United States
Department of
Agriculture

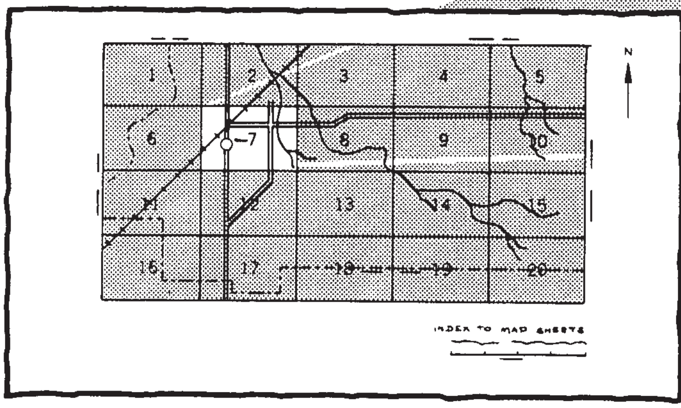
Soil
Conservation
Service

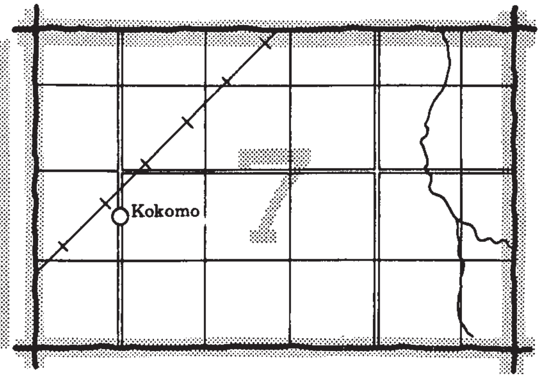
In cooperation with
Virginia Polytechnic
Institute
and State University

Soil Survey of Isle of Wight County Virginia

HOW TO USE

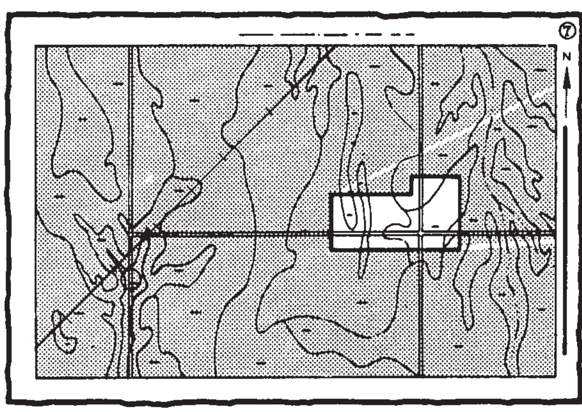
1. Locate your area of interest on the "Index to Map Sheets".

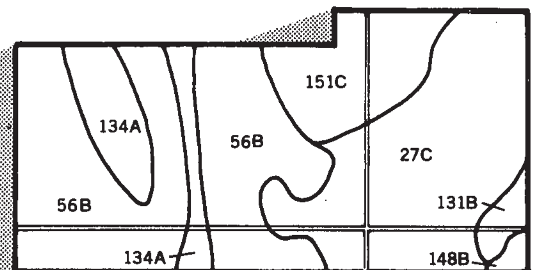




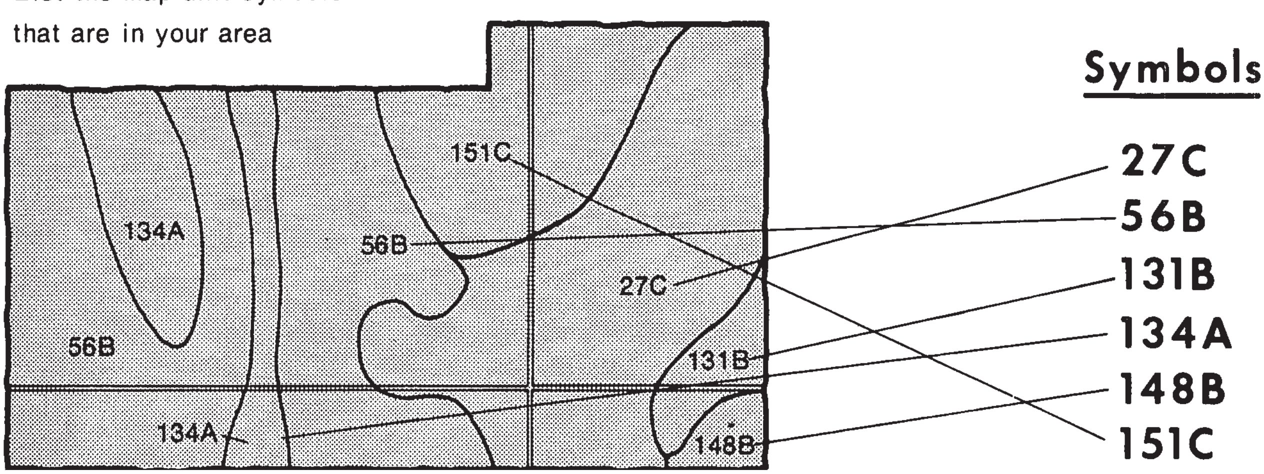
2. Note the number of the map sheet and turn to that sheet.

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



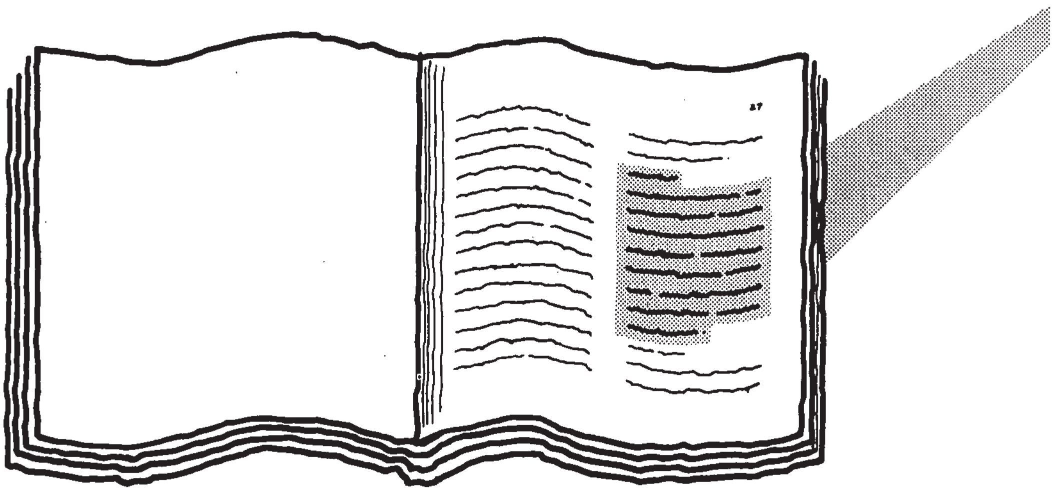


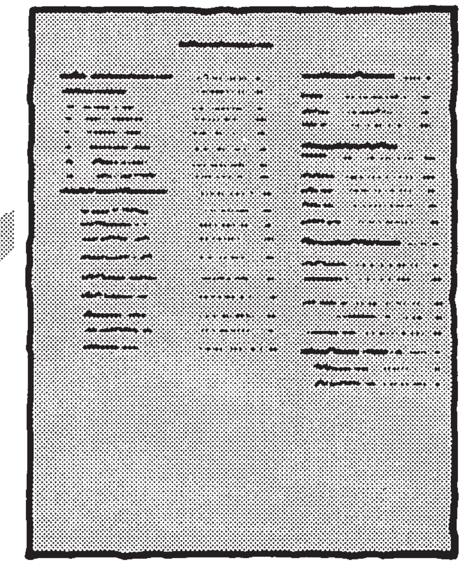
4. List the map unit symbols that are in your area



