown soil fills ditches and canals, reducing their effectiveness. Leaving crop residue on the surface and bedding help to control soil blowing on cropland. Bedding leaves the surface rough, lessening the probability that soil particles will be picked up and moved across the surface.

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

Liming the Soil

All of the soils in the county have a high lime requirement because they have a high content of organic matter. In their natural state, they are extremely acid. Lime should be applied according to the results of

soil tests. When these soils are first limed, the lime should be applied to a depth of 5 to 6 inches. Each ton of dry agricultural lime increases the soil pH level by 0.1 to 0.3 pH unit. To attain the desired pH level of 5.0 for organic soils, 5 to 7 tons of lime per acre are required initially. The desired pH level of mineral soils is 5.3 to 5.5, and the initial lime requirement is generally 4 to 5 tons per acre. To maintain these pH levels, 1 ton of lime per acre is required every 2 to 3 years. Because many of the soils have adequate magnesium, calcitic sources of lime are suitable. If soil tests indicate a lower magnesium level than is desirable, a dolomitic source of lime should be used.

Controlling Plant Nutrient Levels

In their natural state, the soils in the county generally have a low level of available plant nutrients; however, they respond well to applications of fertilizer and retain nutrients from the fertilizer. The level of available phosphorus is generally very low, and extra fertilizer is required for the first year of farming. After that, the only phosphorus deficiencies that require correction are those indicated by soil tests.

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

Nitrogen is a constituent of organic matter, and some nitrogen is available for plant growth through decomposition of the organic matter. The ratio of carbon to nitrogen in organic soils, however, can be as high as 40:1, so additions are needed to reduce this ratio to less than 20:1. If these organic soils become saturated at times of heavy rainfall, significant amounts of nitrogen are lost through denitrification. As a result, the amount of nitrogen required by crops on these soils is not significantly different from that required on mineral soils that have a light colored surface layer.

Most organic soils have deficiencies of such micronutrients as copper, manganese, zinc, and boron. The deficiencies are most common in winter wheat and can be corrected by small amounts of fertilizer. Soil testing is recommended to determine the kind and amount of micronutrients needed.

The organic soils are cold because of their high moisture content and the insulating effect of organic matter. Consequently, these soils receive frost a few days later in spring and a few days earlier in fall than the mineral soils in the same area. Properly adjusted

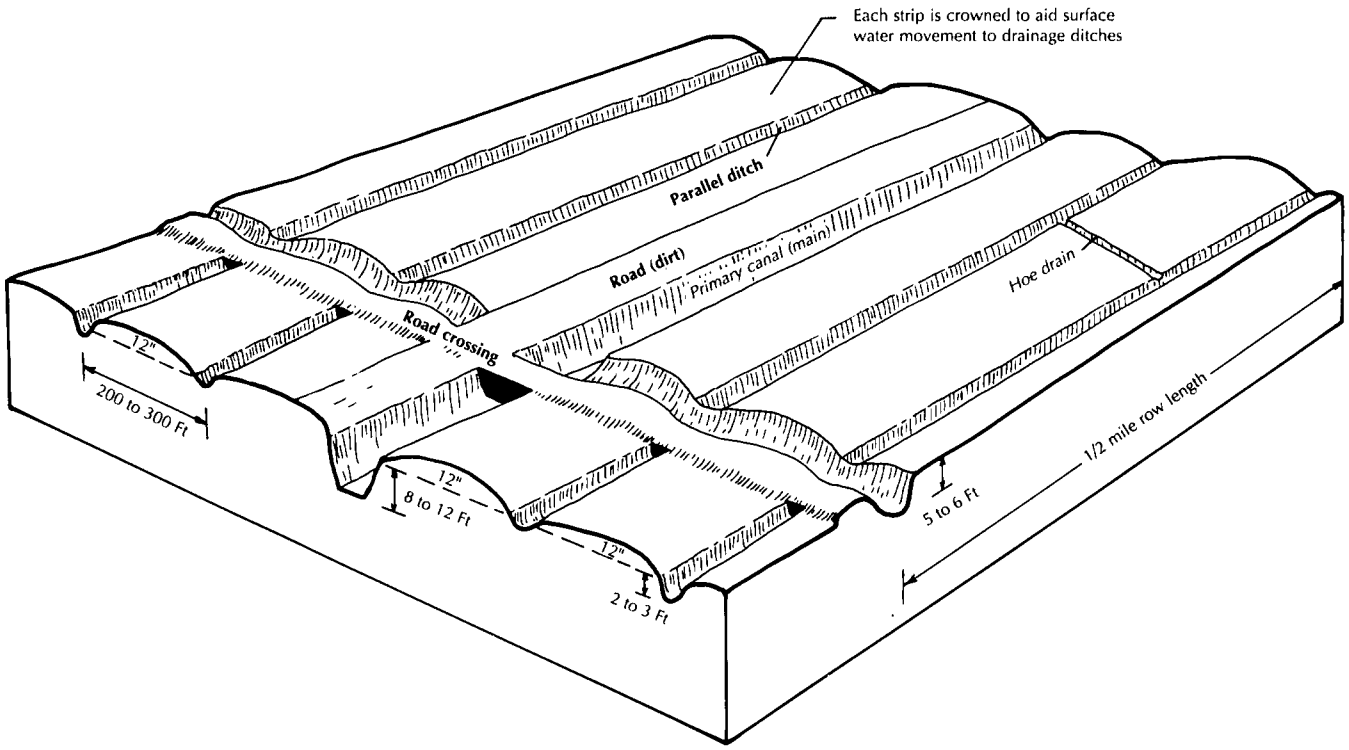


Figure 8.—The drainage system commonly used on wet soils in Dare County.

planting dates for corn are needed to prevent frost damage. The growth rate for corn seedlings is slow in spring because of the cool soil temperature. Selection of early maturing varieties of soybeans for late plantings helps to prevent the crop damage caused by early frost in fall.

The growth rate of seedlings is greatly increased if bands of fertilizer containing ammonium nitrogen and phosphorus are applied. This fertilizer helps to establish strong, fast-growing stands even in a cold, wet spring.

Chemical Weed Control

The use of herbicides for weed control is a common practice on the cropland in Dare County. It decreases the need for tillage and is an integral 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 of both these properties were determined for the soils in the county. Table 16 shows a general range of organic matter content in the surface layer of the soils. The texture of the surface layer is given in the USDA texture column in table 15.

In some areas the organic matter content projected for the different soils is outside the range shown in the table. The content can be higher in soils that have received high amounts of animal or manmade waste. Soils that have recently been brought into cultivation may have a higher content of organic matter in the surface layer than similar soils that have been cultivated for a long time. Conservation tillage can increase the content of organic matter in the surface layer. A lower content of organic matter is common where the surface layer has been partly or completely removed by erosion or land smoothing. Other activities also may affect the organic matter content of a given soil. Current soil tests should be used for specific organic matter determinations.

On sandy soils that have less than 2 percent organic matter, rapid leaching of herbicides can damage young plants or prevent normal seed germination. The effectiveness of herbicides commonly decreases if the organic matter content exceeds 6 to 10 percent, and higher application rates may be required.

The herbicide label shows specific application rates based on organic matter content and texture of the surface layer.

Yields Per Acre

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

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

A high level of management includes maintaining proper levels of soil reaction and fertility as indicated by standard soil tests. Nitrogen rates for corn on soils that have a yield potential of 125 to 150 bushels per acre should be 140 to 160 pounds of nitrogen per acre. If the yield potential is only 100 bushels per acre, then rates of 100 to 120 pounds of nitrogen per acre should be used. Application of nitrogen in excess of potential yields generally is not a sound practice. Excess applications of fertilizer cause water pollution and are an unnecessary expense. If corn or cotton is grown after the harvest of soybeans or peanuts, nitrogen rates can be reduced by 20 to 30 pounds per acre.

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

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

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for use as cropland *(14)*. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The

criteria used in grouping the soils do not include major, and generally expensive, landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland and for engineering purposes.

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

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

Class I soils have few limitations that restrict their use.

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

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, s,* or *c* to the class numeral, for example, IIe. The letter *e* shows that the main hazard is the 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); *s* shows that the soil is limited mainly because it is droughty; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

There are no subclasses in class I because the soils of this class have few limitations. The soils in class V are subject to little or no erosion, but they have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation. Class V contains only the subclasses indicated by *w, s,* or *c*.

The acreage of soils in each capability class and subclass is shown in table 7. The capability classification of each map unit is given in the section "Detailed Soil Map Units" and in the yields table.

Woodland Management and Productivity

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

Forest managers in Dare County are faced with the challenge of producing greater yields from smaller areas of forest land. Meeting this challenge will require a greater intensity of management and applied silvicultural practices. Many of the silvicultural techniques resemble those used for years in agriculture. These techniques include establishing, weeding, and thinning a desirable young stand; propagating the more productive species and genetic varieties; providing shorter rotations and complete fiber utilization; controlling insects, diseases, and weeds; and improving tree growth by applications of fertilizer and drainage systems. Even though timber crops require decades to grow, the goal of intensive woodland management is similar to the goal of intensive agriculture—to produce the greatest yield of the most valuable crop as quickly as possible.

Acquisition of major areas of land by the U.S. Fish and Wildlife Service has limited the areas available for commercial forests in Dare County. The Alligator Wildlife Refuge and the holdings of the U.S. military contain the soils best suited to commercial tree production. Commerical forest is land that is producing or is capable of producing crops of industrial wood and is not withdrawn from timber production. Loblolly pine is the most important timber species in the county because it grows fast, is adapted to the soil and climate, brings the highest average sale value per acre, and is easy to establish and manage.

One of the first steps in planning intensive woodland management is to determine the potential productivity of the soil for several alternative tree species. The most productive and valued trees are then selected for each soil type. Site and yield information enables a forest manager to estimate future wood supplies. These estimates are the basis of realistic decisions concerning expenses and profits associated with intensive woodland management, land acquisition, or industrial investments.

The potential productivity of woodland depends on physiography, soil properties, climate, and the effects of past management. Specific soil properties and site characteristics, including soil depth, texture, structure, and depth to the water table, affect forest productivity

primarily by influencing the available water capacity, aeration, and root development. The net effects of the interaction of these soil properties and site characteristics determine the potential site productivity.

Other site factors are also important. The gradient and length of slopes affect water movement and availability. The amount of rainfall, the length of the growing season, and soil drainage also influence site productivity.

This soil survey can be used by woodland managers planning ways to increase the productivity of forest land. Some soils respond better to applications of fertilizer than others, and some are more susceptible to landslides and erosion after roads are built and timber is harvested. Some soils require special reforestation efforts. In the section "Detailed Soil Map Units," the description of each map unit in the survey area suitable for timber includes information about productivity, limitations in harvesting timber, and management concerns in producing timber. The common forest understory plants also are listed. Table 8 summarizes this forestry information and rates the soils for a number of factors to be considered in management. *Slight, moderate*, and *severe* are used to indicate the degree of the major soil limitations to be considered in forest management.

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

Table 8 lists the *ordination symbol* for each soil. The first part of the ordination symbol, a number, indicates the potential productivity of a soil for the indicator species in cubic meters per hectare. The larger the number, the greater the potential productivity. Potential productivity is based on the site index and the point where mean annual increment is the greatest.

The second part of the ordination symbol, a letter, indicates the major kind of soil limitation affecting use and management. The letter *W* indicates a soil in which excessive water, either seasonal or year-round, causes a significant limitation. The letter *S* indicates a dry, sandy soil. If a soil has more than one limitation, the priority is as follows: W and S.

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

Ratings of *equipment limitation* indicate limits on the use of forest management equipment, year-round or seasonal, because of such soil characteristics as slope, wetness, 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 be operated and more sophisticated systems are needed. The rating is *slight* if equipment use is restricted by soil wetness for less than 2 months and if special equipment is not needed. The rating is *moderate* if slopes are so steep that wheeled equipment cannot be operated safely across the slope, if soil wetness restricts equipment use from 2 to 6 months per year, or if special equipment is needed to prevent or minimize soil compaction. The rating is *severe* if slopes are so steep that tracked equipment cannot be operated safely across the slope, if soil wetness restricts equipment use for more than 6 months per year, or if special equipment is needed to prevent or minimize 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 activities.

Ratings of *seedling mortality* refer to the probability of the death of naturally occurring or properly planted seedlings of good stock in periods of normal rainfall, as influenced by kinds of soil or topographic features. Seedling mortality is caused primarily by too much water or too little water. The factors used in rating a soil for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rooting depth, and the aspect of the slope. The mortality rate generally is highest on soils that have a sandy or clayey surface layer. The risk is *slight* if, after site preparation, expected mortality is less than 25 percent; *moderate* if expected mortality is between 25 and 50 percent; and *severe* if expected mortality exceeds 50 percent. Ratings of *moderate* or *severe* indicate that it may be necessary to use containerized or larger than usual planting stock or to make special site preparations, such as bedding, furrowing, installing a surface drainage system, and providing artificial shade for seedlings. Reinforcement planting is often needed if the risk is moderate or severe.

The *potential productivity* of *common trees* on a soil is expressed as a *site index* and a *productivity class*. Common trees are listed in the order of their observed general occurrence. Additional species that commonly

occur on the soils may be listed in the detailed soil map unit descriptions. Generally, only two or three tree species dominate.

The *site index* is determined by taking height measurements and determining the age of selected trees within stands of a given species. The site index for this survey is the average height, in feet, that the trees attain in 50 years. This index applies to fully stocked, even-aged, unmanaged stands. The productivity of the soils in this survey is based mainly on published data *(3, 4, 5, 8, 12)*.

The *productivity class* represents an expected volume produced by the most important trees, expressed in cubic meters per hectare per year.

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

Recreation

In table 9, 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 sewer lines. 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 9, 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 9 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 12 and interpretations for dwellings without basements and for local roads and streets in table 11.

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, stones, or boulders that increase the cost of shaping sites or of building access roads and parking areas.

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

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

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

Wildlife Habitat

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

In table 10, 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 alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are ragweed, 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, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are honeysuckle, autumn olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, cedar, and juniper.

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

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are 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, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, pheasant, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, deer, and bear.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

Engineering

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

test data in the "Soil Properties" section.

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

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

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

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, 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 alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of 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 11 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

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

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil

properties, site features, and observed performance of the soils. Depth to 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, and the available water capacity in the upper 40 inches affect plant growth. Flooding, wetness, slope, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established. Soil tests are essential to determine liming and fertilizer needs. Help in making soil tests or in deciding what soil additive, if any, should be used can be obtained from the Dare County Soil and Water Conservation District Office or the local office of the North Carolina Agricultural Extension Service.

Sanitary Facilities

Table 12 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 12 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, and flooding affect absorption of the effluent.

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

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Animal waste lagoons commonly used in farming operations are generally deeper and rely on anaerobic bacteria to decompose the waste material. These types of lagoons are not considered in the ratings.

Table 12 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, flooding, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and 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 12 are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, slope, and flooding affect both types of landfill. Texture, highly organic layers, and soil reaction affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

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

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

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

Construction Materials

Table 13 gives information about the soils as a source of roadfill, sand, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

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

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

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by 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. They have at least 5 feet of suitable material, a 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 a moderate shrink-swell potential or slopes of 15 to 25 percent. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, or slopes of more than 25 percent. They are wet, and depth to the water table is less than 1 foot. These soils may have layers of suitable material, but the material is less than 3 feet thick.

Sand is a natural aggregate suitable for commercial use with a minimum of processing. It is used in many kinds of construction. Specifications for each use vary widely. In table 13, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

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

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

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

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

Soils rated *good* have friable, loamy material to a

depth of at least 40 inches. They have slopes of less than 8 percent. They are naturally fertile or respond well to fertilizer and are not so wet that excavation is difficult.

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

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

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

Water Management

Table 14 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for embankments, dikes, and levees and for aquifer-fed excavated ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

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

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

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

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

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and 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 permeability, depth to a high water table, or depth of standing water if the soil is subject to ponding, slope, susceptibility to flooding, and subsidence of organic layers. Excavating and grading and the stability of ditchbanks are affected by slope and the hazard of cutbanks caving. Availability of drainage outlets is not considered in the ratings.

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

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control water 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 soil blowing 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 soil blowing, low available water capacity, restricted rooting depth, 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.

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 classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 15 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 soils are identified as 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.

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

Liquid limit and *plasticity index* (Atterberg limits)

indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

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

Physical and Chemical Properties

Table 16 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 determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at ⅓ bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

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

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

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

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

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

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

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion. Losses are expressed in tons per acre per year. These estimates are based primarily on percentage of silt, sand, and organic matter (up to 4

percent) and on soil structure and permeability. Values of K range from 0.02 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by 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 16, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

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

Soil and Water Features

Table 17 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 infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

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

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

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

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

Some soils in table 17 are assigned to a dual hydrologic group (B/D or A/D). The first letter is for drained areas, and the second letter is for undrained areas.

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

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

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the

soil. Indicated in table 17 are the depth to the seasonal high water table, the kind of water table, 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 17. An apparent water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil.

Two numbers in the column showing the depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. 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 it is within a depth of 6 feet 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 17 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.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(15)*. 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. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Entisol.

SUBORDER. Each order is divided into suborders, primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquent (*Aqu*, meaning water, plus *ent*, from Entisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Psammaquents (*Psamm*, meaning sandy, plus *aquent*, the suborder of the Entisols 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 Psammaquents.

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

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 underlying material within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described (fig. 9). The detailed description of each soil horizon follows standards in the *Soil Survey Manual (13)*. Many of the technical terms used in the descriptions are defined in *Soil Taxonomy (15)*. 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."

Baymeade Series

The Baymeade series consists of well drained soils that formed in loamy and sandy marine sediments. Slopes range from 1 to 10 percent.

Typical pedon of Baymeade fine sand, 1 to 10 percent slopes, on the northwest end of Roanoke

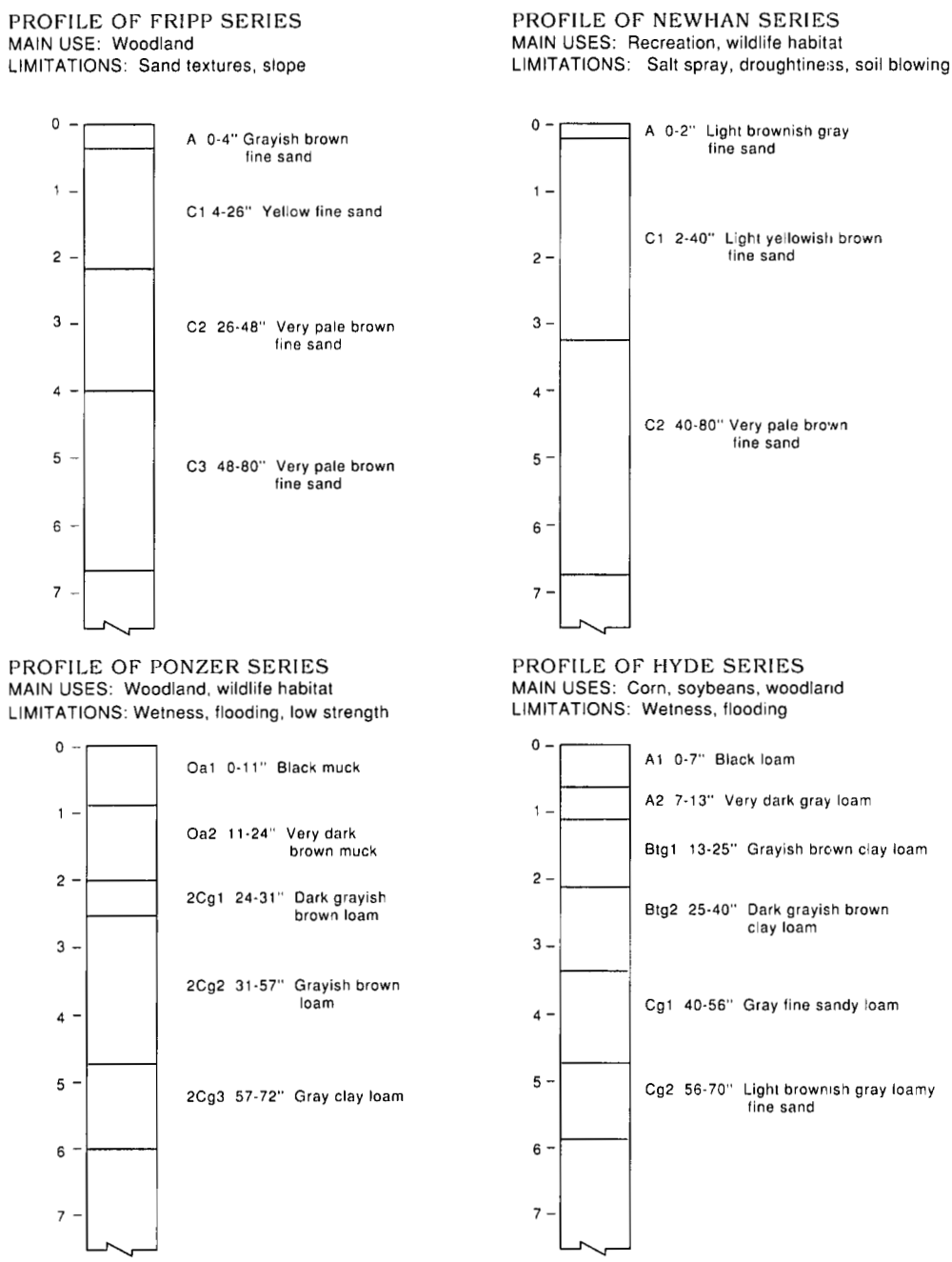


Figure 9.—Profiles, major uses, and limitations of four contrasting soils.

Island, 100 feet southwest of the intersection of U.S. Highway 64 and Secondary Road 1161, in a woods (state plane coordinates 2,972,200 feet E., 809,800 feet N.):

Oe—2 inches to 0; partially decomposed needles, leaves, and twigs; abrupt smooth boundary.

A—0 to 8 inches; dark gray (10YR 4/1) fine sand; weak fine granular structure; very friable; many fine roots; many uncoated sand grains; strongly acid; clear smooth boundary.

E—8 to 14 inches; light brownish gray (10YR 6/2) fine sand; single grained; loose; few fine roots; few fine opaque minerals; strongly acid; abrupt smooth boundary.

Bhs—14 to 20 inches; dark brown (7.5YR 4/4) fine

sand; single grained; loose; few fine distinct strong brown (7.5YR 5/6) mottles and common medium dark brown (7.5YR 3/2) bodies; strongly acid; clear smooth boundary.

E′—20 to 32 inches; light yellowish brown (10YR 6/4) fine sand; single grained; loose; few fine roots; few fine opaque minerals; moderately acid; clear smooth boundary.

Bt1—32 to 38 inches; yellowish brown (10YR 5/6) sandy clay loam; weak fine subangular blocky structure; friable; few faint clay films on faces of peds; few fine roots; few fine opaque minerals; moderately acid; clear smooth boundary.

Bt2—38 to 46 inches; strong brown (7.5YR 5/6) sandy loam; weak fine subangular blocky structure; friable; sand grains coated and bridged with clay; few fine roots; few fine opaque minerals; moderately acid; clear smooth boundary.

C1—46 to 59 inches; strong brown (7.5YR 5/8) fine sand; single grained; loose; few fine opaque minerals; moderately acid; clear smooth boundary.

C2—59 to 72 inches; yellowish brown (10YR 5/6) fine sand; single grained; loose; few fine opaque minerals; slightly acid; gradual smooth boundary.

C3—72 to 80 inches; yellowish brown (10YR 5/4) fine sand; single grained; loose; few fine opaque minerals; slightly acid.

The sandy and loamy material extends to a depth of 80 inches or more. Unless limed, the soils range from very strongly acid to slightly acid in all horizons.

The A horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. The E and E′ horizons have hue of 10YR or 2.5Y, value of 4 to 8, and chroma of 1 to 6. They are sand or fine sand.

The Bhs horizon has hue of 7.5YR or 10YR, value of 3 to 6, and chroma of 4 to 6. It has few to many dark bodies that are firm or very firm. This horizon is sand or fine sand.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 4 to 8. It is sandy loam, fine sand loam, or sandy clay loam.

The C horizon has hue of 7.5YR to 2.5Y, value of 5 to 8, and chroma of 1 to 8. It is sand, fine sand, loamy sand, or loamy fine sand.

The Baymeade soils in Dare County are taxadjuncts to the series because they have a thin spodic horizon above the argillic horizon. This difference, however, does not significantly affect the behavior, use, or management of the soils.

Belhaven Series

The Belhaven series consists of very poorly drained soils that formed in highly decomposed organic material underlain by loamy marine sediments. Slopes range from 0 to 2 percent.

Typical pedon of Belhaven muck, 0 to 2 percent slopes, rarely flooded, approximately 3 miles northwest of Stumpy Point, 1.5 miles west of the intersection of U.S. Highway 264 and Dead-End Road, 0.1 mile south of the intersection of Dead-End Road and Long Curve Road, 40 feet east of Long Curve Road, in a woods (state plane coordinates 2,951,200 feet E., 740,600 feet N.):

Oe—4 inches to 0; partially decomposed forest litter consisting of leaves, twigs, and stems; clear smooth boundary.

Oa1—0 to 12 inches; muck, black (10YR 2/1) broken face and rubbed; about 15 percent fiber unrubbed, less than 1 percent rubbed; weak medium granular structure; very friable; slightly sticky; many fine and medium and few coarse roots; few stumps and logs; few fine charcoal fragments; extremely acid; clear smooth boundary.

Oa2—12 to 30 inches; muck, black (5YR 2/1) broken face and rubbed; about 15 percent fiber unrubbed, less than 1 percent rubbed; massive; slightly sticky; common medium and coarse roots; few stumps and logs; few fine charcoal fragments; extremely acid; clear smooth boundary.

Oa3—30 to 38 inches; muck, dark reddish brown (5YR 2/2) broken face and rubbed; about 18 percent fiber unrubbed, less than 1 percent rubbed; massive; slightly sticky; common medium and few coarse roots; few stumps and logs; extremely acid; clear smooth boundary.

2AC—38 to 47 inches; dark reddish brown (5YR 2/2) mucky loam; massive; slightly sticky and slightly plastic; extremely acid; clear smooth boundary.

2Cg1—47 to 70 inches; very dark grayish brown (10YR 3/2) loam; massive; slightly sticky and slightly plastic; few fine flakes of mica; very strongly acid; clear smooth boundary.

2Cg2—70 to 72 inches; gray (5Y 5/1) loam; massive; slightly sticky and slightly plastic; few fine flakes of mica; very strongly acid.

The organic material ranges from 16 to 51 inches in thickness. The organic horizons are extremely acid (in 0.01 molar solution of calcium chloride) unless the surface has been limed. The underlying mineral horizons are extremely acid to slightly acid. Logs, stumps, and fragments of wood make up 0 to 5 percent of the upper organic horizons in cleared areas that are cultivated and 5 to 35 percent in undrained areas. Pieces of charcoal range from 2 to 8 percent in the upper tier to few (less than 2 percent) in the lower tiers.

Few or common flakes of mica are in the mineral horizons of most pedons.

The surface layer has hue of 5YR to 5Y, value of 2 or 3, and chroma of 1 or 2. The lower tiers of organic material have hue of 2.5YR to 10YR, value of 2 or 3, and chroma of 1 or 2. The hue is 5YR or 2.5YR in 10 or more inches of the subsurface tier. The content of fiber is 15 to 45 percent before rubbing and less than 10 percent after rubbing. It is highest in the lower tier. The organic material is pastelike, has the greasy feel of collodial material, and is massive under natural wet conditions. Upon aeration after a drainage system is installed, structure evolves in the organic material. Excessive drying causes shrinkage and the formation of hard subangular blocky peds. When these peds dry, they are rewetted very slowly unless crushed.

The 2AC or 2A horizon has hue of 2.5YR to 5Y, value of 2 or 3, and chroma of 1 or 2. It is fine sandy loam, sandy loam, loam, or the mucky analogs of those textures.

The 2Cg horizon has hue of 2.5YR to 5Y, value of 3 to 6, and chroma of 1 or 2. It is loam, clay loam, sandy clay loam, loamy sand, or sandy loam.

Cape Fear Series

The Cape Fear series consists of very poorly drained soils that formed in loamy and clayey marine sediments. Slopes range from 0 to 2 percent.

Typical pedon of Cape Fear loam, 0 to 2 percent slopes, rarely flooded, approximately 2.2 miles south of the intersection of U.S. Highway 64 and Milltail Road to Link Road, 0.6 mile east of Link Road to Creel Road, 1.7 miles north of Creel Road, 150 feet west of Creel Road, in a cultivated field (state plane coordinates 2,932,000 feet E., 781,500 feet N.):

Ap—0 to 7 inches; black (10YR 2/1) loam; moderate medium granular structure; friable; common fine and medium roots; strongly acid; clear smooth boundary.

A—7 to 13 inches; black (10YR 2/1) loam; weak coarse granular structure; friable; common fine and medium roots; very strongly acid; clear smooth boundary.

Btg1—13 to 33 inches; gray (5Y 5/1) clay; common medium prominent brownish yellow (10YR 6/6) and strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm; sticky and plastic; few medium roots; few distinct gray (N 5/0) clay films on faces of peds; very strongly acid; clear smooth boundary.

Btg2—33 to 48 inches; gray (N 6/0) clay loam; common medium prominent strong brown (7.5YR 5/6), common fine prominent light yellowish brown (2.5Y 6/4), and few fine prominent yellowish red (5YR 4/6) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few distinct gray (5Y 5/1) clay films on faces of peds; very strongly acid; clear smooth boundary.

Cg1—48 to 66 inches; gray (N 6/0) sandy loam; common medium prominent strong brown (7.5YR 4/6) and common medium distinct pale olive (5Y 6/3) mottles; massive; friable; common opaque minerals; strongly acid; clear smooth boundary.

Cg2—66 to 72 inches; light gray (N 7/0) loamy sand; common medium distinct pale olive (5Y 6/3) mottles; massive; friable; common opaque minerals; strongly acid.

The clayey Btg horizon is 20 to 40 inches thick. Reaction ranges from very strongly acid to moderately acid throughout the profile unless the surface layer has been limed.

The Ap and A horizons have hue of 10YR to 2.5Y, value of 2 or 3, and chroma of 1 or 2 or are neutral in hue and have value of 2 or 3.

The Btg horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2 or is neutral in hue and has value of 4 to 7. Most pedons have few or common mottles of higher chroma. This horizon is clay, sandy clay, silty clay, or clay loam.

Some pedons have a BCg horizon. This horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2 or is neutral in hue and has value of 4 to 7. It is loam or sandy clay loam.

The Cg or 2Cg horizon has hue of 10YR to 5Y or of 5GY or 5BG, value of 4 to 7 and chroma of 1 or 2, or it is neutral in hue and has value of 4 to 7. It is sandy loam, loamy sand, or sand.

Carteret Series

The Carteret series consists of very poorly drained soils that formed in sandy marine sediments. Slopes range from 0 to 2 percent.