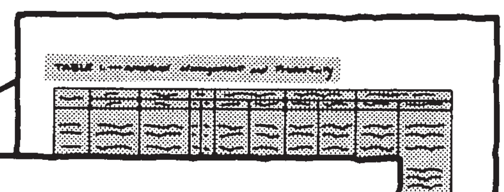
THIS SOIL SURVEY

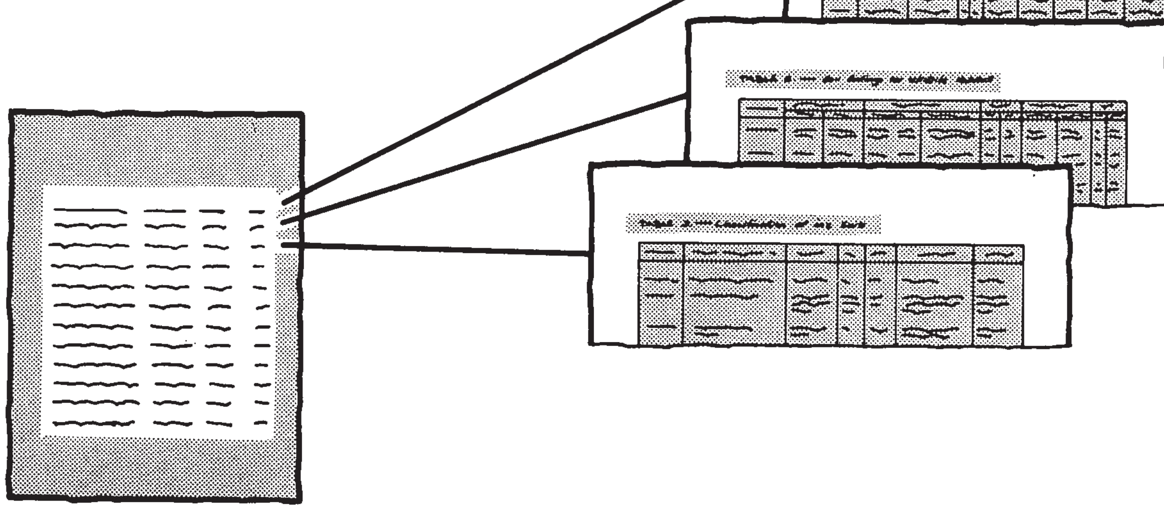
5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.





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





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

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

Major fieldwork for this soil survey was completed in 1982. Soil names and descriptions were approved in 1983. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1982. This survey was made by the Soil Conservation Service in cooperation with the Virginia Polytechnic Institute and State University. It is part of the technical assistance furnished to the Peanut Soil and Water Conservation District. This survey was financed in part by the Virginia Soil and Water Conservation Commission and the Isle of Wight County Board of Supervisors.

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.

This soil survey supersedes the soil survey of Isle of Wight County published in 1941.

Cover: Seed peanuts shocked to dry. The soil is Emporia fine sandy loam, 0 to 2 percent slopes.

Contents

Soil series

Issued September 1986

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Summary of Tables

Foreword

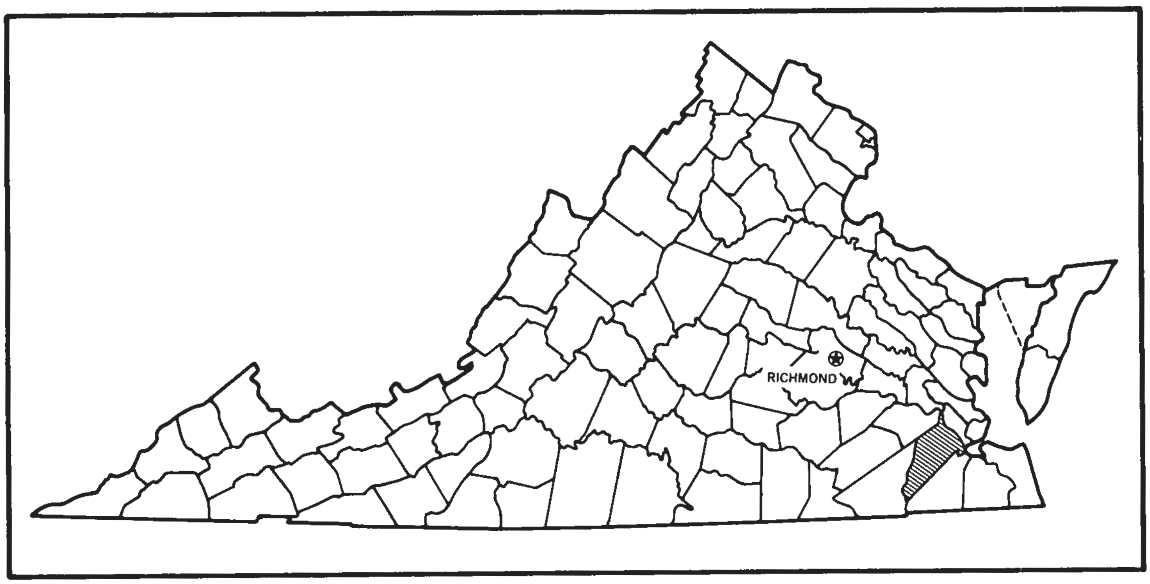
This soil survey contains information that can be used in land-planning programs in Isle of Wight County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the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

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

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

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

Manly S. Wilder
State Conservationist
Soil Conservation Service



Location of Isle of Wight County in Virginia.

Soil Survey of
Isle of Wight County, Virginia

By William F. Kitchel, H. Thomas Saxton III,
Ruth A. Strauss, Steve K. Thomas, and Carl D. Peacock, Jr.,
The Virginia Polytechnic Institute and State University

United States Department of Agriculture, Soil Conservation Service
In cooperation with
Virginia Polytechnic Institute and State University

ISLE of WIGHT County is in the southeastern part of Virginia. It is west of the Portsmouth-Norfolk metropolitan area. The area of the county is about 317 square miles, or 203,000 acres.

Although farming and woodland have been the main land uses, urban development from the Hampton-Newport News area is expanding into the county. Corn, soybeans, and peanuts are grown on most farms. Hogs and beef cattle are raised on some farms, and there are a few dairy farms.

This soil survey supersedes the soil survey of Isle of Wight County published in 1941 *(7)*. This survey updates the earlier one, provides additional information, and contains larger scale maps that show the soils in greater detail.

General Nature of the Survey Area

This section describes the climate, the history, the agriculture, and the industry in the survey area. It also describes the physiography, the relief, and the drainage patterns in the area.

Climate

Prepared by the Virginia Polytechnic Institute and State University, Blacksburg, Virginia.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Holland, Virginia, 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 41 degrees F, and the average daily minimum temperature is 30 degrees. The lowest temperature on record, which occurred at Holland on February 1, 1965, is 1 degree. In summer the average temperature is 76 degrees, and the average daily maximum temperature is 86 degrees. The highest recorded temperature, which occurred at Holland on June 27, 1952, is 105 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 (40 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 48 inches. Of this, 27 inches, or 60 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 13.4 inches. Thunderstorms occur on about 40 days each year, and most occur in summer.

The average seasonal snowfall is 8 inches. The greatest snow depth at any one time during the period of record was 14 inches. On an average of 3 days, at least 1 inch of snow is on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 70 percent of the time possible in summer and 60 percent in winter.