Typical pedon of Carteret sand, 0 to 2 percent slopes, frequently flooded, approximately 0.4 mile north of Buxton on North Carolina Highway 12, about 0.4 mile north of the intersection of Old Lighthouse Road (Secondary Road 1231) and North Carolina Highway 12, about 250 feet west of the highway (state plane coordinates 3,038,500 feet E., 571,400 feet N.):

A—0 to 4 inches; dark grayish brown (10YR 4/2) sand; weak fine granular structure; very friable; common fine and medium roots; few shell fragments; neutral; clear smooth boundary.

Cg1—4 to 24 inches; gray (5Y 5/1) sand; single

grained; loose; common fine and medium roots; common shell fragments; common opaque minerals; neutral; gradual smooth boundary.

Cg2—24 to 80 inches; grayish brown (10YR 5/2) sand; single grained; loose; common shell fragments; common opaque minerals; neutral.

The sandy material extends to a depth of 80 inches or more. Reaction ranges from moderately acid to moderately alkaline throughout the profile. The soils have few to many shell fragments throughout.

The A horizon has hue of 10YR to 2.5Y, value of 3 to 5, and chroma of 1 to 3, or it is neutral in hue and has a value of 3 to 5.

The Cg horizon has hue of 10YR to 5Y, value of 4 or 5, and chroma of 1 or 2; is neutral in hue and has value of 4 or 5; or has hue of 5GY or 5G, value of 4 or 5, and chroma of 1. It is dominantly sand or loamy sand, but some pedons have thin, intermittent layers of clay loam or silty clay loam.

Conaby Series

The Conaby series consists of very poorly drained soils that formed in muck and sandy marine sediments. Slopes range from 0 to 2 percent.

Typical pedon of Conaby muck, 0 to 2 percent slopes, rarely flooded, approximately 1.75 miles north of Frisco on North Carolina Highway 12, about 2,500 feet east of the highway and 25 feet north of a private road (state plane coordinates 3,020,600 feet E., 555,000 feet N.):

Oa1—0 to 3 inches; muck, black (10YR 2/1) broken face and rubbed; about 20 percent fiber unrubbed, 8 percent rubbed, massive; friable; common fine roots; very strongly acid; clear wavy boundary.

Oa2—3 to 14 inches; muck, very dark gray (10YR 3/1) broken face and rubbed; about 5 percent fiber unrubbed, less than 1 percent rubbed; massive; very friable; common fine roots; common clean sand grains and few pebbles; strongly acid; clear smooth boundary.

A—14 to 18 inches; grayish brown (10YR 5/2) sand; single grained; loose; uncoated; few pebbles; very strongly acid; gradual wavy boundary.

C—18 to 23 inches; dark yellowish brown (10YR 4/4) sand; single grained; loose; thin coatings of organic stains on sand grains; few pebbles; very strongly acid; gradual wavy boundary.

Cg—23 to 60 inches; gray (5Y 5/1) sand; single grained; loose; common pebbles and shell fragments; slightly acid.

The thickness of the organic material is 8 to 16 inches. Reaction ranges from extremely acid to strongly acid in the upper part of the control section and from moderately acid to mildly alkaline in the lower part and in the Cg horizon.

The Oa horizon generally has hue of 5YR to 2.5Y, value of 2 or 3, and chroma of 1 or 2. In some pedons, however, the lower part has hue of 2.5YR to 2.5Y, value of 2 or 3, and chroma of 1 to 4. In undisturbed layers the fiber content ranges from 2 to 15 percent before rubbing and is less than 10 percent after rubbing.

The A horizon has hue of 7.5YR to 2.5Y, value of 3 to 5, and chroma of 1 to 3. It is sand, loamy sand, fine sand, loamy fine sand, or the mucky analogs of those textures.

Some pedons have a Bg horizon. This horizon has hue of 10YR to 5Y, value of 3 to 5, and chroma of 1 or 2. In most pedons it has few or common, fine or medium mottles of higher chroma. It is sandy loam, fine sandy loam, or loam.

The C horizon has hue of 10YR to 2.5Y, value of 4 to 6, and chroma of 3 or 4. The C and Cg horizons are loamy sand, sandy loam, or sand, or they are stratified.

The Conaby soils in Dare County are taxadjuncts to the series because the texture below the histic epipedon is sand. This difference, however, does not significantly affect the behavior, use, or management of the soils.

Corolla Series

The Corolla series consists of moderately well drained and somewhat poorly drained soils that formed in sandy marine sediments. Slopes range from 0 to 6 percent.

Typical pedon of Corolla fine sand, 0 to 6 percent slopes, rarely flooded, approximately 0.1 mile north of milepost 6 on U.S. Highway 158, about 0.1 mile west of the intersection of U.S. Highway 158 and Eden Street, 20 feet north of Eden Street (state plane coordinates 2,981,500 feet E., 851,000 feet N.):

A—0 to 3 inches; dark grayish brown (10YR 4/2) fine sand; single grained; loose; few fine roots; neutral; abrupt smooth boundary.

C1—3 to 17 inches; yellowish brown (10YR 5/4) sand; single grained; loose; few fine opaque minerals; neutral; clear smooth boundary.

C2—17 to 28 inches; brown (10YR 5/3) sand; common medium distinct light brownish gray (10YR 6/2) and few fine distinct reddish yellow (7.5YR 6/8) mottles; single grained; loose; common fine opaque minerals; neutral; clear smooth boundary.

Cg1—28 to 51 inches; grayish brown (10YR 5/2) sand; single grained; loose; common fine opaque minerals; neutral; clear smooth boundary.

Cg2—51 to 75 inches; grayish brown (10YR 5/2) sand; common coarse distinct yellowish brown (10YR 5/4) mottles; single grained; loose; common fine opaque minerals; neutral.

The fine to coarse sand is more than 75 inches thick. Reaction ranges from moderately acid to moderately alkaline throughout the profile. Some pedons have small, calcareous shell fragments.

The A horizon has hue of 10YR or 2.5Y, value of 3 to 7, and chroma of 1 to 3.

The C horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 3 or 4. Most pedons have few or common mottles of high chroma. Mottles of low chroma, associated with wetness, are at a depth of 15 to 40 inches.

The Cg horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2. It is sand or fine sand.

Some pedons have an Ab horizon. This horizon has hue of 10YR or 2.5Y, value of 3 to 6, and chroma of 1 to 3. It is 24 to 72 inches below the surface. It is sand or fine sand.

Currituck Series

The Currituck series consists of very poorly drained soils that formed in organic material over sandy marine sediments. Slopes are 0 to 1 percent.

Typical pedon of Currituck mucky peat, 0 to 1 percent slopes, frequently flooded, approximately 0.9 mile south of the intersection of Tarkle Ridge Road and Ivey Lane, 100 feet west of the end of Tarkle Ridge Road, in a marsh (state plane coordinates 2,965,600 feet E., 854,300 feet N.):

Oe—0 to 17 inches; dark brown (7.5YR 3/2) mucky peat; about 75 percent fiber unrubbed, 25 percent rubbed; massive; friable; many fine to coarse roots; herbaceous material; about 40 percent mineral material; very strongly acid; clear smooth boundary.

Oa1—17 to 30 inches; very dark brown (7.5YR 2/2) muck; about 40 percent fiber unrubbed, 10 percent rubbed; massive; friable; common fine and medium roots; extremely acid; clear smooth boundary.

Oa2—30 to 40 inches; very dark brown (7.5YR 2/2) muck; about 25 percent fiber unrubbed, 2 percent rubbed; massive; friable; extremely acid; clear smooth boundary.

A—40 to 50 inches; black (10YR 2/1) sand; single grained; very friable; extremely acid; clear smooth boundary.

Cg—50 to 65 inches; dark grayish brown (10YR 4/2) sand; single grained; loose; common opaque minerals; few flakes of mica; very strongly acid.

The organic material ranges from 16 to 51 inches in thickness. Reaction ranges from very strongly acid to moderately acid in the upper organic horizon and from extremely acid to moderately acid in the lower organic and mineral horizons.

The surface tier is either hemic or sapric, or a combination of both, depending on the history of vegetative succession. The content of mineral material ranges from 40 to 65 percent. The surface tier has hue of 7.5YR to 2.5Y, value of 2 to 4, and chroma of 1 to 3.

The subsurface tier consists of sapric material; however, the upper 1 to 6 inches may be hemic material. This tier has hue of 7.5YR to 5Y or of 5GY, value of 2 to 5, and chroma of 1 or 2.

The A horizon has hue of 10YR to 5Y, value of 2 or 3, and chroma of 1 or 2. It is sand or loamy sand.

The Cg horizon has hue of 10YR to 5Y or of 5GY to 5BG, value of 4 to 6, and chroma of 1 or 2. It is sand or loamy sand.

Duckston Series

The Duckston series consists of poorly drained soils that formed in sandy marine sediments. Slopes range from 0 to 2 percent.

Typical pedon of Duckston fine sand, 0 to 2 percent slopes, occasionally flooded, on the Outer Banks, approximately 1.0 mile southeast of the Wright Brothers Memorial, 0.25 mile west of the beach, and 150 feet east of U.S. Highway 158 (state plane coordinates 2,989,200 feet E., 837,100 feet N.):

A1—0 to 3 inches; very dark grayish brown (10YR 3/2) fine sand; single grained; loose; many fine and medium roots; moderately acid; clear smooth boundary.

A2—3 to 8 inches; dark grayish brown (10YR 4/2) fine sand; common medium distinct yellowish brown (10YR 5/6) stains around roots; single grained; loose; many fine and medium roots; common dark minerals; moderately acid; clear smooth boundary.

Cg—8 to 13 inches; light brownish gray (10YR 6/2) sand; common medium distinct yellowish brown (10YR 5/6) stains around roots; single grained; loose; many fine and medium roots; common dark minerals; moderately acid; clear smooth boundary.

Ab—13 to 17 inches; dark gray (10YR 4/1) sand; single grained; loose; few pieces of undecomposed plant material; slightly acid; clear smooth boundary.

C'g—17 to 80 inches; gray (5Y 5/1) sand; single

grained; loose; common fine opaque minerals; common minerals of various colors; neutral.

The total thickness of the A and C horizons is 72 inches or more. The soils range from extremely acid to moderately alkaline throughout. Some pedons have few or common, fine or medium, brownish organic stains and grayish or whitish mottles. Small, calcareous shell fragments are in some pedons. The soils contain few or common grains of black, red, pink, dark brown, and white minerals. Some pedons have a slight to strong sulfur odor below the surface horizon.

The A horizon has hue of 10YR to 5Y, value of 3 to 8, and chroma of 1 or 2. The Ab horizon has hue of 10YR to 5Y, value of 3 or 4, and chroma of 1 or 2. It has few or common pieces of undecomposed plant material. It is sand or fine sand.

The Cg and C'g horizons have hue of 10YR to 5Y, value of 4 to 8, and chroma of 1 or 2, or they have hue of 5GY, value of 5 or 6, and chroma of 1. Mottles are in shades of red, yellow, brown, or gray in some pedons. These horizons are sand or fine sand.

Fripp Series

The Fripp series consists of excessively drained soils that formed in sandy marine sediments. Slopes range from 2 to 30 percent.

Typical pedon of Fripp fine sand, 2 to 30 percent slopes, approximately 0.5 mile south of U.S. Highway 158 and Kitty Hawk School on Dogwood Trail, 150 feet west of Dogwood Trail (state plane coordinates 2,965,900 feet E., 867,600 feet N.):

A—0 to 4 inches; grayish brown (10YR 5/2) fine sand; single grained; loose; few fine and medium roots; neutral; clear wavy boundary.

C1—4 to 26 inches; yellow (10YR 7/6) fine sand; single grained; loose; neutral; clear wavy boundary.

C2—26 to 48 inches; very pale brown (10YR 7/4) fine sand; single grained; loose; neutral; clear wavy boundary.

C3—48 to 80 inches; very pale brown (10YR 7/3) fine sand; single grained; loose; neutral.

The sandy material extends to a depth of 80 inches or more. The content of silt plus clay is 5 percent or less. Reaction ranges from moderately acid to mildly alkaline throughout the profile.

The A horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2. The upper part of the C horizon has hue of 7.5YR to 2.5Y, value of 5 to 8, and chroma of 3 to 8. The lower part has hue of 10YR to 5Y, value of 6 to 8, and chroma of 1 to 8. Low chroma is not caused by wetness. The C horizon is sand or fine sand.

Hobonny Series

The Hobonny series consists of very poorly drained, organic soils that formed in herbaceous plant material mixed with woody plant material and a small amount of mineral soil material. Slopes are 0 to 1 percent.

Typical pedon of Hobonny muck, 0 to 1 percent slopes, frequently flooded, west of Nags Head woods, approximately 2 miles west of the Atlantic Ocean at milepost 11 on U.S. Highway 158 and 100 feet east of the Roanoke Sound, in a marsh (state plane coordinates 2,986,200 feet E., 824,200 feet N.):

Oa1—0 to 16 inches; very dark grayish brown (10YR 3/2) muck; dense root mat and decaying fibers; estimated 60 percent live roots; massive; friable; strongly acid; gradual wavy boundary.

Oa2—16 to 30 inches; very dark grayish brown (10YR 3/2) muck; about 65 percent fiber unrubbed, 5 percent rubbed; massive; friable; strong sulfur odor; squeezes easily between fingers; strongly acid; gradual wavy boundary.

Oa3—30 to 72 inches; dark gray (5YR 4/1) muck; about 50 percent fiber unrubbed, 5 percent rubbed; massive; friable; strong sulfur odor; squeezes easily between fingers; strongly acid.

The organic material is 51 to more than 90 inches thick. The organic tiers are extremely acid to strongly acid throughout. They are very strongly acid or strongly acid in at least some part of the control section. The underlying mineral layers are very strongly acid to moderately acid. More than half of the subsurface and bottom tiers are nonsaline or slightly saline.

The surface tier has hue of 5YR to 10YR, value of 2 to 5, and chroma of 1 to 4. The content of fiber in the organic material is less than 20 percent after rubbing.

The lower organic tiers have hue of 5YR to 10YR, value of 2 to 4, and chroma of 1 to 4. The content of fiber is as much as 50 percent before rubbing but less than 15 percent after rubbing.

The fibers are dominantly herbaceous throughout the profile. Some pedons, however, have as much as 35 percent woody fibers in the control section. Most pedons have decaying logs and large wood fragments in the lower part.

Hyde Series

The Hyde series consists of very poorly drained soils formed in loamy marine sediments. Slopes range from 0 to 2 percent.

Typical pedon of Hyde loam, 0 to 2 percent slopes, rarely flooded, near the Navy bombing range, approximately 0.15 mile south of the intersection of Navy Lead Road and Beechland Road, 30 feet east of Beechland Road, in a woods (state plane coordinates 2,916,600 feet E., 742,000 feet N.):

A1—0 to 7 inches; black (10YR 2/1) loam; weak medium granular structure; friable; common fine and medium roots; strongly acid; clear smooth boundary.

A2—7 to 13 inches; very dark gray (10YR 3/1) loam that has value of less than 5.5 dry; weak medium granular structure; friable; common fine and medium roots; very strongly acid; clear smooth boundary.

Btg1—13 to 25 inches; grayish brown (2.5Y 5/2) clay loam; common fine distinct light yellowish brown (10YR 6/4) mottles; weak fine subangular blocky structure; friable; few fine and medium roots; few faint clay films on faces of peds; some surface material deposited in old root channels; very strongly acid; clear smooth boundary.

Btg2—25 to 40 inches; dark grayish brown (2.5Y 4/2) clay loam; common medium faint dark grayish brown (10YR 4/2) mottles; weak medium subangular blocky structure; friable; few faint clay films on faces of peds; very strongly acid; clear smooth boundary.