The prevailing wind is from the southwest. Average windspeed is highest, 12 miles per hour, in March.

History

An area in what is now Isle of Wight County was visited in 1608 by Captain John Smith, who crossed the James River and procured 14 bushels of corn for the Jamestown colony from a tribe of Worrosquoyack Indians. The first English settlement in the area was established in 1619, near the mouth of Lawnes Creek and the James River. The settlers were Cavaliers from Bristol, England. In 1634 the Virginia colony was divided into eight shires, or counties, one of which was named after the Worrosquoyack Indians. In 1637 the county was renamed Isle of Wight County, after the island off the south coast of England. The present boundaries of the county were established in 1674.

Agriculture and Industry

The main crops in the survey area are corn, soybeans, and peanuts. A small acreage is used for wheat, and a few areas are in permanent pasture. Ryegrass is commonly seeded with row crops, both as a cover crop and for off-season grazing.

The livestock enterprises consist mainly of raising hogs and beef cattle. Several dairy farms and poultry farms are in the survey area.

Much of the industry consists of processing, marketing, and storage of agricultural or wood products. Large tracts of land under corporate ownership are managed for forest products. Commercial meatpacking plants process the swine raised in the area.

Physiography, Relief, and Drainage

Isle of Wight County lies in the Embayed section of the Coastal Plain in the southeastern part of Virginia. Elevations range from about sea level along the James River to about 97 feet at the Surry County line. The Suffolk Scarp (4) in the northeastern part of the county ranges in elevation from 35 to 70 feet (fig. 1). It separates the broad, clayey, upland flats (5) in the lower lying areas from the dissected uplands and broad, loamy, upland flats (2,3) at higher elevations. Tidal marshes (6) are between the James River and the broad, clayey, upland flats. Adjacent to the Blackwater River is a narrow strip of river terraces and flood plains (1).

The county is mostly nearly level and gently sloping, but some small areas near drainageways are sloping to steep. Narrow side slopes that blend into gently sloping areas of well drained soils are along the many small streams and drainageways throughout the county. These gently sloping areas are adjacent to the poorly drained upland swamps called pocosins on broad, loamy flats (3).

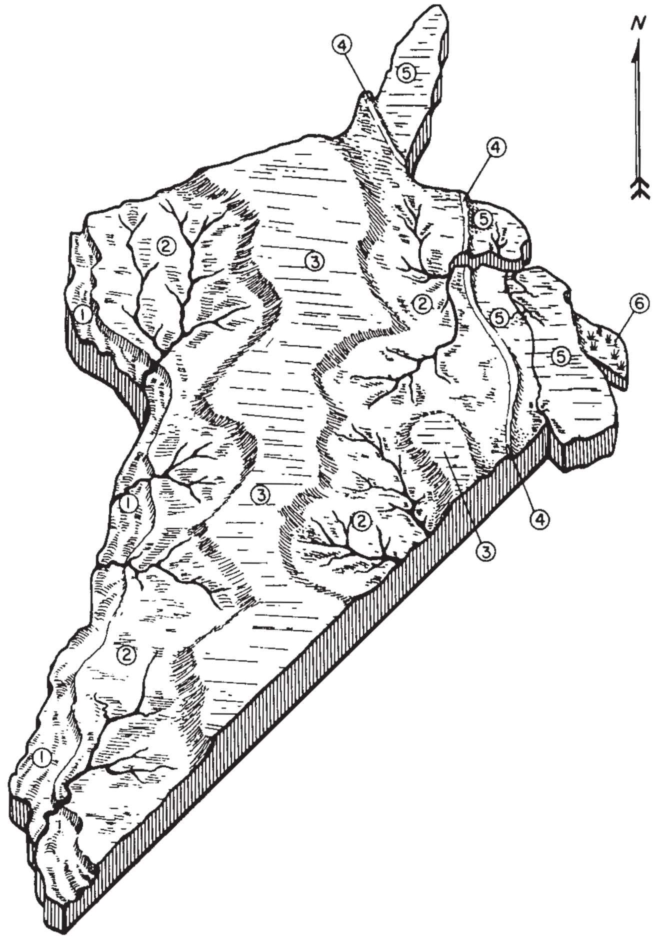


Figure 1.—Physiography, relief, and the major drainage patterns in Isle of Wight County, Virginia. The main physiographic areas are: (1) terraces and flood plains; (2) dissected uplands; (3) broad, loamy, upland flats; (4) the Suffolk Scarp; (5) broad, clayey, upland flats; and (6) tidal marshes. The numbers in the diagram correspond also to those in the text.

The drainage pattern is well defined on the dissected uplands and the broad, loamy, upland flats but is poorly defined on the broad, clayey upland flats. The northern part of the county is drained by the James River. The western and southern parts are drained by the Blackwater River. The eastern part is drained by Chuckatuck Creek.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their locations and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of parent material. 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 or segment of the landscape. By observing the soils in the survey area and relating their positon to specific segments of the landscape, a soil scientist develops a concept or model of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with considerable accuracy the kind of soil at a specific location on the landscape.

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

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

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests (*3*). Soil scientists interpreted the data from these analyses and tests as well as the field-observed characteristics and the soil properties in terms of expected behavior of the soils under different uses. Interpretations for all of the soils were field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and new interpretations sometimes are developed to meet local needs. Data were assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management were assembled from farm records and from field or plot experiments on the same kinds of soil.

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

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

Map Unit Composition

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

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

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

The next section, "Survey Procedures," explains specific procedures used to make this survey.

Survey Procedures

The general procedures followed in making this survey are described in the National Soils Handbook of the Soil Conservation Service.

Before the actual fieldwork began, the preliminary boundaries of slopes and of landforms were plotted stereoscopically on aerial photographs flown in 1974 at a scale of 1:800,000 and enlarged to a scale of 1:15,840. Topographic maps of the U.S. Geological Survey, at a scale of 1:24,000, and photographs were studied to relate land and image features.

Traverses were made on foot at intervals of about one-fourth mile. Traverses at closer intervals were made in the areas of high variability.

Soil examinations along the traverses were made 50 to 500 yards apart, depending on the landscape and the soil pattern. Observations of such items as landforms, trees blown down, vegetation, roadbanks, and animal burrows were made continuously without regard to spacing. Soil boundaries were determined on the basis of soil examinations, observations, and photo interpretation. The soil material was examined with the aid of a hand auger or a spade to a depth of about 6 feet or to sand if the sand was at a depth of less than 5 feet. The pedons described as typical were observed and studied in pits that were dug by field soil scientists.

The delineations of each map unit were chosen to be representative of the map unit and were transected to determine the composition of the map unit. The point-intercept method of transecting (3) was used in open areas. A random transect method (5) was used in forested areas and in areas of limited accessibility.

Samples of chemical and physical analyses were taken from the site of the typical pedon of the major soils in the survey area. The analyses were made by the Soils Laboratory of the Virginia Polytechnic Institute and State University, Blacksburg, Virginia. The results and the laboratory procedures can be obtained by request from the laboratory.

After the completion of soil mapping on aerial photographs, the map unit delineations were transferred by hand to orthophotographs at a scale of 1:15,840. Surface drainage was mapped in the field. Cultural features were transferred from 7 1/2-minute topographic maps of the U.S. Geological Survey and were recorded from visual observations.

There are areas along the borders of Isle of Wight County where the boundaries on the general soil map and the names of general soil map units do not match those of adjoining counties. These discrepancies exist because of differences in the detail of mapping, changes in soil classification, and different proportions of the same soil in adjoining counties. Where some of these conditions exist, the adjoining counties match with similar kinds of soils.