Cg1—40 to 56 inches; gray (5Y 6/1) fine sandy loam; common medium prominent yellowish brown (10YR 5/8) and common medium distinct light yellowish brown (10YR 6/4) mottles; massive; friable; very strongly acid; clear smooth boundary.

Cg2—56 to 70 inches; light brownish gray (2.5Y 6/2) loamy fine sand; common coarse distinct light olive brown (2.5Y 5/4) mottles; massive; very friable; strongly acid.

The thickness of the solum is 40 to more than 60 inches. Reaction ranges from extremely acid to strongly acid in the A and Btg horizons and from extremely acid to neutral in the Cg horizon. In some pedons few or common flakes of mica are in the lower part of the Btg horizon and in the Cg horizon.

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

The Btg horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 or 2, or it is neutral in hue and has value of 4 to 6. It is clay loam, silty clay 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 is neutral in hue and has value of 4 to 7. It is sand, loamy sand, sandy loam, sandy clay loam, or clay loam.

Icaria Series

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

Typical pedon of Icaria loamy fine sand, 0 to 2 percent slopes, rarely flooded, approximately 0.1 mile south of the intersection of Secondary Road 1118 and Secondary Road 1173, about 0.1 mile west of Secondary Road 1173 to the end of a dirt road, 60 feet south of the end of the dirt road, in a woods (state plane coordinates 2,982,600 feet E., 803,200 feet N.):

Oe—3 inches to 0; partially decomposed needles, leaves, and twigs; abrupt smooth boundary.

A—0 to 12 inches; black (10YR 2/1) loamy fine sand; weak medium granular structure; friable; common fine and medium roots; extremely acid; clear smooth boundary.

Btg—12 to 33 inches; light brownish gray (10YR 6/2) sandy clay loam; common medium distinct brownish yellow (10YR 6/6) mottles; weak fine subangular blocky structure; friable; few fine roots; few faint clay films on faces of peds; very strongly acid; clear smooth boundary.

2Bhb1—33 to 42 inches; dark brown (7.5YR 3/2) sand; single grained; loose; most sand grains coated with organic matter; strongly acid; clear smooth boundary.

2Bhb2—42 to 47 inches; dark reddish brown (5YR 3/2) sand; single grained; loose; most sand grains coated with organic matter; strongly acid; clear smooth boundary.

2Bhb3—47 to 72 inches; dark brown (10YR 3/3) sand; single grained; loose; most sand grains coated with organic matter; strongly acid.

The upper sequum of these soils, which includes the argillic horizon, ranges from 20 to 40 inches in thickness. The lower sequum consists of spodic horizons that commonly extend to a depth of more than 60 inches. In some pedons the spodic horizons are separated by thin albic horizons. Reaction ranges from extremely acid to strongly acid throughout the profile unless the surface layer has been limed.

The A horizon has hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 1 or 2. Some pedons have an E horizon. This horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. It is fine sandy loam, sandy loam, or loam.

The Btg horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2. It has mottles of high chroma in some pedons. It is dominantly sandy clay loam, loam,

or clay loam, but thin layers of sandy loam or fine sandy loam are in some pedons.

Some pedons have a 2Eb horizon. This horizon has hue of 10YR to 5Y, value of 4 to 8, and chroma of 1 to 3. It is sand, fine sand, loamy fine sand, or loamy sand.

The 2Bhb horizon has hue of 5YR to 10YR, value of 2 to 4, and chroma of 1 to 3. It is sand or fine sand.

Johns Series

The Johns series consists of somewhat poorly drained and moderately well drained soils that formed in loamy marine sediments. Slopes range from 0 to 2 percent.

Typical pedon of Johns loamy sand, 0 to 2 percent slopes, on Roanoke Island, approximately 0.2 mile west of intersection of Secondary Road 1144 and North Carolina Highway 345, about 50 feet south of Secondary Road 1144, in a woods (state plane coordinates 2,997,200 feet E., 778,100 feet N.):

Oe—3 inches to 0; partially decomposed needles, leaves, and twigs; abrupt smooth boundary.

A—0 to 4 inches; very dark gray (10YR 3/1) loamy sand; weak fine granular structure; very friable; common fine and medium roots; common clean sand grains; very strongly acid; abrupt smooth boundary.

E—4 to 8 inches; gray (10YR 5/1) loamy sand; weak fine granular structure; friable; common fine and medium roots; very strongly acid; abrupt smooth boundary.

Bh—8 to 13 inches; very dark brown (7.5YR 2/2) loamy sand; massive; weakly cemented; very strongly acid; clear smooth boundary.

Bt1—13 to 17 inches; yellowish brown (10YR 5/4) sandy loam; common medium distinct brownish yellow (10YR 6/8) and very pale brown (10YR 7/3) mottles; weak fine subangular blocky structure; friable; few opaque minerals; very strongly acid; clear smooth boundary.

Bt2—17 to 26 inches; yellowish brown (10YR 5/4) sandy clay loam; common medium faint yellowish brown (10YR 5/6) and few fine distinct grayish brown (10YR 5/2) mottles; weak fine subangular blocky structure; friable; slightly sticky; few faint clay films on faces of peds; few opaque minerals; very strongly acid; clear smooth boundary.

C1—26 to 32 inches; light yellowish brown (10YR 6/4) sand; few fine distinct light gray (10YR 7/1) mottles; common opaque minerals; very strongly acid; clear smooth boundary.

C2—32 to 37 inches; very pale brown (10YR 7/4) sand; common fine distinct reddish yellow (7.5YR 7/8) and light gray (10YR 7/1) mottles; single grained; loose; common opaque minerals; very strongly acid; clear smooth boundary.

Cg—37 to 72 inches; light brownish gray (10YR 6/2) sand; common medium distinct strong brown (7.5Y 5/8) and brown (10YR 5/3) and few fine distinct yellow (10YR 7/8) mottles; single grained; loose; common opaque minerals; very strongly acid.

The sandy and loamy material is 26 to more than 60 inches thick. Reaction is very strongly acid or strongly acid throughout the profile.

The A horizon has hue of 10YR to 5Y, value of 3 to 5, and chroma of 1 to 3. The E horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 to 4. It is loamy sand or loamy fine sand.

The Bh horizon has hue of 5YR to 10YR, value of 2 to 5, and chroma of 2 to 4. It is loamy sand or loamy fine sand.

Some pedons have an E′ horizon. This horizon has hue of 10YR to 5Y, value of 5 to 8, and chroma of 2 to 4. It is loamy sand, loamy fine sand, fine sandy loam, or sandy loam.

The Bt horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 3 to 8. It has mottles in shades of red, gray, and brown in most pedons. It is sandy clay loam, clay loam, fine sandy loam, or sandy loam.

Some pedons have a Btg horizon. This horizon has hue of 10YR to 5Y, value of 5 to 8, and chroma of 1 or 2. It is sandy clay loam, clay loam, fine sandy loam, or sandy loam.

The C horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 3 to 8. It is loamy sand, loamy fine sand, sand, or fine sand.

The Cg horizon has hue of 10YR to 5Y, value of 5 to 8, and chroma of 1 or 2. It is fine sand, sand, loamy fine sand, or loamy sand.

The Johns soils in Dare County are taxadjuncts to the series because they have a thin spodic horizon above the argillic horizon and have chroma of 1 or 2 in the E horizon. These differences, however, do not significantly affect the behavior, use, or management of the soils.

Leon Series

The Leon series consists of poorly drained soils that formed in sandy marine sediments. Slopes range from 0 to 2 percent.

Typical pedon of Leon fine sand, 0 to 2 percent slopes, rarely flooded, on Roanoke Island, approximately 0.8 mile west of the intersection of U.S.

Highway 64 and Airport Road, 40 feet south of Airport Road, in a woods (state plane coordinates 2,976,200 feet E., 807,500 feet N.):

A—0 to 7 inches; dark gray (10YR 4/1) fine sand; single grained; loose; common fine and medium roots; many clean sand grains mixed with organic matter; very strongly acid; clear smooth boundary.

E—7 to 15 inches; light gray (10YR 7/1) sand; single grained; loose; few fine and medium roots; very strongly acid; clear smooth boundary.

Bh1—15 to 18 inches; dark brown (7.5YR 3/2) sand; weak medium granular structure; very friable; few fine roots; organic coatings on more than 95 percent of sand grains; very strongly acid; clear smooth boundary.

Bh2—18 to 23 inches; dark reddish brown (5YR 3/2) sand; weak medium granular structure; very friable; few fine roots; organic coatings on more than 95 percent of sand grains; very strongly acid; clear smooth boundary.

Cg—23 to 72 inches; gray (10YR 5/1) sand; single grained; loose; very strongly acid.

The sandy material extends to a depth of 72 inches or more. Reaction ranges from extremely acid to strongly acid throughout the profile.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1 or 2. When dry, this horizon has a salt-and-pepper appearance because of mixing of organic matter and white sand grains.

The E horizon has hue of 10YR or 2.5Y, value of 5 to 8, and chroma of 1 or 2. It is sand or fine sand.

The Bh horizon has hue of 5YR to 10YR, value of 2 or 3, and chroma of 1 to 3. It is sand or fine sand.

The Cg horizon has hue of 10YR, value of 5 to 8, and chroma of 1 to 3. It is sand or fine sand.

Newhan Series

The Newhan series consists of excessively drained soils that formed in sandy material deposited by the wind. Slopes range from 0 to 30 percent.

Typical pedon of Newhan fine sand, 0 to 10 percent slopes, approximately 0.2 mile west of the intersection of Duck Road and Hillcrest Drive, 0.2 mile north of Hillcrest Drive and Sea Oats Trail, 50 feet south of Sea Oats Trail (state plane coordinates 2,961,600 feet E., 887,000 feet N.):

A—0 to 2 inches; light brownish gray (10YR 6/2) fine sand; single grained; loose; few fine roots; few opaque minerals; neutral; abrupt smooth boundary.

C1—2 to 40 inches; light yellowish brown (10YR 6/4) fine sand; single grained; loose; few fine roots; few opaque minerals; neutral; gradual smooth boundary.

C2—40 to 80 inches; very pale brown (10YR 7/4) fine sand; single grained; loose; few opaque minerals; neutral.

The sandy material extends to a depth of 80 inches or more. Reaction ranges from moderately acid to mildly alkaline throughout the profile. Calcareous shell fragments, mostly of sand size, make up as much as 35 percent of the volume. The content of silt plus clay in the 10- to 40-inch control section is less than 5 percent.

The A horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 to 3. The C horizon has hue of 10YR to 5GY, value of 5 to 8, and chroma of 1 to 6. Low chroma is not caused by wetness. This horizon is fine sand or sand.

Osier Series

The Osier series consists of poorly drained soils that formed in sandy marine sediments. Slopes range from 0 to less than 2 percent.

Typical pedon of Osier fine sand, 0 to 2 percent slopes, rarely flooded, approximately 0.7 mile north of milepost 8 on U.S. Highway 158, about 0.7 mile west of the intersection of Landing Road and U.S. Highway 158, about 0.1 mile north of the intersection of Landing Road and Dogwood Drive, about 0.1 mile west of the intersection of Dogwood Drive and East Cedar Drive, 60 feet south of East Cedar Drive, in a woods (state plane coordinates 2,981,100 feet E., 843,000 feet N.):

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

Cg1—3 to 28 inches; light brownish gray (2.5Y 6/2) fine sand; single grained; loose; few fine roots; few opaque minerals; strongly acid; clear smooth boundary.

Cg2—28 to 80 inches; gray (5Y 5/1) fine sand; single grained; loose; few opaque minerals; moderately acid.

The sandy material extends to a depth of 80 inches or more. Reaction ranges from extremely acid to moderately acid throughout the profile.

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

The Cg horizon has hue of 10YR to 5Y, value of 3 to 8, and chroma of 1 or 2, or it is neutral in hue and has value of 3 to 8. It is fine sand or sand.

Some pedons have an Ab horizon. This horizon has hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 1 or 2. It is fine sand or sand.

Ousley Series

The Ousley series consists of moderately well drained soils that formed in sandy marine sediments. Slopes range from 0 to 5 percent.

Typical pedon of Ousley fine sand, 0 to 5 percent slopes, rarely flooded, approximately 0.1 mile south of the intersection of Secondary Road 1217 (Collington Road) and Baum Bay Drive, 100 feet west of Baum Bay Drive, in a woods (state plane coordinates 2,982,500 feet E., 840,000 feet N.):

A—0 to 3 inches; grayish brown (10YR 5/2) fine sand; single grained; loose; common fine and medium roots; strongly acid; clear smooth boundary.

C1—3 to 17 inches; yellowish brown (10YR 5/4) fine sand; single grained; loose; few medium roots; common opaque minerals; strongly acid; clear smooth boundary.

C2—17 to 30 inches; light olive brown (2.5Y 5/4) fine sand; common fine distinct dark grayish brown (10YR 4/2) mottles; single grained; loose; common opaque minerals; strongly acid; clear smooth boundary.

Cg1—30 to 60 inches; dark grayish brown (2.5Y 4/2) fine sand; single grained; loose; common opaque minerals; strongly acid; clear smooth boundary.

Cg2—60 to 80 inches; dark gray (5Y 4/1) fine sand; single grained; loose; common opaque minerals; strongly acid.

The sandy material extends to a depth of 80 inches or more. Reaction is very strongly acid or strongly acid throughout the profile.

The A horizon has hue of 10YR to 2.5Y, value of 3 to 7, and chroma of 1 or 2.

The C horizon has hue of 10YR to 2.5Y, value of 5 to 8, and chroma of 3 to 6. It is fine sand or sand.

The Cg horizon has hue of 10YR to 5Y, value of 4 to 8, and chroma of 1 or 2. It is fine sand or sand.

Ponzer Series

The Ponzer series consists of very poorly drained soils that formed in organic material over loamy marine sediments. Slopes range from 0 to 2 percent.

Typical pedon of Ponzer muck, 0 to 2 percent slopes, rarely flooded, approximately 6.5 miles west of the intersection of U.S. Highway 264 and Lake Worth Road, about 1.0 mile on West Lake Worth Road to Long Curve Road, 1.8 miles north of Long Curve Road to Jackson Road, 3.7 miles west on Jackson Road, 50 feet south of Jackson Road, in a woods (state plane coordinates 2,933,100 feet E., 735,600 feet N.):

Oa1—0 to 11 inches; black (10YR 2/1) muck; about 10 percent fiber unrubbed, less than 2 percent rubbed; weak medium granular structure; friable; common fine and medium roots; extremely acid; clear smooth boundary.

Oa2—11 to 24 inches; very dark brown (10YR 2/2) muck; about 15 percent fiber unrubbed, less than 1 percent rubbed; massive; friable; few medium roots; extremely acid; clear smooth boundary.

2Cg1—24 to 31 inches; dark grayish brown (10YR 4/2) loam; massive; friable; extremely acid; clear smooth boundary.

2Cg2—31 to 57 inches; grayish brown (10YR 5/2) loam; massive; friable, slightly sticky; extremely acid; clear smooth boundary.

2Cg3—57 to 72 inches; gray (N 6/0) clay loam; massive; slightly sticky; very strongly acid.

The thickness of the organic material commonly is 16 to 40 inches but ranges to 51 inches. This material is extremely acid unless the surface layer has been limed. The mineral underlying material ranges from extremely acid to mildly alkaline. Logs, stumps, and fragments of wood make up 0 to 20 percent of the organic layers.

The Oa horizon has hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 1 or 2, or it is neutral in hue and has value of 2 or 3. The content of fiber in the organic tiers is 2 to 30 percent before rubbing and less than 10 percent after rubbing. The organic layers are typically massive under natural wet conditions. In areas that are drained and cultivated, a granular or blocky structure can develop in all of the organic layers, depending on the nature and depth of the organic material as well as the duration of drainage.

Some pedons have an A horizon. This horizon has hue of 7.5YR to 5Y, value of 2 to 4, and chroma of 1 or 2. It is loam, sandy clay loam, silt loam, or fine sandy loam.

The 2Cg horizon has hue of 10YR to 5G, value of 5 to 7, and chroma of 1 or 2, or it is neutral in hue and has value of 5 to 7. It varies in texture, but mineral layers are loamy in the control section.

Pungo Series

The Pungo series consists of very poorly drained soils that formed in organic material over loamy or clayey marine sediments. Slopes range from 0 to 2 percent.

Typical pedon of Pungo muck, 0 to 2 percent slopes, rarely flooded, approximately 0.9 mile west of the intersection of U.S. Highway 264 and Lake Worth Road, about 0.1 mile north of the intersection of Lake Worth Road and Long Curve Road, 90 feet east of Long Curve Road, behind a tower (state plane coordinates 2,952,900 feet E., 724,300 feet N.):

Oe—2 inches to 0; partially decomposed needles, leaves, and twigs.

Oa1—0 to 10 inches; muck, dark reddish brown (5YR 2/2) broken face and rubbed; about 5 percent fiber unrubbed, less than 1 percent rubbed; weak medium granular structure; slightly sticky; common medium roots; logs and common stumps; extremely acid; clear smooth boundary.

Oa2—10 to 50 inches; muck, dark reddish brown (5YR 2/2) broken face and rubbed; about 5 percent fiber unrubbed, less than 1 percent rubbed; massive; slightly sticky; muck is pastelike and has a greasy feel when wet; common medium roots; few logs and stumps; extremely acid; gradual smooth boundary.

Oa3—50 to 65 inches; muck, dark reddish brown (5YR 3/2) broken face and rubbed; about 10 percent fiber unrubbed, less than 1 percent; massive; slightly sticky; muck is pastelike and has a greasy feel when wet; common medium roots; common stumps and logs; extremely acid; clear smooth boundary.

2Cg—65 to 72 inches; gray (N 6/0) loam; massive; friable; very strongly acid.

The organic deposits range from 51 inches to more than 90 inches in thickness. They are extremely acid (in 0.01 molar solution of calcium chloride). The underlying mineral horizons are extremely acid to neutral. Logs, stumps, and roots make up as much as 35 percent of the surface area and subsurface volume. The content of fiber before rubbing ranges from 2 to 60 percent throughout the profile. In the lower tiers, the content of fiber after rubbing ranges to 12 percent in some pedons.

The surface tier has hue of 5YR to 10YR, value of 2 or 3, and chroma of 1 or 2. The subsurface tiers have hue of 2.5YR to 5Y, value of 2 or 3, and chroma of 1 to 4. About 10 inches or more of these tiers has hue of 5YR or 2.5YR. The organic material is massive and is pastelike or has a greasy feel when saturated. In areas that have been drained and have subsided, the organic material can form a weak granular structure if it is allowed to aerate slowly. When this material dries over a short period, it shrinks and is rewetted slowly unless crushed. The mineral underlying horizon is loam, sandy clay, silty clay, or clay and has gleyed colors.

Roper Series

The Roper series consists of very poorly drained soils that have an organic surface layer. These soils formed mainly in loamy marine deposits. Slopes range from 0 to 2 percent.

Typical pedon of Roper muck, 0 to 2 percent slopes, rarely flooded, approximately 2.5 miles southwest of Stumpy Point on U.S. Highway 264, about 2.2 miles southwest of the intersection of U.S. Highway 264 and Secondary Road 1100, about 100 feet west of U.S. Highway 264 (state plane coordinates 2,956,200 feet E., 716,700 feet N.):

Oa1—0 to 6 inches; muck, black (10YR 2/1) broken face and rubbed; less than 1 percent fiber rubbed; weak medium granular structure; very friable; common fine and medium roots; extremely acid; clear smooth boundary.

Oa2—6 to 13 inches; muck, black (5YR 2/1) broken face and rubbed; less than 1 percent fiber rubbed; weak medium granular structure; friable; common fine and medium roots; extremely acid; clear smooth boundary.

A—13 to 18 inches; very dark grayish brown (10YR 3/2) mucky loam; weak medium subangular blocky structure; friable; common medium roots; extremely acid; clear smooth boundary.

Bg—18 to 34 inches; dark grayish brown (10YR 4/2) loam; common medium distinct brownish yellow (10YR 6/6) mottles; weak medium subangular blocky structure; friable, slightly sticky; few medium roots; extremely acid; gradual smooth boundary.

Cg1—34 to 50 inches; gray (10YR 6/1) loamy fine sand; massive; friable; extremely acid; clear smooth boundary.

Cg2—50 to 72 inches; gray (N 6/0) loam; massive; friable; few fine flakes of mica; extremely acid.

The thickness of the muck and loamy material over unconforming sandy sediments ranges from 30 to more than 60 inches. Reaction ranges from extremely acid to strongly acid in the upper part of the control section and from extremely acid to moderately acid in the lower part and in the Cg horizon. Few or common fine flakes of mica are throughout the lower part of the soils.

The Oa horizon has hue of 5YR to 2.5Y, value of 2 or 3, and chroma of 1 or 4, or it is neutral in hue and has value of 2 or 3. The content of fiber ranges from 2 to 15 percent before rubbing and from 0 to 4 percent after rubbing. Charcoal fragments are common in some pedons.

The A horizon has hue of 10YR to 5Y, value of 3 or

4, and chroma of 1 or 2, or it is neutral in hue and has value of 3 or 4. It is silt loam, clay loam, mucky silt loam, mucky loam, or loam.

The Bg horizon has hue of 10YR to 5Y or of 5GY, value of 4 to 6, and chroma of 1 or 2. Some pedons have few or common mottles of higher chroma. This horizon is dominantly silty clay loam, loam, or silt loam, but thin strata of clay loam or silty clay are in some pedons.

The Cg or 2Cg horizon has hue of 10YR to 5Y, value of 3 to 5, and chroma of 1 or 2, or it is neutral in hue and has value of 3 to 5. It ranges from sand to clay.

References

(1) American Association of State Highway and Transportation Officials. 1982. Standard specifications for highway materials and methods of sampling and testing. Ed. 13, 2 vols., illus.

(2) American Society for Testing and Materials. 1988. Standard test method for classification of soils for engineering purposes. ASTM Stand. D 2487.

(3) Beck, Donald E. 1962. Yellow-poplar site index curves. U.S. Dep. Agric., Forest Serv., Southeast. Forest Exp. Stn. Res. Note 180, 2 pp., illus.

(4) Broadfoot, Walter M., and R.M. Krinard. 1959. Guide for evaluating sweetgum sites. U.S. Dep. Agric., Forest Serv., South. Forest Exp. Stn. Occas. Pap. 176, 8 pp., illus.

(5) Coile, T.S., and F.X. Schumacher. 1953. Site index of young stands of loblolly and shortleaf pines in the Piedmont Plateau Region. J. For. 51: 432-435, illus.

(6) Dolan, R., and L. Vincent. 1970. Shoreline changes along the Outer Banks of North Carolina. U.S. Dep. Inter., Tech. Rep. 70-5, illus.

(7) Graetz, Karl E. 1973. Seacoast plants of the Carolinas for conservation beautification. U.S. Dep. Agric., Soil Conserv. Serv., 206 pp., illus.

(8) Olson, D.J. 1959. Site index curves for upland oak in the Southeast. U.S. Dep. Agric., Forest Serv., Southeast. Forest Exp. Stn. Res. Note 125, 2 pp.

(9) Robison, T.M. 1977. Public water supplies of North Carolina, Part 4, Northern Coastal Plain. U.S. Dep. Inter., Geol. Surv., 218 pp., illus.

(10) Sharpe, Bill. 1954. A new geography of North Carolina. Vol. I, 533 pp., illus.

(11) Stick, David. 1958. The Outer Banks of North Carolina, 1584-1958. 352 pp., illus.

(12) United States Department of Agriculture. 1929 (rev. 1976). Volume, yield, and stand tables for second growth southern pines. U.S. Dep. Agric., Forest Serv., Misc. Publ. 50, 302 pp., illus.

(13) United States Department of Agriculture. 1951 (being revised). Soil survey manual. U.S. Dep. Agric. Handb. 18, 503 pp., illus.

(14) United States Department of Agriculture. 1961. Land capability classification. U.S. Dep. Agric. Handb. 210, 21 pp.

(15) United States Department of Agriculture. 1975. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. Soil Conserv. Serv., U.S. Dep. Agric. Handb. 436, 754 pp., illus.

(16) United States Department of Agriculture. 1979. Soil survey of the Outer Banks of North Carolina. Soil Conserv. Serv., North Carolina Dep. of Nat. and Econ. Resour., and North Carolina State Univ., 114 pp., illus.

(17) United States Department of the Interior. 1981. Report on the fisheries of the South Atlantic States. U.S. Fish and Wildl. Serv., Vol. 11, 285 pp.

Glossary

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

AC soil. A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well-aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

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

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

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

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Basal area. The cross-sectional area of a tree bole measured at 4.5 feet above ground level. It is 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.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

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

Clayey. A general textural term that includes sandy clay, silty clay, and clay. According to family level criteria in the soil taxonomy system, a specific textural name referring to fine earth (particles less than 2 millimeters in size) containing 35 percent or more clay by weight within the control section. The content of rock fragments is less than 35 percent by volume.

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

CMAI (cumulative mean annual increment). The age or rotation at which growing stock of a forest produces the greatest annual growth (for that time period). It is the age at which periodic annual growth and mean annual growth are equal.

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.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate

pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

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 4½ 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.

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

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

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

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

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

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

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

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

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic).—Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and

the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated).—Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, such as fire, that exposes the surface.

Excess lime (in tables). Excess carbonates in the soil restrict the growth of some plants.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Fine textured soil. Sandy clay, silty clay, or clay.

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.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric material.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual*. The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is, in part, a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as 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.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

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

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

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.

Irrigation. Application of water to soils to assist in

production of crops. Methods of irrigation are:
Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.
Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.
Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.
Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.
Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.
Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.
Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.
Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.
Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loamy. A general textural term that includes coarse sandy loam, sandy loam, fine sandy loam, very fine sandy loam, loam, silt loam, silt, clay loam, sandy clay loam, and silty clay loam. According to family level criteria in the soil taxonomic system, a specific textural name referring to fine earth (particles less than 2 millimeters in size) of loamy very fine sand or finer textured material that contains less than 35 percent clay by weight within the control section. The content of rock fragments is less than 35 percent by volume.

Low strength. The soil is not strong enough to support loads.

Mean annual increment. The average yearly volume of a stand of trees from the year of origin to the age under consideration.

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

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

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

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

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

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

Muck. Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

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 through the profile. Permeability is measured as the number of inches per hour that water moves 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, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

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

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Poor filter (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor outlets (in tables). Refers to areas where 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 degrees of acidity or alkalinity, expressed as pH values, are:

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately 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

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandy. A general textural term that includes coarse sand, sand, fine sand, very fine sand, loamy coarse sand, loamy sand, loamy fine sand, and loamy very fine sand. According to family level criteria in the soil taxonomic system, a specific textural name referring to fine earth (particles less than 2 millimeters in size) of sand or loamy sand that contains less than 50 percent very fine sand by weight within the control section. The content of rock fragments is less than 35 percent by volume.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Seasonal high water table. The highest level of a saturated zone (the apparent or perched water table) over a continuous period of more than 2 weeks in most years, but not a permanent water table.

Seepage (in tables). The movement of water through the soil 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.

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.

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.

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

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

Substratum. The part of the soil below the solum.

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.

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."

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.

Underlying material. Technically, the C horizon; the part of the soil below the biologically altered A and B horizons.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. This contrasts with poorly graded soil.

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

(Recorded in the period 1951-81 at New Holland, North Carolina)

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average	Maximum temperature higher than--	Minimum temperature lower than--	Average number of growing degree days*	Average	Less than--	More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January-----	54.8	33.8	44.3	74	12	73	4.13	2.29	5.75	7	0.7
February----	56.9	35.2	46.1	77	16	67	3.79	2.42	5.03	7	1.1
March-------	63.8	41.7	52.8	82	23	162	3.59	2.14	4.88	7	.2
April-------	72.5	49.7	61.1	88	31	333	3.23	1.87	4.43	5	.0
May---------	78.7	58.0	68.4	92	40	570	4.29	2.60	5.80	7	.0
June--------	84.4	65.5	74.9	96	50	747	4.49	2.25	6.43	6	.0
July--------	87.4	69.7	78.6	97	58	887	6.08	3.45	8.41	9	.0
August------	86.7	69.2	78.0	96	56	868	6.57	3.61	9.17	8	.0
September---	82.3	64.3	73.3	93	49	699	5.55	2.15	8.39	5	.0
October-----	74.1	54.1	64.1	88	32	437	3.80	1.33	5.84	5	.0
November----	65.8	44.1	55.0	82	25	178	3.58	1.43	5.39	5	.0
December----	57.6	36.2	46.9	76	17	93	3.49	1.39	5.25	6	.1
Yearly:											
Average----	72.1	51.8	62.0	---	---	---	---	---	---	---	---
Extreme----	---	---	---	97	12	---	---	---	---	---	---
Total------	---	---	---	---	---	5,114	52.59	46.69	58.70	77	2.1

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1951-81 at New Holland, 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--	Mar. 14	Apr. 5	Apr. 14
2 years in 10 later than--	Mar. 6	Mar. 28	Apr. 9
5 years in 10 later than--	Feb. 19	Mar. 13	Mar. 30
First freezing temperature in fall:			
1 year in 10 earlier than--	Nov. 16	Nov. 8	Oct. 28
2 years in 10 earlier than--	Nov. 26	Nov. 14	Nov. 1
5 years in 10 earlier than--	Dec. 16	Nov. 25	Nov. 11

TABLE 3.--GROWING SEASON

(Recorded in the period 1951-81 at New Holland, 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	263	230	204
8 years in 10	275	239	211
5 years in 10	298	256	225
2 years in 10	323	274	238
1 year in 10	338	283	245

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
BaC	Baymeade fine sand, 1 to 10 percent slopes	2,038	0.8
BeA	Beaches, 0 to 2 percent slopes, storm tidal	471	0.2
BnD	Beaches-Newhan complex, 0 to 25 percent slopes	4,565	1.8
BvA	Belhaven muck, 0 to 2 percent slopes, rarely flooded	38,616	15.4
CaA	Cape Fear loam, 0 to 2 percent slopes, rarely flooded	3,060	1.2
CeA	Carteret sand, 0 to 2 percent slopes, frequently flooded	7,575	3.0
CnA	Conaby muck, 0 to 2 percent slopes, rarely flooded	1,923	0.8
CoB	Corolla fine sand, 0 to 6 percent slopes, rarely flooded	4,562	1.8
CrB	Corolla-Duckston complex, 0 to 6 percent slopes, rarely flooded	1,501	0.6
CuA	Currituck mucky peat, 0 to 1 percent slopes, frequently flooded	7,320	2.9
DtA	Duckston fine sand, 0 to 2 percent slopes, occasionally flooded	6,683	2.7
DuE	Dune land, 2 to 40 percent slopes	638	0.3
DwE	Dune land-Newhan complex, 2 to 40 percent slopes	1,087	0.4
FrD	Fripp fine sand, 2 to 30 percent slopes	6,386	2.6
HoA	Hobonny muck, 0 to 1 percent slopes, frequently flooded	11,029	4.4
HyA	Hyde loam, 0 to 2 percent slopes, rarely flooded	24,804	9.9
IcA	Icaria loamy fine sand, 0 to 2 percent slopes, rarely flooded	1,587	0.6
JoA	Johns loamy sand, 0 to 2 percent slopes	1,045	0.4
LeA	Leon fine sand, 0 to 2 percent slopes, rarely flooded	339	0.1
NeC	Newhan fine sand, 0 to 10 percent slopes	5,773	2.3
NhC	Newhan-Corolla complex, 0 to 10 percent slopes	2,011	0.8
NuC	Newhan-Urban land complex, 0 to 10 percent slopes	477	0.2
OsA	Osier fine sand, 0 to 2 percent slopes, rarely flooded	1,373	0.6
OuB	Ousley fine sand, 0 to 5 percent slopes, rarely flooded	2,423	1.0
PoA	Ponzer muck, 0 to 2 percent slopes, rarely flooded	12,635	5.1
PsB	Psamments, 0 to 6 percent slopes	1,307	0.5
PuA	Pungo muck, 0 to 2 percent slopes, rarely flooded	89,230	35.7
RpA	Roper muck, 0 to 2 percent slopes, rarely flooded	9,647	3.9
	Total	250,105	100.0