General Soil Map Units

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

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

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

Soil Descriptions

1. Chipley-Alaga

Moderately well drained and somewhat excessively drained, nearly level to gently sloping, sandy soils; on terraces and uplands

These soils are on narrow to broad terraces adjacent to flood plains (fig. 2). Some areas are subject to occasional flooding.

This map unit makes up about 4 percent of the survey area. It is about 32 percent Chipley soils, 22 percent Alaga soils, and 46 percent minor soils.

Chipley soils are moderately well drained. The surface layer is dark gray sand. The substratum is pale yellow to light yellowish brown, mottled sand.

Alaga soils are somewhat excessively drained. The surface layer is brown fine sand. The substratum is light yellowish brown to pale brown loamy fine sand.

The minor soils are the very poorly drained Nawney and Kinston soils on flood plains and drainageways, the poorly drained Leon soils on broad ridges and along drainageways, and the moderately well drained Slagle soils on narrow ridges.

About 10 percent of the acreage of this unit is cleared and is used for cultivated crops. Most of the uncleared acreage consists of narrow, gently sloping and nearly level ridgetops separated by drainageways and flood plains. The uncleared areas generally are in mixed hardwoods and loblolly pine.

These soils are poorly suited to cultivated crops. Droughtiness and the low natural fertility are the main limitations for farming.

These soils are suitable for trees. Productivity is moderate. Droughtiness and the low natural fertility are the main limitations in woodland management.

These soils are well suited to sanitary facilities and to building site development except in areas that are subject to flooding. Droughtiness and seepage are the main limitations.

2. Slagle-Uchee-Yemassee

Moderately well drained, well drained, and somewhat poorly drained, nearly level to gently sloping, loamy soils; on dissected uplands

These soils are on nearly level to gently sloping, narrow to very broad ridgetops and gently sloping side slopes of intervening drainageways that dissect the uplands. Slopes generally range from 0 to 6 percent.

This map unit makes up about 56 percent of the survey area. It is about 50 percent Slagle soils, 16 percent Uchee soils, 4 percent Yemassee soils, and 30 percent minor soils.

Slagle soils are on nearly level to gently sloping, narrow to very broad, slightly convex ridgetops and gently sloping side slopes. They are moderately well drained. The surface layer is dark grayish brown fine sandy loam. The subsoil is yellowish brown to light olive brown, mottled sandy clay loam.

Uchee soils are on nearly level to gently sloping, narrow to very broad, slightly convex ridgetops and gently sloping side slopes. They are well drained. The surface layer is very dark grayish brown to yellowish brown loamy sand 20 to 40 inches thick. The subsoil is yellowish brown sandy clay loam that is mottled in the lower part.

Yemassee soils are on nearly level, very broad ridgetops. They are somewhat poorly drained. The subsoil is dark grayish brown fine sandy loam. The subsoil is light yellowish brown and mottled in the upper part and gray and mottled in the lower part. It is clay loam.

The minor soils are the poorly drained Kinston soils in depressions and around heads of drainageways, the

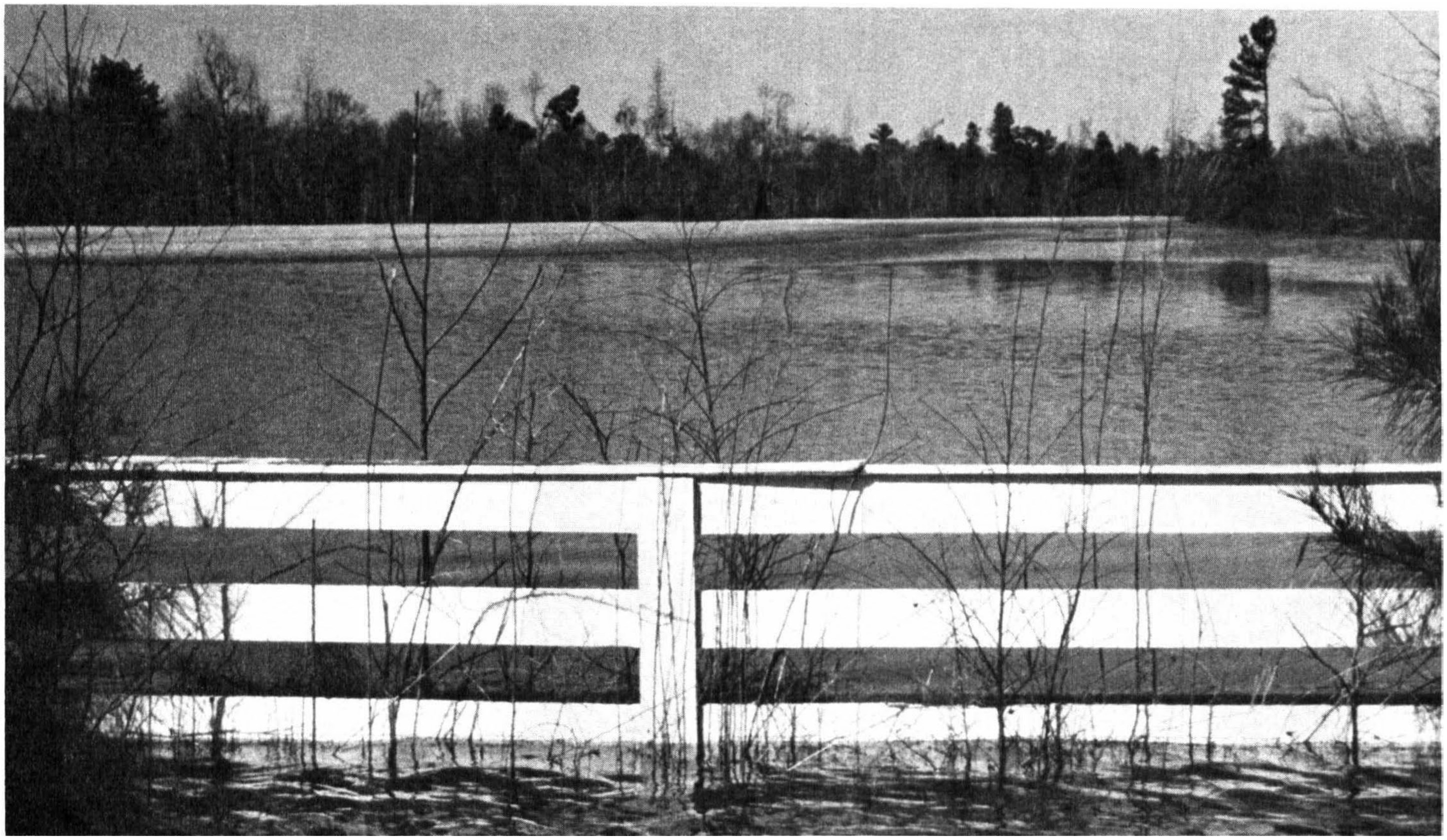


Figure 2.—Flooding in an area of Chipley sand. Alaga fine sand is on the ridgetop in the background.

poorly drained Myatt soils on broad flats, the well drained Emporia soils on heads of slopes, and the moderately well drained Nevarc soils and the well drained and somewhat excessively drained Remlik soils on moderately steep to very steep slopes along the major creeks and drainageways.

About 50 percent of the acreage of this unit is cleared. Of this, about 95 percent is used for cultivated crops. The most common crops are corn, peanuts, and soybeans. The uncleared acreage consists of broad, wet flats, wet areas along drainageways, and sloping and steep side slopes along the major creeks and drainageways. These uncleared areas generally are managed for loblolly pine or are in mixed hardwoods and pine.

These soils are suitable for trees. Loblolly pine grows well on the major soils in this map unit. Productivity is high. Restricted access of equipment during seasonal wetness is the main limitation in woodland management on these soils.

These soils are moderately well suited to sanitary facilities and to building site development. Seasonal wetness is the main limitation.

3. Myatt-Yemassee

Poorly drained and somewhat poorly drained, nearly level, loamy soils; on broad, flat uplands

These soils are in broad areas separated by major creeks and by the better drained soils adjacent to the creeks (fig. 3). This map unit makes up about 27 percent of the survey area. It is about 55 percent Myatt soils, 18 percent Yemassee soils, and 27 percent minor soils.

Myatt soils are poorly drained. The surface layer is very dark gray fine sandy loam. The subsoil is gray, mottled sandy clay loam.

Yemassee soils are somewhat poorly drained. The surface layer is dark grayish brown fine sandy loam. The subsoil is light yellowish brown and mottled in the upper part and gray and mottled in the lower part. It is sandy clay loam.

The minor soils are the moderately well drained Slagle soils in the higher areas in the unit and, along with the well drained Uchee soils, in the lower positions around the edges of the unit.

About 10 percent of the acreage of this unit is cleared. Of this, about 75 percent is artificially drained and is used for cultivated crops. The most common crops are corn and soybeans. The uncleared acreage consists of broad flats that are managed for loblolly pine or that are in mixed hardwoods and loblolly pine.

These soils are suitable for trees. Loblolly pine, red maple, and sweetgum grow well on the major soils in the unit. Productivity is moderately high. Restricted access of equipment during seasonal wetness is the main limitation in woodland management.

These soils are poorly suited to sanitary facilities and to building site development. Seasonal wetness is the main limitation.

4. Rumford-Kenansville

Somewhat excessively drained and well drained, nearly level to gently sloping, loamy soils; on the Suffolk Scarp

These soils are on broad, slightly convex ridgetops and narrow upland flats. This map unit makes up about 2 percent of the survey area. It is about 34 percent Rumford soils, 33 percent Kenansville soils, and 33 percent minor soils.

Rumford soils are on broad ridgetops. They are somewhat excessively drained. The surface layer is brown loamy sand. The subsoil is brown, mottled sandy loam and sand.

Kenansville soils are on narrow upland flats and on broad ridgetops. They are well drained. The surface layer is brown loamy sand 20 to 40 inches thick. The subsoil is brown sandy loam and sand.

The minor soils are the somewhat excessively drained Alaga soils scattered randomly throughout the unit, the well drained Uchee soils in lower positions within the unit and around the edges of the unit, and the somewhat poorly drained Yemassee soils in depressions.

About 95 percent of the acreage of this unit is cleared. Nearly all of the cleared land is used for cultivated crops. The most common crops are peanuts, soybeans, and corn. The uncleared acreage consists of steeply sloping areas and heads of drains that generally are not managed for timber production. The uncleared acreage is in mixed hardwoods and pine.

These soils are suitable for trees. Loblolly pine, red and white oak, and poplar grow well on the major soils in the unit. Productivity is moderately high.

These soils are well suited to sanitary facilities and to building site development.

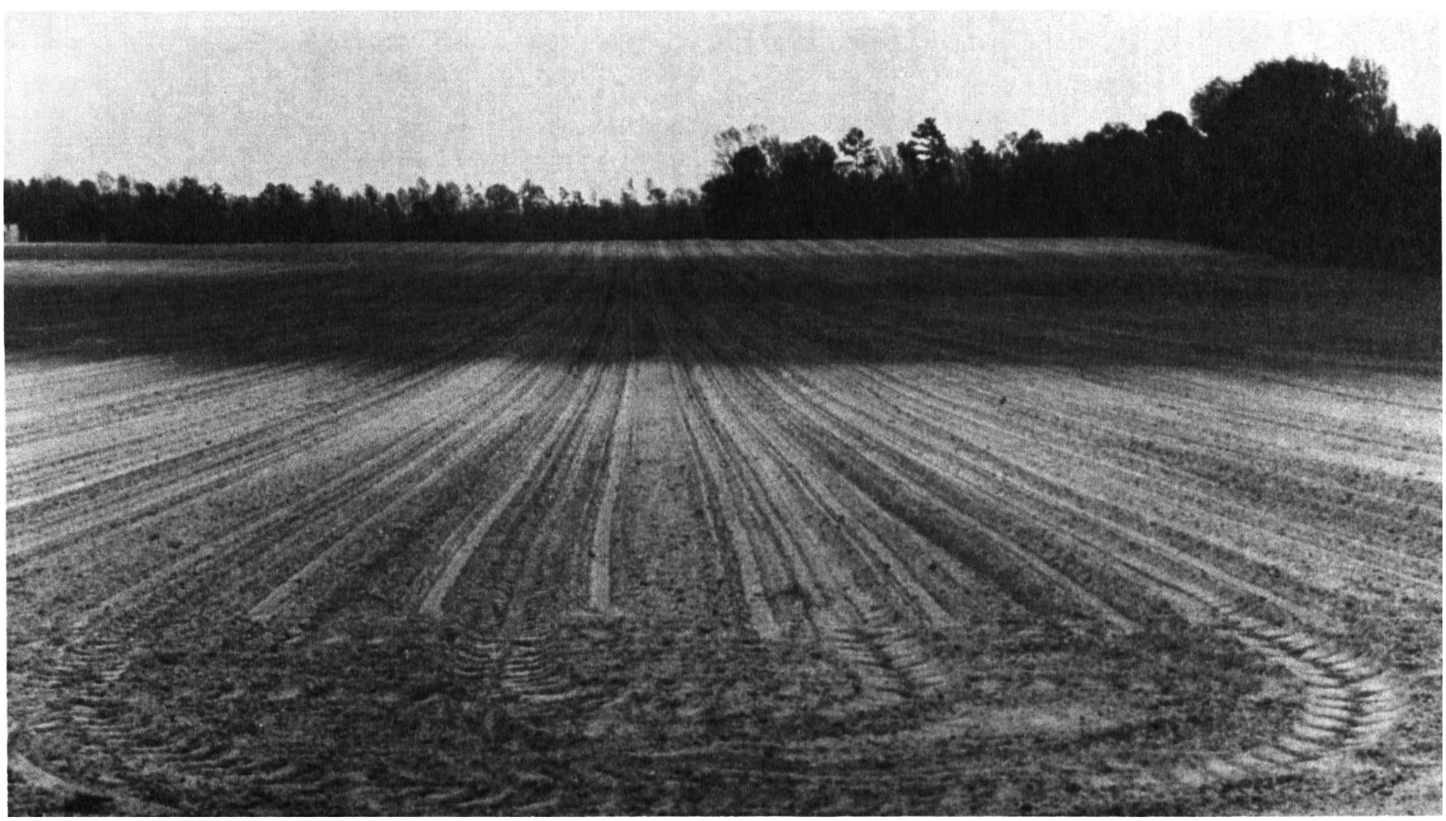


Figure 3.—Yemassee fine sandy loam is in the light-colored area in the foreground; Myatt fine sandy loam is in the dark-colored area in the middleground; and Slagle fine sandy loam, 2 to 6 percent slopes, is on the ridge in the background.

5. Peawick-Chickahominy

Moderately well drained and poorly drained, nearly level to gently sloping, clayey soils; on broad, flat uplands

These soils are in broad areas. This map unit makes up about 8 percent of the survey area. It is about 63 percent Peawick soils, 16 percent Chickahominy soils, and 21 percent minor soils.