TABLE 5.--PRIME FARMLAND

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name)

Map symbol	Soil name
HyA	Hyde loam, 0 to 2 percent slopes, rarely flooded (where drained)
IcA	Icaria loamy fine sand, 0 to 2 percent slopes, rarely flooded (where drained)
JoA	Johns loamy sand, 0 to 2 percent slopes
RpA	Roper muck, 0 to 2 percent slopes, rarely flooded (where drained)

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Corn	Soybeans	Wheat
		Bu	Bu	Bu
BaC---------- Baymeade	IIIs	60	20	---
BeA*. Beaches				
BnD*: Beaches.				
Newhan----------	VIIIs	---	---	---
BvA---------- Belhaven	VIIw	---	---	---
	IVw**	125	40	45
CaA---------- Cape Fear	VIw	---	---	---
	IIIw**	140	45	50
CeA---------- Carteret	VIIIw	---	---	---
CnA---------- Conaby	VIw	---	---	---
CoB---------- Corolla	VIIs	---	---	---
CrB:				
Corolla----------	VIIs	---	---	---
Duckston----------	VIIw	---	---	---
CuA---------- Currituck	VIIIw	---	---	---
DtA---------- Duckston	VIIw	---	---	---
DuE*---------- Dune land	VIIIe	---	---	---
DwE: Dune land.				
Newhan----------	VIIIs	---	---	---
FrD---------- Fripp	VIIs	---	---	---
HoA---------- Hobonny	VIIw	---	---	---
HyA---------- Hyde	VIw	---	---	---
	IIIw**	150	45	55
IcA---------- Icaria	VIw	---	---	---
JoA---------- Johns	IIw	120	45	50

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Wheat
		Bu	Bu	Bu
LeA---------- Leon	IVw	---	---	---
NeC---------- Newhan	VIIIs	---	---	---
NhC:				
Newhan----------	VIIIs	---	---	---
Corolla----------	VIIs	---	---	---
NuC*:				
Newhan----------	VIIIs	---	---	---
Urban land.				
OsA---------- Osier	Vw	---	---	---
OuB---------- Ousley	IIIw	50	20	---
PoA----------	VIIw	---	---	---
Ponzer	IVw**	130	40	55
PsB. Psamments				
PuA----------	VIIw	---	---	---
Pungo	IVw**	100	25	30
RpA----------	IIIw**	160	45	55
Roper	VIw	---	---	---

* See description of the map unit for composition and behavior characteristics of the map unit.
** Drained areas.

TABLE 7.--CAPABILITY CLASSES AND SUBCLASSES

(Miscellaneous areas are excluded. Absence of an entry indicates no acreage)

Class	Total acreage	Major management concerns (Subclass)		
		Erosion (e)	Wetness (w)	Soil problem (s)
		Acres	Acres	Acres
I	---	---	---	---
II	1,045	---	1,045	---
III	7,521	---	5,483	2,038
IV	339	---	339	---
V	1,373	---	1,373	---
VI	41,021	---	41,021	---
VII	171,554	---	158,396	13,158
VIII	27,252	1,345	18,109	7,798

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
BaC---------- Baymeade	6S	Slight	Moderate	Moderate	Loblolly pine--------	66	6	Loblolly pine**.
					Longleaf pine--------	63	4	
					Live oak----------	---	---	
					Hickory----------	---	---	
					Sweetgum----------	---	---	
					Southern red oak-----	---	---	
					White oak----------	---	---	
					Post oak----------	---	---	
BvA---------- Belhaven	6W	Slight	Severe	Severe	Loblolly pine--------	65	6	Loblolly pine**.
					Pond pine----------	60	3	
					Sweetgum----------	---	---	
					Red maple----------	---	---	
					Blackgum----------	---	---	
					Atlantic white cedar-	---	---	
					Baldcypress----------	---	---	
CaA---------- Cape Fear	11W	Slight	Severe	Severe	Loblolly pine--------	100	11	Loblolly pine**, native hardwoods***.
					Sweetgum----------	---	---	
					Willow oak----------	86	6	
					Water oak----------	---	---	
					Water tupelo---------	---	---	
					Baldcypress----------	---	---	
					Red maple----------	---	---	
					Swamp white oak------	---	---	
					Atlantic white cedar-	---	---	
					Pond pine----------	---	---	
FrD---------- Fripp	6S	Slight	Moderate	Moderate	Loblolly pine--------	70	6	Loblolly pine, longleaf pine, sand pine.
					Longleaf pine--------	60	4	
					Sand pine----------	---	---	
					Live oak----------	---	---	
					Cherrybark oak-------	---	---	
					Hickory----------	---	---	
					Black cherry---------	---	---	
					Eastern redcedar-----	---	---	
HyA---------- Hyde	10W	Slight	Severe	Severe	Loblolly pine--------	96	10	Loblolly pine**.
					Sweetgum----------	---	---	
					Water oak----------	---	---	
					Pond pine----------	---	---	
					Red maple----------	---	---	
					Green ash----------	---	---	
					Yellow poplar--------	---	---	
					Elm----------	---	---	
					Willow oak----------	---	---	
					Swamp tupelo---------	---	---	
					Water tupelo---------	---	---	
					Baldcypress----------	---	---	
IcA---------- Icaria	9W	Slight	Moderate	Moderate	Loblolly pine--------	86	9	Loblolly pine**, native hardwoods***.
					Sweetgum----------	---	---	
					Red maple----------	---	---	
					Water oak----------	---	---	
					Willow oak----------	---	---	

See footnotes at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
JoA---------- Johns	9W	Slight	Slight	Slight	Loblolly pine--------	88	9	Loblolly pine.
					Sweetgum----------	---	---	
					Willow oak----------	---	---	
					Persimmon----------	---	---	
					Live oak----------	---	---	
LeA---------- Leon	7W	Slight	Moderate	Moderate	Loblolly pine--------	76	7	Loblolly pine.
					Live oak----------	---	---	
					Water oak----------	---	---	
OsA---------- Osier	9W	Slight	Severe	Severe	Loblolly pine--------	87	9	Loblolly pine**.
					Water oak----------	---	---	
					Sweetgum----------	---	---	
					Red maple----------	---	---	
					Blackgum----------	---	---	
OuB---------- Ousley	8W	Slight	Moderate	Moderate	Loblolly pine--------	80	8	Loblolly pine.
					Live oak----------	---	---	
					Water oak----------	---	---	
					Sweetgum----------	---	---	
PoA---------- Ponzer	6W	Slight	Severe	Severe	Loblolly pine--------	70	6	Loblolly pine**.
					Pond pine----------	60	3	
					Sweetgum----------	---	---	
					Red maple----------	---	---	
					Atlantic white cedar-	---	---	
PuA---------- Pungo	5W	Slight	Severe	Severe	Loblolly pine--------	60	5	Loblolly pine**.
					Pond pine----------	55	2	
					Red maple----------	---	---	
					Sweetbay----------	---	---	
					Baldcypress----------	---	---	
					Swamp tupelo---------	---	---	
					Atlantic white cedar-	---	---	
RpA---------- Roper	8W	Slight	Severe	Severe	Loblolly pine--------	80	8	Loblolly pine.**
					Sweetgum----------	---	---	
					Water oak----------	---	---	
					Red maple----------	---	6	
					Sweetbay----------	---	---	
					Blackgum----------	---	---	
					Baldcypress----------	---	---	
					Water tupelo---------	---	---	

* Productivity class is the yield in cubic meters per hectare per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

** Trees named are suitable for planting in areas that have been adequately drained and/or bedded.

*** Use natural regeneration of native hardwoods.

TABLE 9.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "moderate" and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
BaC: Baymeade	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
BeA*. Beaches					
BnD*: Beaches.					
Newhan	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Severe: droughty.
BvA: Belhaven	Severe: flooding, wetness, excess humus.	Severe: wetness, excess humus, too acid.	Severe: excess humus, wetness, too acid.	Severe: wetness, excess humus.	Severe: too acid, wetness, excess humus.
CaA: Cape Fear	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
CeA: Carteret	Severe: flooding, wetness, too sandy.	Severe: flooding, wetness, excess salt.	Severe: too sandy, wetness, flooding.	Severe: wetness, too sandy, flooding.	Severe: excess salt, wetness, flooding.
CnA: Conaby	Severe: flooding, wetness, excess humus.	Severe: wetness, excess humus.	Severe: excess humus, wetness.	Severe: wetness, excess humus.	Severe: wetness, excess humus.
CoB: Corolla	Severe: flooding, too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
CrB*:					
Corolla	Severe: flooding, too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
Duckston	Severe: flooding, wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
CuA: Currituck	Severe: flooding, ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding, flooding.	Severe: ponding, excess humus.	Severe: ponding, flooding, excess humus.
DtA: Duckston	Severe: flooding, 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 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
DuE*:					
Dune land	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: too sandy, slope.	Severe: droughty, slope.
DwE*:					
Dune land	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: too sandy, slope.	Severe: droughty, slope.
Newhan	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Severe: droughty, slope.
FrD: Fripp	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Severe: droughty, slope.
HoA: Hobonny	Severe: flooding, wetness, excess humus.	Severe: flooding, wetness, excess humus.	Severe: wetness, flooding, excess humus.	Severe: wetness, excess humus.	Severe: wetness, flooding, excess humus.
HyA: Hyde	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
IcA: Icaria	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
JoA: Johns	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, droughty.
LeA: Leon	Severe: wetness, too sandy, flooding.	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.
NeC: Newhan	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
NhC*:					
Newhan	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
Corolla	Severe: flooding, too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
NuC*:					
Newhan	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
Urban land.					
OsA: Osier	Severe: flooding, wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
OuB---------- Ousley	Severe: flooding, too sandy.	Severe: too sandy.	Severe: too sandy, flooding.	Severe: too sandy.	Severe: droughty, flooding.
PoA---------- Ponzer	Severe: flooding, wetness, excess humus.	Severe: wetness, excess humus, too acid.	Severe: excess humus, wetness, too acid.	Severe: wetness, excess humus.	Severe: wetness, excess humus, too acid.
PsB. Psamments					
PuA---------- Pungo	Severe: flooding, wetness, excess humus.	Severe: wetness, excess humus, too acid.	Severe: excess humus, wetness, too acid.	Severe: wetness, excess humus.	Severe: wetness, excess humus, too acid.
RpA---------- Roper	Severe: flooding, wetness, excess humus.	Severe: wetness, excess humus.	Severe: excess humus, wetness.	Severe: wetness, excess humus.	Severe: wetness, excess humus.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated. Ratings for wet soils are for undrained areas)