Peawick soils are on nearly level to gently sloping, narrow to very broad, slightly convex ridgetops and gently sloping side slopes. They are moderately well drained. The surface layer is dark gray silt loam. The subsoil is yellowish brown, mottled silty clay and clay loam.

Chickahominy soils are on nearly level, broad flats. They are poorly drained. The surface layer is dark gray silt loam. The subsoil is gray, mottled silty clay.

The minor soils are the moderately well drained Slagle soils on the edges of the unit, the somewhat poorly drained Yemassee soils scattered randomly throughout the unit, and the moderately well drained Nevarc soils and the well drained and somewhat excessively drained Remlik soils on moderately steep to very steep slopes along the major creeks and drainageways.

About 35 percent of the acreage of this unit is cleared. Of this, about 10 percent is used for pasture and about 60 percent is used for cultivated crops. The most common crops are corn and soybeans. The uncleared acreage consists of broad flats and gently sloping areas that are managed for loblolly pine or are in mixed hardwoods and loblolly pine.

These soils are suitable for trees. Loblolly pine, red maple, and sweetgum grow well on the major soils in the unit. Productivity is moderately high.

Restricted access of equipment during seasonal wetness is the main limitation in woodland management.

These soils are poorly suited to sanitary facilities and to building site development. Seasonal wetness and permeability are the main limitations.

6. Bohicket-Rappahannock

Very poorly drained, nearly level, clayey and mucky soils; in tidal marshes

These soils are in winding areas along tidal creeks and in broad areas adjacent to the James River. This map unit makes up about 3 percent of the survey area. It is about 44 percent Bohicket soils, 25 percent Rappahannock soils, and 31 percent minor soils.

Bohicket soils are along tidal creeks and are subject to tidal inundation. The surface layer is dark gray silty clay loam. The subsoil is gray silty clay.

Rappahannock soils are adjacent to the James River and are also subject to tidal inundation. The surface layer is very dark gray muck. The substratum is gray silty clay loam.

The minor soils are the moderately well drained Slagle and Peawick soils and the somewhat excessively drained Alaga soils on higher landscapes within or surrounding the unit.

The soils making up this map unit are poorly suited to most uses other than as habitat for wetland wildlife.

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, Slagle fine sandy loam, 2 to 6 percent slopes, is one of several phases in the Slagle series.

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

A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Peawick-Slagle complex, 2 to 6 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils in a mapped area are not uniform. An area can be made up of only one of the major soils, or it can be made up of all of them. Nevarc and Remlik soils, 15 to 60 percent slopes, is an undifferentiated group in this survey area.

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

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Urban 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

1—Alaga fine sand. This is a very deep, somewhat excessively drained, nearly level to gently sloping soil on low ridges. Areas range from about 3 to 50 acres. Slopes range from 0 to 4 percent.

Typically, the surface layer is brown fine sand 3 inches thick. The substratum is light yellowish brown loamy fine sand to a depth of 30 inches and pale brown loamy fine sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Emporia soils on side slopes, Leon soils in depressions and drainageways, and Nawney soils on flood plains. The included soils make up 10 to 20 percent of the map unit.

Permeability of this Alaga soil is rapid. The available water capacity is low. Runoff is slow. Natural fertility and organic matter content are low. Shrink-swell potential is low. The root zone is more than 60 inches deep. In unlimed areas the surface layer and substratum are strongly acid or moderately acid. The seasonal high water table is more than 72 inches below the surface.

This soil is used mainly as woodland.

This soil is moderately well suited to cultivated crops. The low natural fertility, the low organic matter content, the low available water capacity, and acidity are limitations. The hazard of erosion is slight. The soil tilth is good. Applications of fertilizers and lime and seasonal moisture changes result in fluctuations in the levels of available plant nutrients in the sandy surface layer. Applications of fertilizers, especially nitrogen, during the growing season are needed rather than a single application in early spring. Calcium and magnesium levels in the soil fluctuate widely; thus, yearly or biyearly, small applications of lime are needed.

This soil is poorly suited to pasture grasses and legumes. The low natural fertility, the low organic matter content, the low available water capacity, and acidity are limitations. Suitable pasture management practices are maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizers.

Potential productivity for loblolly pine is moderately high. This soil is easily managed for timber. The rate of seedling mortality is increased by the low available moisture during droughty periods.

Seepage, the sandy substratum, and sloughing of excavation walls are limitations to use of this soil as sites for buildings, and sanitary facilities. This soil is well suited to use as sites for septic tank absorption fields, dwellings without basements, and local roads and streets. If this soil is used for onsite sewage or waste disposal, the ground water can be polluted because of the rapid permeability in the sandy substratum.

This soil is in capability subclass IIIs.

2—Bohicket silty clay loam. This is a very deep, very poorly drained soil in level tidal marshes along the major creeks. The soil is covered twice daily by brackish water and is continuously waterlogged (fig. 4). Areas range from about 10 to 250 acres. Slopes range from 0 to 1 percent.

Typically, the surface layer is dark gray silty clay loam 11 inches thick. The substratum is very dark gray silty clay that has pockets of silt loam to a depth of 19 inches, greenish gray silty clay that has pockets of light gray sandy loam to a depth of 43 inches, and dark greenish gray clay to a depth of 60 inches or more.

Figure 4.—Bohicket silty clay loam, which is continuously wet, is flooded twice daily by brackish tidal water. In most places plant growth is limited to saltwater-tolerant grasses.

Included with this soil in mapping are small areas of Alaga soils on higher landscapes and Rappahannock soils in tidal marshes. The included soils make up 10 to 30 percent of the map unit.

Permeability of this Bohicket soil is very slow. The available water capacity is very low. Runoff is slow. Natural fertility is low, and organic matter content is high. Shrink-swell potential is high. The root zone is limited by the water table and brackish water; consequently, roots generally remain near the surface. In unlimed areas the surface layer and subsoil are extremely acid to moderately alkaline. In some places tidal water is as much as 36 inches deep during an exceptional high tide.

This soil is well suited to use as habitat for wetland wildlife. The soil generally is not suited to most other uses. Most areas are covered by big cordgrass, reeds, cattails, arrowleaf, rushes, and other aquatic plants (fig. 4).

This soil is in capability subclass VIIIw.

3—Chickahominy silt loam. This is a very deep, poorly drained, and nearly level soil on upland flats. Areas range from about 10 to 120 acres. This soil is subject to ponding. Slopes range from 0 to 2 percent.

Typically, the surface layer is very dark gray silt loam 2 inches thick. The subsoil is gray, mottled silty clay to a depth of 18 inches, dark gray, mottled clay to a depth of 33 inches, and light brownish gray, mottled silty clay to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Kinston soils in drainageways and Peawick soils on higher landscapes near drainageways. The included soils make up 10 to 20 percent of the map unit.

Permeability of this Chickahominy soil is very slow. The available water capacity is moderate. Runoff is slow. Natural fertility and organic matter content are low. Shrink-swell potential is high. The root zone is more than 60 inches deep. In unlimed areas the surface layer and subsoil are extremely acid to strongly acid. The seasonal high water table is between the surface and a depth of 6 inches in winter and early spring.

This soil is used mainly as woodland.

This soil is poorly suited to cultivated crops. Crop production is limited by the low natural fertility, wetness, and acidity. The hazard of erosion is slight. The soil tilth is fair. Working the soil when wet causes clods to form and reduces plant stands because of poor conditions for seed germination. Working the soil when wet also reduces the grade of peanuts because of higher percentages of foreign material mixed in with the peanuts. Field losses of peanuts resulting from broken pegs are increased if the sticky surface layer and subsoil, cling to the peanuts.