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
BaC---------- Baymeade	Poor	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
BeA*. Beaches										
BnD*: Beaches.										
Newhan----------	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
BvA---------- Belhaven	Very poor.	Very poor.	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
CaA---------- Cape Fear	Fair	Good	Good	Good	Good	Poor	Fair	Good	Good	Poor.
CeA---------- Carteret	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Fair	Good	Very poor.	Very poor.	Fair.
CnA---------- Conaby	Very poor.	Fair	Fair	Fair	Fair	Good	Good	Poor	Fair	Good.
CoB---------- Corolla	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.
CrB*:										
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.
CuA---------- Currituck	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Good	Very poor.	Very poor.	Good.
DtA---------- Duckston	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Poor.
DuE*---------- Dune land	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
DwE*:										
Dune land---------	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Newhan----------	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
FrD---------- Fripp	Very poor.	Very poor.	Poor	Poor	Poor	Very poor.	Very poor.	Very poor.	Poor	Very poor.
HoA---------- Hobonny	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
HyA---------- Hyde	Very poor.	Poor	Poor	Poor	Poor	Good	Fair	Poor	Poor	Fair.
IcA---------- Icaria	Poor	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
JoA---------- Johns	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
LeA---------- Leon	Poor	Fair	Good	Poor	Fair	Fair	Poor	Fair	Fair	Poor.
NeC---------- Newhan	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
NhC*:										
Newhan----------	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
Corolla----------	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.
NuC*:										
Newhan----------	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
Urban land.										
OsA---------- Osier	Very poor.	Poor	Fair	Fair	Fair	Fair	Good	Poor	Fair	Fair.
OuB---------- Ousley	Poor	Fair	Good	Fair	Fair	Poor	Very poor.	Fair	Fair	Very poor.
PoA---------- Ponzer	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
PsB. Psamments										
PuA---------- Pungo	Very poor.	Very poor.	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
RpA---------- Roper	Very poor.	Fair	Fair	Fair	Fair	Good	Good	Poor	Fair	Good.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
BaC---------- Baymeade	Severe: cutbanks cave.	Slight---------	Moderate: wetness.	Moderate: slope.	Slight---------	Severe: droughty.
BeA*. Beaches						
BnD*: Beaches.						
Newhan----------	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Severe: droughty.
BvA---------- Belhaven	Severe: excess humus, wetness.	Severe: flooding, wetness, low strength.	Severe: flooding, wetness.	Severe: flooding, wetness, low strength.	Severe: wetness.	Severe: too acid, wetness, excess humus.
CaA---------- Cape Fear	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness.	Severe: wetness.
CeA---------- Carteret	Severe: cutbanks cave, wetness, flooding.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: excess salt, wetness, flooding.
CnA---------- Conaby	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, excess humus.
CoB---------- Corolla	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Moderate: flooding, wetness.	Severe: droughty.
CrB*:						
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: wetness, flooding.	Severe: wetness, droughty.
CuA---------- Currituck	Severe: cutbanks cave, excess humus, wetness.	Severe: subsides, flooding, wetness.	Severe: subsides, flooding, wetness.	Severe: subsides, flooding, wetness.	Severe: subsides, wetness, flooding.	Severe: wetness, flooding, excess humus.
DtA---------- Duckston	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, droughty.
DuE*---------- Dune land	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
DwE*:						
Dune land	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.
Newhan	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.
FrD Fripp	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.
HoA Hobonny	Severe: excess humus, wetness.	Severe: flooding, wetness, low strength.	Severe: flooding, wetness, low strength.	Severe: flooding, wetness, low strength.	Severe: wetness, flooding.	Severe: wetness, flooding, excess humus.
HyA Hyde	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness.	Severe: wetness.
IcA Icaria	Severe: wetness, cutbanks cave.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness.
JoA Johns	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, droughty.
LeA Leon	Severe: cutbanks cave, wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: wetness.
NeC Newhan	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Severe: droughty.
NhC*:						
Newhan	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Severe: droughty.
Corolla	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Moderate: flooding, wetness.	Severe: droughty.
NuC*:						
Newhan	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Severe: droughty.
Urban land.						
OsA Osier	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, droughty.
OuB Ousley	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.	Severe: droughty.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
PoA---------- Ponzer	Severe: excess humus, wetness.	Severe: subsides, flooding, wetness.	Severe: subsides, flooding, wetness.	Severe: subsides, flooding, wetness.	Severe: subsides, low strength, wetness.	Severe: wetness, excess humus, too acid.
PsB. Psamments						
PuA---------- Pungo	Severe: excess humus, wetness.	Severe: subsides, flooding, wetness.	Severe: subsides, flooding, wetness.	Severe: subsides, flooding, wetness.	Severe: subsides, wetness, low strength.	Severe: wetness, excess humus, too acid.
RpA---------- Roper	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, low strength.	Severe: wetness, excess humus.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the Glossary. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
BaC---------- Baymeade	Severe: poor filter.	Severe: seepage.	Severe: seepage, wetness, too sandy.	Severe: seepage.	Poor: too sandy.
BeA*. Beaches					
BnD*: Beaches.					
Newhan----------	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
BvA---------- Belhaven	Severe: wetness, percs slowly.	Severe: seepage, excess humus, wetness.	Severe: seepage, wetness, too acid.	Severe: seepage, wetness.	Poor: wetness, thin layer.
CaA---------- Cape Fear	Severe: wetness, percs slowly.	Severe: seepage.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
CeA---------- Carteret	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, wetness.
CnA---------- Conaby	Severe: wetness.	Severe: seepage, excess humus, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: wetness.
CoB---------- Corolla	Severe: wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
CrB*:					
Corolla----------	Severe: wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: seepage, wetness, too sandy.	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.
CuA---------- Currituck	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, excess humus.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, wetness.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
DtA---------- Duckston	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, wetness.
DuE*---------- Dune land	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, slope.
DwE*:					
Dune land----------	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, slope.
Newhan----------	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, slope.
FrD---------- Fripp	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, slope.
HoA---------- Hobonny	Severe: flooding, wetness.	Severe: flooding, excess humus, wetness.	Severe: flooding, excess humus, wetness.	Severe: flooding, wetness.	Poor: wetness, excess humus.
HyA---------- Hyde	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
IcA---------- Icaria	Severe: wetness.	Severe: wetness, seepage.	Severe: wetness, seepage, too sandy.	Severe: wetness, seepage.	Poor: wetness.
JoA---------- Johns	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
LeA---------- Leon	Severe: wetness, poor filter, flooding.	Severe: seepage, wetness, flooding.	Severe: seepage, wetness, flooding.	Severe: seepage, wetness, flooding.	Poor: seepage, too sandy, wetness.
NeC---------- Newhan	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
NhC*:					
Newhan----------	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
NhC*:					
Corolla	Severe: wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
NuC*:					
Newhan	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
Urban land.					
OsA Osier	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
OuB Ousley	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy.
PoA Ponzer	Severe: wetness, percs slowly.	Severe: excess humus, wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
PsB. Psamments					
PuA Pungo	Severe: subsides, wetness, percs slowly.	Severe: excess humus, wetness.	Severe: seepage, wetness, excess humus.	Severe: wetness.	Poor: wetness, excess humus, too acid.
RpA Roper	Severe: wetness, percs slowly.	Severe: seepage, excess humus, wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Topsoil
BaC: Baymeade	Good	Probable	Poor: too sandy.
BeA*. Beaches			
BnD*: Beaches.			
Newhan	Good	Probable	Poor: too sandy.
BvA: Belhaven	Poor: wetness.	Improbable: excess fines.	Poor: excess humus, wetness, too acid.
CaA: Cape Fear	Poor: wetness, low strength.	Improbable: excess fines.	Poor: too clayey, wetness.
CeA: Carteret	Poor: wetness.	Probable	Poor: too sandy, excess salt, wetness.
CnA: Conaby	Poor: wetness.	Improbable: excess fines.	Poor: excess humus, wetness.
CoB: Corolla	Fair: wetness.	Probable	Poor: too sandy.
CrB*:			
Corolla	Fair: wetness.	Probable	Poor: too sandy.
Duckston	Poor: wetness.	Probable	Poor: too sandy, wetness.
CuA: Currituck	Poor: wetness.	Probable	Poor: excess humus, wetness.
DtA: Duckston	Poor: wetness.	Probable	Poor: too sandy, wetness.
DuE*: Dune land	Poor: slope.	Probable	Poor: too sandy, slope.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Topsoil
DwE*:			
Dune land	Poor: slope.	Probable	Poor: too sandy, slope.
Newhan	Fair: slope.	Probable	Poor: too sandy, slope.
FrD Fripp	Fair: slope.	Probable	Poor: too sandy, slope.
HoA Hobonny	Poor: wetness.	Improbable: excess fines.	Poor: wetness, excess humus.
HyA Hyde	Poor: low strength, wetness.	Improbable: excess fines.	Poor: wetness.
IcA Icaria	Poor: wetness.	Probable	Poor: wetness.
JoA Johns	Fair: wetness.	Probable	Fair: too sandy, thin layer.
LeA Leon	Poor: wetness.	Probable	Poor: too sandy, wetness.
NeC Newhan	Good	Probable	Poor: too sandy.
NhC*:			
Newhan	Good	Probable	Poor: too sandy.
Corolla	Fair: wetness.	Probable	Poor: too sandy.
NuC*:			
Newhan	Good	Probable	Poor: too sandy.
Urban land.			
OsA Osier	Poor: wetness.	Probable	Poor: too sandy.
OuB Ousley	Fair: wetness.	Probable	Poor: too sandy.
PoA Ponzer	Poor: wetness.	Improbable: excess fines.	Poor: excess humus, wetness, too acid.
PsB. Psamments			

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Topsoil
PuA---------- Pungo	Poor: wetness.	Improbable: excess humus.	Poor: excess humus, wetness, too acid.
RpA---------- Roper	Poor: wetness.	Improbable: excess fines.	Poor: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "moderate" and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for-- Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
BaC---------- Baymeade	Severe: seepage, piping.	Severe: cutbanks cave.	Deep to water	Slope, droughty, fast intake.	Too sandy, soil blowing.	Droughty, rooting depth.
BeA*. Beaches						
BnD*: Beaches.						
Newhan----------	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, slope.	Slope, too sandy.	Slope, droughty.
BvA---------- Belhaven	Severe: piping, wetness.	Severe: slow refill, cutbanks cave.	Subsides, too acid.	Wetness, soil blowing, too acid.	Wetness, soil blowing.	Wetness.
CaA---------- Cape Fear	Severe: hard to pack, wetness.	Severe: slow refill.	Percs slowly---	Wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
CeA---------- Carteret	Severe: seepage, piping, wetness.	Severe: salty water, cutbanks cave.	Flooding, cutbanks cave.	Wetness, droughty, fast intake.	Wetness, too sandy.	Wetness, excess salt, droughty.
CnA---------- Conaby	Severe: piping, wetness.	Severe: cutbanks cave.	Subsides-------	Wetness, soil blowing, rooting depth.	Wetness, soil blowing.	Wetness, rooting depth.
CoB---------- Corolla	Severe: seepage, wetness, piping.	Severe: cutbanks cave.	Slope, cutbanks cave.	Slope, wetness, droughty.	Wetness, too sandy, soil blowing.	Droughty.
CrB*:						
Corolla----------	Severe: seepage, wetness, piping.	Severe: cutbanks cave.	Slope, cutbanks cave.	Slope, wetness, droughty.	Wetness, too sandy, soil blowing.	Droughty.
Duckston---------	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Flooding, cutbanks cave.	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty.
CuA---------- Currituck	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, flooding, subsides.	Ponding, rooting depth, flooding.	Ponding, too sandy, soil blowing.	Wetness, rooting depth.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
DtA Duckston	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Flooding, cutbanks cave.	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty.
DuE* Dune land	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, soil blowing.	Slope, too sandy, soil blowing.	Slope, droughty.
DwE*:						
Dune land	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, soil blowing.	Slope, too sandy, soil blowing.	Slope, droughty.
Newhan	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, slope.	Slope, too sandy.	Slope, droughty.
FrD Fripp	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, slope.	Slope, too sandy, soil blowing.	Slope, droughty.
HoA Hobonny	Severe: excess humus, wetness.	Moderate: slow refill.	Flooding, subsides.	Wetness, soil blowing.	Wetness, soil blowing.	Wetness.
HyA Hyde	Severe: wetness.	Severe: slow refill.	Favorable	Wetness	Wetness, erodes easily.	Wetness, erodes easily.
IcA Icaria	Severe: wetness, piping, seepage.	Severe: cutbanks cave.	Cutbanks cave	Wetness	Wetness, too sandy.	Wetness.
JoA Johns	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Droughty, rooting depth.
LeA Leon	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave, flooding.	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty.
NeC Newhan	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, slope.	Too sandy	Droughty.
NhC*:						
Newhan	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, slope.	Too sandy	Droughty.
Corolla	Severe: seepage, wetness, piping.	Severe: cutbanks cave.	Slope, cutbanks cave.	Slope, wetness, droughty.	Wetness, too sandy, soil blowing.	Droughty.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
NuC*:						
Newhan	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, slope.	Too sandy	Droughty.
Urban land.						
OsA Osier	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, fast intake.	Wetness, too sandy.	Wetness, droughty.
OuB Ousley	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Flooding, cutbanks cave.	Wetness, droughty, fast intake.	Wetness, too sandy.	Droughty.
PoA Ponzer	Severe: wetness, piping.	Severe: slow refill.	Percs slowly, subsides, too acid.	Wetness, percs slowly, soil blowing.	Wetness, percs slowly, soil blowing.	Wetness, percs slowly.
PsB. Psamments						
PuA Pungo	Severe: excess humus, wetness.	Severe: slow refill.	Subsides, too acid.	Wetness, soil blowing, too acid.	Wetness, soil blowing.	Wetness.
RpA Roper	Severe: wetness.	Severe: slow refill.	Subsides	Wetness, soil blowing.	Wetness, erodes easily, soil blowing.	Wetness, erodes easily.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In								Pct	
BaC---------- Baymeade	0-32	Fine sand--------	SM, SP-SM	A-2, A-3	100	100	51-100	5-20	---	NP
	32-46	Fine sandy loam, sandy clay loam, sandy loam.	SC, SM, SM-SC	A-2, A-4	100	100	60-100	23-49	<25	NP-10
	46-80	Loamy fine sand, sand, sandy loam.	SM, SP-SM	A-2, A-3	100	100	51-100	5-35	---	NP
BeA*. Beaches										
BnD*: Beaches.										
Newhan----------	0-80	Fine sand, sand	SP, SP-SM	A-3	95-100	95-100	60-75	0-5	---	NP
BvA---------- Belhaven	0-38	Muck----------	PT	---	---	---	---	---	---	---
	38-47	Sandy loam, fine sandy loam, mucky loam.	SM, SC, SM-SC	A-2, A-4	100	100	60-85	30-49	<30	NP-10
	47-72	Loam, clay loam, sandy clay loam, sandy loam.	CL, CL-ML, SC, SM-SC	A-4, A-6	100	100	80-100	20-95	7-36	4-15
CaA---------- Cape Fear	0-13	Loam----------	ML, CL-ML, CL	A-4, A-6	100	95-100	85-100	60-90	20-40	3-15
	13-48	Clay loam, clay, silty clay, sandy clay.	ML, CL, MH, CH	A-7	100	95-100	90-100	60-85	41-65	15-35
	48-72	Sandy loam, loamy sand, sand.	SM, SP-SM	A-2, A-4	100	100	51-100	5-35	---	NP
CeA---------- Carteret	0-80	Sand, loamy sand	SP, SP-SM	A-3	95-100	90-100	60-90	4-10	---	NP
CnA---------- Conaby	0-14	Muck----------	PT	---	---	---	---	---	---	---
	14-60	Sand, loamy sand, sandy loam.	SM, SP-SM	A-2, A-3	100	96-100	65-85	5-35	---	NP
CoB---------- Corolla	0-75	Fine sand, sand	SW, SP-SM, SP	A-2, A-3	80-100	75-100	60-95	1-12	---	NP
CrB*:										
Corolla---------	0-75	Fine sand, sand	SW, SP-SM, SP	A-2, A-3	80-100	75-100	60-95	1-12	---	NP
Duckston--------	0-8	Fine sand--------	SP-SM, SP	A-2, A-3	100	95-100	60-75	3-12	---	NP
	8-80	Sand, fine sand	SP-SM, SP	A-2, A-3	100	95-100	60-75	3-12	---	NP
CuA---------- Currituck	0-17	Mucky peat-------	PT	A-8	---	---	---	---	---	---
	17-40	Muck----------	PT	A-8	---	---	---	---	---	---
	40-65	Loamy sand, sand	SM, SP-SM	A-2, A-3	95-100	90-100	50-75	5-35	---	NP
DtA---------- Duckston	0-8	Fine sand--------	SP-SM, SP	A-2, A-3	100	95-100	60-75	3-12	---	NP
	8-80	Sand, fine sand	SP-SM, SP	A-2, A-3	100	95-100	60-75	3-12	---	NP

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In								Pct	
DuE*---------- Dune land	0-60	Sand, fine sand	SP, SP-SM, SM	A-3, A-2	100	100	50-70	0-15	---	NP
DwE*:										
Dune land-------	0-60	Sand, fine sand	SP, SP-SM, SM	A-3, A-2	100	100	50-70	0-15	---	NP
Newhan----------	0-80	Fine sand--------	SP, SP-SM	A-3	95-100	95-100	60-75	0-5	---	NP
FrD---------- Fripp	0-4	Fine sand--------	SP, SP-SM	A-3	100	98-100	85-99	0-5	---	NP
	4-80	Fine sand, sand	SP, SP-SM	A-3	100	98-100	85-99	0-5	---	NP
HoA---------- Hobonny	0-16	Muck----------	PT	---	---	---	---	---	---	---
	16-72	Sapric material	PT	A-8	---	---	---	---	---	---
HyA---------- Hyde	0-13	Loam----------	ML	A-4	100	98-100	85-100	60-90	<35	NP-7
	13-40	Clay loam, loam, silty clay loam.	CL	A-6, A-4, A-7	100	98-100	90-100	75-95	22-42	7-20
	40-70	Variable---------	---	---	---	---	---	---	---	---
IcA---------- Icaria	0-12		SM, SM-SC, ML	A-2, A-4	98-100	98-100	65-95	30-65	<30	NP-7
	12-33	Sandy clay loam, clay loam, loam.	SC, CL	A-4, A-6	98-100	98-100	75-95	36-75	18-40	7-18
	33-72	Sand, fine sand	SM, SP-SM	A-2	100	100	50-75	10-30	---	NP
JoA---------- Johns	0-13	Loamy sand-------	SM	A-2, A-4	100	95-100	60-90	15-45	---	NP
	13-26	Sandy clay loam, sandy loam, clay loam, fine sandy loam.	SC, SM-SC, CL, CL-ML	A-2, A-4, A-6, A-7	100	95-100	60-98	25-65	15-45	5-25
	26-72	Sand, loamy sand, fine sand, loamy fine sand.	SM, SP-SM, SP	A-2, A-3	95-100	95-100	51-90	4-25	---	NP
LeA---------- Leon	0-15	Fine sand--------	SP, SP-SM	A-3, A-2-4	100	100	80-100	2-12	---	NP
	15-23	Fine sand, sand	SP, SP-SM	A-3, A-2-4	100	100	80-100	2-12	---	NP
	23-72	Fine sand, sand	SM, SP-SM	A-3, A-2-4	100	100	80-100	5-20	---	NP
NeC---------- Newhan	0-80	Fine sand, sand	SP, SP-SM	A-3	95-100	95-100	60-75	0-5	---	NP
NhC*:										
Newhan----------	0-80	Fine sand, sand	SP, SP-SM	A-3	95-100	95-100	60-75	0-5	---	NP
Corolla---------	0-75	Fine sand, sand	SW, SP-SM, SP	A-2, A-3	80-100	75-100	60-95	1-12	---	NP
NuC*:										
Newhan----------	0-80	Fine sand, sand	SP, SP-SM	A-3	95-100	95-100	60-75	0-5	---	NP
Urban land.										
OsA---------- Osier	0-3	Fine sand--------	SP-SM	A-2, A-3	100	98-100	60-85	5-12	---	NP
	3-80	Sand, fine sand	SP, SP-SM	A-1, A-3, A-2-4	100	90-100	40-60	2-10	---	NP
OuB---------- Ousley	0-3	Fine sand--------	SP-SM, SM	A-2, A-3	100	100	70-100	5-25	---	NP
	3-80	Sand, fine sand	SP-SM, SM, SP	A-1, A-2, A-3	100	95-100	36-99	2-15	---	NP