In some places low yields are the result of the high level of exchangeable aluminum in this acid soil. Crop yields are increased by applications of lime and fertilizers. Installing drainage to lower the seasonal high water table can improve soil productivity.

This soil is moderately well suited to pasture grasses and legumes. The low natural fertility, the moderate available water capacity, and acidity are limitations. Suitable pasture management practices are maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizers.

Potential productivity for loblolly pine is high. Wetness and the clayey subsoil limit the use of equipment in woodland management. Plant competition interferes with the establishment of desirable timber species.

Wetness, the very slow permeability of the subsoil, shrink-swell potential, and the low strength are limitations to use of this soil as sites for buildings, sanitary facilities, including septic tank absorption fields, dwellings without basements, and local roads and streets.

This soil is in capability subclass IVw.

4—Chipley sand. This is a very deep, moderately well drained, nearly level to gently sloping soil on ridges and in depressions adjacent to flood plains. Areas range from about 3 to 50 acres. Slopes range from 0 to 4 percent.

Typically, the surface layer is mottled dark gray, gray, and dark grayish brown sand 6 inches thick. The substratum is mottled sand more than 54 inches thick. It is pale yellow to a depth of 12 inches, light yellowish brown to a depth of 25 inches, pale yellow to a depth of 36 inches, and very pale brown to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Kinston soils in drainageways, Leon soils scattered randomly throughout the mapped areas, and Nawney soils on flood plains. The included soils make up 10 to 30 percent of the map unit.

Permeability of this Chipley soil is rapid. The available water capacity is low. Runoff is slow. Natural fertility is low and organic matter content is moderate. Shrink-swell potential is low. The root zone is more than 60 inches deep. In unlimed areas the surface layer and subsoil are very strongly acid to moderately acid. The seasonal high water table is 24 to 36 inches below the surface in winter.

This soil is used mainly as woodland.

This soil is poorly suited to cultivated crops because of the sandy layers, the low available water capacity, the low natural fertility, the low organic matter content, and acidity. The hazard of erosion is slight. The soil tilth is good. Applications of fertilizers and lime and seasonal moisture changes result in fluctuations in the levels of available plant nutrients in the sandy surface layer. Applications of fertilizers, especially nitrogen, during the growing season are needed rather than a single application in early spring. Calcium and magnesium levels in the soil fluctuate widely; thus, yearly or biyearly, small applications of lime are needed.

This soil is moderately well suited to pasture grasses and legumes. The low natural fertility, the low organic matter content, and acidity are limitations. Suitable pasture management practices are maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizers.

Potential productivity for loblolly pine is high. This soil is easily managed for timber. The rate of seedling mortality is increased by moisture stress during droughty periods.

Seepage, wetness, the sandy substratum, and sloughing of excavation walls are limitations to use of this soil as sites for buildings, sanitary facilities, including septic tank absorption fields, dwellings without basements, and local roads and streets. If this soil is used for onsite sewage or waste disposal, the ground water can be polluted because of the rapid permeability in the sandy substratum.

This soil is in capability subclass IIIs.

5A—Emporia fine sandy loam, 0 to 2 percent slopes. This is a very deep, well drained, and nearly level soil on broad ridgetops. Areas range from about 3 to 50 acres.

Typically, the surface layer is mottled dark grayish brown and light brownish gray fine sandy loam to a depth of 3 inches. The subsurface layer is light yellowish brown, mottled fine sandy loam to a depth of 15 inches. The subsoil is more than 45 inches thick. It is yellowish brown sandy clay loam to a depth of 33 inches, yellowish brown, mottled sandy loam to a depth of 40 inches, and yellowish brown, mottled sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Nawney soils on flood plains, Uchee soils scattered randomly throughout the mapped areas, and Yemassee soils in depressions and along drainageways. The included soils make up 10 to 20 percent of the map unit.

Permeability of this Emporia soil is moderately slow or moderate. The available water capacity is moderate. Runoff is slow. Natural fertility and organic matter content are low. Shrink-swell potential is moderate. The root zone is more than 60 inches deep. In unlimed areas the surface layer and subsoil are very strongly acid or strongly acid. The seasonal high water table is 36 to 50 inches below the surface in winter.

This soil is used mainly for cultivated crops.

This soil is well suited to cultivated crops, especially peanuts, corn, and soybeans. Crop production is limited by the low natural fertility, the low organic matter content, and acidity. The hazard of erosion is slight. The soil tilth is good.

This soil is well suited to pasture grasses and legumes. The low natural fertility, the low organic matter content, and acidity are limitations. Suitable pasture management practices are maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizers.

Potential productivity for loblolly pine is moderately high. This soil is easily managed for timber. In some places plant competition interferes with the establishment of desirable timber species.

The moderately slow permeability in the subsoil, wetness, and the low strength are limitations to use of this soil as sites for buildings, sanitary facilities, including septic tank absorption fields, dwellings without basements, and local roads and streets. Some areas of this soil on islands adjacent to the James River are subject to flooding.

This soil is in capability subclass I.

5B—Emporia fine sandy loam, 2 to 6 percent slopes. This is a very deep, well drained, and gently sloping soil on upland ridges and side slopes. Areas range from about 2 to 30 acres.

Typically, the surface layer is mottled dark grayish brown and light brownish gray fine sandy loam to a depth of 3 inches. The subsurface layer is light yellowish brown, mottled fine sandy loam to a depth of 15 inches. The subsoil is more than 45 inches thick. It is yellowish brown sandy clay loam to a depth of 33 inches, yellowish brown, mottled sandy loam to a depth of 40 inches, and yellowish brown, mottled sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Nawney soils on flood plains, Uchee soils scattered randomly throughout the mapped areas, and Yemassee soils in depressions and along drainageways. The included soils make up 10 to 20 percent of the map unit.

Permeability of this Emporia soil is moderately slow or moderate. The available water capacity is moderate. Runoff is medium. Natural fertility and organic matter content are low. Shrink-swell potential is moderate. The root zone is more than 60 inches deep. In unlimed areas the surface layer and subsoil are very strongly acid or strongly acid. The seasonal high water table is 36 to 50 inches below the surface in winter.

This soil is used mainly for cultivated crops.

This soil is well suited to cultivated crops, especially peanuts, corn, and soybeans. Crop production is limited by the low natural fertility, the low organic matter content, and acidity. The hazard of erosion is slight. The soil tilth is good. Contour cultivation, conservation tillage, and a conservation cropping system that includes grasses and legumes help to reduce runoff and to control erosion. Cover crops help to control wind and water erosion.

This soil is well suited to pasture grasses and legumes. The low natural fertility, the low organic matter content, and acidity are limitations. Suitable pasture management practices are maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizers.

Potential productivity for loblolly pine is moderately high. This soil is easily managed for timber. In some places plant competition interferes with the establishment of desirable timber species.

The moderately slow permeability in the subsoil, wetness, and the low strength are limitations to use of this soil as sites for buildings, sanitary facilities, including septic tank absorption fields, dwellings without basements, and local roads and streets.

This soil is in capability subclass IIe.

6—Kenansville loamy sand. This is a very deep, well drained, and nearly level to gently sloping soil on low ridges. Areas range from about 3 to 30 acres. Slopes range from 0 to 4 percent.