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	4	10	40	200		
	In								Pct	
PoA---------- Ponzer	0-24	Muck----------	PT	---	---	---	---	---	---	---
	24-57	Loam, sandy clay loam, silt loam, fine sandy loam.	SM, ML, SC, CL	A-2, A-4, A-6	100	100	60-95	25-95	<40	NP-20
	57-72	Variable---------	---	---	---	---	---	---	---	---
PsB. Psamments										
PuA---------- Pungo	0-65	Muck----------	PT	---	---	---	---	---	---	---
	65-72	Clay, silty clay, sandy clay.	CH, CL, SC	A-7, A-6	100	95-100	85-100	45-95	35-65	15-35
RpA---------- Roper	0-13	Muck----------	PT	---	---	---	---	---	---	---
	13-18	Mucky loam, silt loam, mucky silt loam.	CL	A-4, A-6	100	100	90-100	60-95	20-40	8-25
	18-34	Silt loam, silty clay loam, loam.	CL	A-4, A-6	100	100	90-100	60-95	20-40	8-25
	34-72	Variable---------	---	---	---	---	---	---	---	---

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
BaC---------- Baymeade	0-32	0-8	1.60-1.75	6.0-20	0.02-0.06	4.5-6.5	Low----------	0.10	5	.5-1
	32-46	8-26	1.45-1.60	2.0-6.0	0.10-0.14	4.5-6.5	Low----------	0.10		
	46-80	0-12	1.60-1.75	6.0-20	0.02-0.10	4.5-6.5	Low----------	0.10		
BeA*. Beaches										
BnD*: Beaches.										
Newhan----------	0-80	<5	1.60-1.75	>20	<0.05	5.6-7.8	Low----------	0.10	5	<.5
BvA---------- Belhaven	0-38	---	0.40-0.65	0.2-6.0	0.20-0.26	<4.5	Low----------	----	---	20-95
	38-47	5-15	1.45-1.65	2.0-6.0	0.10-0.24	3.6-5.5	Low----------	0.24		
	47-72	10-35	1.30-1.45	0.2-0.6	0.12-0.20	3.6-6.5	Low----------	0.24		
CaA---------- Cape Fear	0-13	5-15	1.30-1.50	0.6-6.0	0.15-0.22	4.5-6.5	Low----------	0.15	5	5-15
	13-48	35-60	1.25-1.40	0.06-0.2	0.12-0.22	3.6-6.0	Moderate-----	0.32		
	48-72	5-30	1.40-1.70	---	---	---	----------	----		
CeA---------- Carteret	0-80	5-12	1.45-1.60	>6.0	0.02-0.10	5.6-8.4	Low----------	0.15	5	.5-2
CnA---------- Conaby	0-14	---	0.40-0.65	0.2-2.0	0.20-0.26	3.6-5.5	Low----------	----	---	20-60
	14-60	5-12	1.60-1.75	2.0-6.0	0.04-0.10	3.6-5.5	Low----------	0.10		
CoB---------- Corolla	0-75	0-3	1.60-1.70	>20	0.01-0.03	5.6-7.8	Low----------	0.10	5	<.5
CrB*:										
Corolla---------	0-75	0-3	1.60-1.70	>20	0.01-0.03	5.6-7.8	Low----------	0.10	5	<.5
Duckston--------	0-8	0-4	1.60-1.70	>20	0.02-0.08	3.6-8.4	Low----------	0.10	5	.5-3
	8-80	0-4	1.60-1.70	>20	0.02-0.05	3.6-8.4	Low----------	0.10		
CuA---------- Currituck	0-17	---	0.25-0.40	0.6-6.0	0.25-0.35	4.5-5.5	Low----------	----	2	---
	17-40	---	0.35-0.55	0.6-6.0	0.25-0.35	3.6-5.5	Low----------	----		
	40-65	3-10	1.60-1.75	6.0-20	0.04-0.09	3.6-5.5	Low----------	----		
DtA---------- Duckston	0-8	0-4	1.60-1.70	>20	0.02-0.08	3.6-8.4	Low----------	0.10	5	.5-3
	8-80	0-4	1.60-1.70	>20	0.02-0.05	3.6-8.4	Low----------	0.10		
DuE*---------- Dune land	0-60	0-1	---	>20	0.03-0.04	---	Low----------	0.10	5	<.1
DwE*:										
Dune land-------	0-60	0-1	---	>20	0.03-0.04	---	Low----------	0.10	5	<.1
Newhan----------	0-80	<5	1.60-1.75	>20	<0.05	5.6-7.8	Low----------	0.10	5	<.5
FrD---------- Fripp	0-4	<5	1.30-1.70	6.0-20	0.02-0.08	5.1-7.8	Low----------	0.10	5	<1
	4-80	<5	1.30-1.70	6.0-20	0.01-0.03	5.6-7.8	Low----------	0.10		
HoA---------- Hobonny	0-16	---	0.20-0.65	0.6-6.0	0.20-0.25	4.5-5.5	Low----------	----	---	20-60
	16-72	---	0.40-0.70	0.6-2.0	0.20-0.25	3.6-5.5	Low----------	0.15		

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
HyA---------- Hyde	0-13	5-18	1.30-1.50	0.6-2.0	0.13-0.20	3.6-5.5	Low----------	0.17	5	3-10
	13-40	18-35	1.30-1.40	0.2-0.6	0.15-0.20	3.6-5.5	Low----------	0.43		
	40-70	---	---	---	---	---	----------	----		
IcA---------- Icaria	0-12	5-25	1.30-1.40	0.6-6.0	0.12-0.18	3.6-5.5	Low----------	0.17	5	3-15
	12-33	18-35	1.45-1.55	0.6-2.0	0.14-0.20	3.6-5.5	Low----------	0.28		
	33-72	2-10	1.40-1.65	2.0-6.0	0.02-0.05	3.6-5.5	Low----------	0.17		
JoA---------- Johns	0-13	4-12	1.60-1.75	2.0-6.0	0.06-0.11	4.5-5.5	Low----------	0.15	5	.5-2
	13-26	18-35	1.40-1.60	0.6-2.0	0.12-0.15	4.5-5.5	Low----------	0.24		
	26-72	2-10	1.60-1.70	6.0-20	0.03-0.06	4.5-5.5	Low----------	0.10		
LeA---------- Leon	0-15	1-6	1.30-1.55	6.0-20	0.05-0.10	3.6-5.5	Low----------	0.10	5	.5-4
	15-23	1-6	1.30-1.65	6.0-20	0.02-0.05	3.6-5.5	Low----------	0.10		
	23-72	2-8	1.35-1.70	0.6-6.0	0.10-0.20	3.6-5.5	Low----------	0.15		
NeC---------- Newhan	0-80	<5	1.60-1.75	>20	<0.05	5.6-7.8	Low----------	0.10	5	<.5
NhC*:										
Newhan----------	0-80	<5	1.60-1.75	>20	<0.05	5.6-7.8	Low----------	0.10	5	<.5
Corolla---------	0-75	0-3	1.60-1.70	>20	0.01-0.03	5.6-7.8	Low----------	0.10	5	<.5
NuC*:										
Newhan----------	0-80	<5	1.60-1.75	>20	<0.05	5.6-7.8	Low----------	0.10	5	<.5
Urban land.										
OsA---------- Osier	0-3	1-10	1.35-1.60	6.0-20	0.03-0.10	3.6-6.0	Low----------	0.10	5	2-5
	3-80	2-5	1.40-1.60	>20	0.02-0.05	3.6-6.0	Low----------	0.05		
OuB---------- Ousley	0-3	1-3	1.35-1.45	6.0-20	0.05-0.10	4.5-5.5	Low----------	0.10	5	<.5
	3-80	1-2	1.45-1.60	6.0-20	0.02-0.06	4.5-5.5	Low----------	0.15		
PoA---------- Ponzer	0-24	---	0.40-0.65	0.06-2.0	0.35-0.45	<4.5	Low----------	----	---	20-80
	24-57	5-25	1.30-1.60	0.2-2.0	0.10-0.24	3.6-7.8	Low----------	0.24		
	57-72	---	---	---	---	---	Low----------	----		
PsB. Psamments										
PuA---------- Pungo	0-10	---	0.35-0.60	0.2-6.0	0.20-0.26	<4.5	Low----------	----	---	40-90
	10-65	---	0.35-0.60	0.06-0.2	0.20-0.26	<4.5	Low----------	----		
	65-72	35-60	1.25-1.35	0.2-6.0	0.12-0.18	3.6-7.3	Moderate-----	0.24		
RpA---------- Roper	0-13	---	0.40-0.65	0.2-6.0	0.24-0.46	3.6-5.5	Low----------	----	---	20-50
	13-18	18-35	1.30-1.40	0.2-0.6	0.16-0.24	3.6-5.5	Low----------	0.43		
	18-34	18-35	1.30-1.40	0.2-0.6	0.16-0.24	3.6-7.8	Low----------	0.43		
	34-72	---	---	---	---	3.6-7.8	----------	----		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," and "apparent" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydrologic group	Flooding			High water table			Subsidence		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Initial	Total	Uncoated steel	Concrete
					Ft			In	In		
BaC---------- Baymeade	A	None-------	---	---	4.0-5.0	Apparent	Dec-Apr	---	---	Low------	Moderate.
BeA*. Beaches											
BnD*: Beaches.											
Newhan--------	A	None-------	---	---	>6.0	---	---	---	---	High-----	Low.
BvA---------- Belhaven	D	Rare-------	---	---	0-1.0	Apparent	Nov-May	2-8	10-26	High-----	High.
CaA---------- Cape Fear	D	Rare-------	---	---	0-1.5	Apparent	Nov-May	---	---	High-----	High.
CeA---------- Carteret	D	Frequent---	Very brief.	Jan-Dec	+3-1.0	Apparent	Jan-Dec	---	---	High-----	High.
CnA---------- Conaby	B/D	Rare-------	---	---	0-1.5	Apparent	Dec-May	2-8	6-13	High-----	High.
CoB---------- Corolla	D	Rare-------	---	---	1.5-3.0	Apparent	Nov-May	---	---	Low------	Low.
CrB*:											
Corolla-------	D	Rare-------	---	---	1.5-3.0	Apparent	Nov-May	---	---	Low------	Low.
Duckston------	A/D	Rare-------	Brief	Jan-Dec	0-1.0	Apparent	Jan-Dec	---	---	Low------	Low.
CuA---------- Currituck	D	Frequent---	Very long.	Jan-Dec	+1-1.0	Apparent	Jan-Dec	16-20	16-38	High-----	High.
DtA---------- Duckston	A/D	Occasional	Brief	Jan-Dec	0-1.0	Apparent	Jan-Dec	---	---	Low------	Low.
DuE*---------- Dune land	A	None-------	---	---	>6.0	---	---	---	---	---	---
DwE*:											
Dune land-----	A	None-------	---	---	>6.0	---	---	---	---	---	---
Newhan--------	A	None-------	---	---	>6.0	---	---	---	---	High-----	Low.
FrD---------- Fripp	A	None-------	---	---	>6.0	---	---	---	---	Low------	Low.
HoA---------- Hobonny	D	Frequent---	Very long.	Jan-Dec	+1-0	Apparent	Jan-Dec	16-24	30-48	High-----	High.
HyA---------- Hyde	B/D	Rare-------	---	---	0-1.5	Apparent	Nov-May	---	---	High-----	High.
IcA---------- Icaria	D	Rare-------	---	---	0-1.0	Apparent	Nov-Apr	---	---	High-----	High.

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Subsidence		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Initial	Total	Uncoated steel	Concrete
					Ft			In	In		
JoA---------- Johns	C	None--------	---	---	1.5-3.0	Apparent	Dec-Apr	---	---	Moderate	High.
LeA---------- Leon	B/D	Rare--------	---	---	0-1.0	Apparent	Nov-Mar	---	---	High-----	High.
NeC---------- Newhan	A	None--------	---	---	>6.0	---	---	---	---	High-----	Low.
NhC*:											
Newhan--------	A	None--------	---	---	>6.0	---	---	---	---	High-----	Low.
Corolla--------	D	Rare--------	---	---	1.5-3.0	Apparent	Nov-May	---	---	Low------	Low.
NuC*:											
Newhan--------	A	None--------	---	---	>6.0	---	---	---	---	High-----	Low.
Urban land.											
OsA---------- Osier	A/D	Rare--------	---	---	0-1.0	Apparent	Nov-Mar	---	---	High-----	High.
OuB---------- Ousley	C	Rare--------	---	---	1.5-3.0	Apparent	Dec-May	---	---	Low------	High.
PoA---------- Ponzer	D	Rare--------	Brief to long.	Dec-May	0-1.0	Apparent	Nov-May	2-6	12-24	High-----	High.
PsB. Psamments											
PuA---------- Pungo	D	Rare--------	---	---	0-1.0	Apparent	Nov-May	16-24	36-50	High-----	High.
RpA---------- Roper	B/D	Rare--------	---	---	0-1.0	Apparent	Nov-May	1-5	3-15	High-----	High.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 18.--CLASSIFICATION OF THE SOILS

(An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series)

Soil name	Family or higher taxonomic class
*Baymeade	Loamy, siliceous, thermic Arenic Hapludults
Belhaven	Loamy, mixed, dysic, thermic Terric Medisaprists
Cape Fear	Clayey, mixed, thermic Typic Umbraquults
Carteret	Mixed, thermic Typic Psammaquents
*Conaby	Coarse-loamy, mixed, nonacid, thermic Histic Humaquepts
Corolla	Thermic, uncoated Aquic Quartzipsamments
Currituck	Sandy or sandy-skeletal, mixed, euic, thermic Terric Medisaprists
Duckston	Siliceous, thermic Typic Psammaquents
Fripp	Thermic, uncoated Typic Quartzipsamments
Hobonny	Euic, thermic Typic Medisaprists
Hyde	Fine-silty, mixed, thermic Typic Umbraquults
Icaria	Fine-loamy over sandy or sandy-skeletal, siliceous, thermic Typic Umbraquults
*Johns	Fine-loamy over sandy or sandy-skeletal, siliceous, thermic Aquic Hapludults
Leon	Sandy, siliceous, thermic Aeric Haplaquods
Newhan	Thermic, uncoated Typic Quartzipsamments
Osier	Siliceous, thermic Typic Psammaquents
Ousley	Thermic, uncoated Aquic Quartzipsamments
Ponzer	Loamy, mixed, dysic, thermic Terric Medisaprists
Psamments	Psamments
Pungo	Dysic, thermic Typic Medisaprists
Roper	Fine-silty, mixed, acid, thermic Histic Humaquepts

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