Typically, the surface layer is brown loamy, mottled sand to a depth of 5 inches. The subsurface layer is light yellowish brown loamy sand to a depth of 28 inches. The subsoil is 21 inches thick. It is yellowish brown, mottled sandy loam to a depth of 32 inches, yellowish brown sandy loam to a depth of 41 inches, and yellowish brown loamy sand to a depth of 49 inches. The substratum is brownish yellow, mottled sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Alaga soils scattered randomly throughout the mapped areas, Kinston soils in depressions and drainageways, and Nawney soils on flood plains. The included soils make up 10 to 30 percent of the map unit.

Permeability of this Kenansville soil is moderately rapid in the upper part of the subsoil and rapid in the lower part and in the substratum. The available water capacity is low. Runoff is slow. Natural fertility and organic matter content are low. Shrink-swell potential is low. The root zone is more than 60 inches deep. In unlimed areas the surface layer and subsoil are very strongly acid or strongly acid.

This soil is used mainly for cultivated crops and as woodland.

This soil is well suited to cultivated crops. Droughtiness, wind erosion, the low available water capacity, the low natural fertility, the low organic matter content, and acidity are limitations. The hazard of erosion is moderate. The soil tilth is good. Applications of fertilizers and lime and seasonal moisture changes result in fluctuations in the levels of available plant nutrients in the sandy surface layer. Applications of fertilizers, especially nitrogen, during the growing season are needed rather than a single application in early spring. Calcium and magnesium levels in the soil fluctuate widely; consequently, yearly or biyearly, small applications of lime are needed. Contour cultivation, conservation tillage, and a conservation cropping system that includes grasses and legumes help to reduce runoff and to control erosion. Cover crops help to control wind erosion.

This soil is moderately well suited to pasture grasses and legumes. The low natural fertility, the low organic matter content, and acidity are limitations. Suitable pasture management practices are maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizers.

Potential productivity for loblolly pine is moderately high. This soil is easily managed for timber. The rate of seedling mortality is increased by moisture stress during droughty periods.

Seepage, the low strength, and sloughing of excavation walls are limitations to use of this soil as sites for buildings, sanitary facilities, including septic tank absorption fields, dwellings without basements, and local roads and streets. If this soil is used for onsite sewage or waste disposal, the ground water can be polluted because of the rapid permeability in the sandy part of the subsoil and in the sandy substratum. Some areas of this soil adjacent to the Blackwater River are subject to flooding for brief periods.

This soil is in capability subclass IIs.

7—Kinston loam. This is a very deep, poorly drained, and nearly level to gently sloping soil in drainageways and depressions. Areas range from about 3 to 150 acres. These soils are subject to frequent flooding. Slopes range from 0 to 4 percent.

Typically, the surface layer is dark grayish brown loam to a depth of 4 inches. The subsurface layer is dark grayish brown, mottled fine sandy loam to a depth of 9 inches. The substratum is grayish brown, mottled sandy clay loam to a depth of 22 inches, very dark grayish brown, mottled sandy clay loam to a depth of 28 inches, grayish brown, mottled sandy loam to a depth of 34 inches, and very dark grayish brown, mottled sandy loam to a depth of 47 inches. Below that, it is gray sandy clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Alaga soils on stream terraces and Slagle and Yemassee soils along drainageways. The included soils make up about 10 to 20 percent of the map unit.

Permeability of this Kinston soil is moderate. The available water capacity is high. Runoff is slow. Natural fertility is low and organic matter content is moderate. Shrink-swell potential is low. In places the root zone is limited because of wetness. In unlimed areas the surface layer and subsoil are very strongly acid or strongly acid. The seasonal high water table is between the surface and a depth of 12 inches in winter and early spring.

This soil is used mainly as woodland.

This soil is not suited to cultivated crops because of wetness and flooding. Crop production is also limited by the low natural fertility and acidity. The soil tilth is good. In some places drainage is needed.

This soil is poorly suited to pasture grasses and legumes. Wetness, the low natural fertility, and acidity are limitations. Suitable pasture management practices are maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizers.

Potential productivity for loblolly pine is very high. Wetness and flooding limit the use of equipment and increase the rate of seedling mortality. Plant competition interferes with the establishment of desirable timber species.

Flooding, wetness, the low strength, and sloughing of excavation walls are limitations to use of this soil as sites for buildings, sanitary facilities, including septic tank absorption fields, dwellings without basements, and local roads and streets.

This soil is in capability subclass VIw.

8—Leon-Chipley sands. This complex consists of the very deep, poorly drained Leon soil and the deep, moderately well drained Chipley soil in nearly level and hummocky areas. It is about 45 percent Leon soil, 30 percent Chipley soil, and 25 percent other soils. These soils are so intermingled or are in areas so small that it was not practical to map them separately. Areas range from about 5 to 150 acres. Slopes range from 0 to 4 percent.

Typically, the surface layer of the Leon soil is dark gray sand to a depth of 6 inches. The subsurface layer is light gray, mottled sand to a depth of 22 inches. The subsoil is 38 inches thick. It is dark reddish brown very firm sand to a depth of 29 inches, yellowish brown, mottled sand to a depth of 36 inches, and dark brown sand to a depth of 41 inches. Below that, it is pale brown, mottled sand to a depth of 60 inches or more.

Typically, the surface layer of the Chipley soil is mottled dark gray, gray, and dark grayish brown sand 6 inches thick. The substratum is mottled sand. It is pale yellow to a depth of 12 inches, light yellowish brown to a depth of 25 inches, pale yellow to a depth of 36 inches, and very pale brown to a depth of 60 inches or more.

Included with these soils in mapping are small areas of Alaga soils on the higher parts of the landscape, Kinston soils in drainageways, and Nawney soils on flood plains. The included soils make up 5 to 10 percent of the map unit.

Permeability of the Leon soil is moderate or moderately rapid, and that of the Chipley soil is rapid. The available water capacity is low. Runoff is slow. Natural fertility is low, and organic matter content is moderate. Shrink-swell potential is low. In places the root zone is limited because of wetness or the firm subsoil. In unlimed areas the surface layer and subsoil of the Leon soil are extremely acid to strongly acid, and those of the Chipley soil are very strongly acid to moderately acid. In winter and early spring, the seasonal high water table of the Leon soil is between the surface and a depth of 12 inches and that of the Chipley soil is 24 to 36 inches below the surface.

These soils are used mainly as woodland.

These soils are poorly suited to cultivated crops because of the low available water capacity and the rapid permeability in the Chipley soil. Crop production is limited by the low natural fertility and by acidity. The hazard of erosion is slight. The soil tilth is good. Applications of fertilizers and lime and seasonal moisture changes result in fluctuations in the levels of available plant nutrients in the sandy surface layer. Consequently, applications of fertilizers, especially nitrogen, during the growing season are needed rather than a single application in early spring. Calcium and magnesium levels in the soils fluctuate widely; thus, yearly or biyearly, small applications of lime are needed.

These soils are moderately well suited to pasture grasses and legumes. The low natural fertility, wetness, the low organic matter content, and acidity are limitations. Suitable pasture management practices are maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizers.

Potential productivity for timber is moderate on the Leon soil and high on the Chipley soil. These soils are easily managed for timber. Wetness limits the use of equipment during some parts of the year.

Wetness, seepage, the sandy subsoil or substratum, and sloughing of excavation walls are limitations to use of these soils as sites for buildings, development; sanitary facilities, including septic tank absorption fields, dwellings without basements, and local roads and streets. If the Chipley soil is used for onsite sewage or waste disposal, the ground water can be polluted because of the rapid permeability in the sandy substratum. In some areas adjacent to the Blackwater River, the soils are subject to flooding for brief periods.

The soils are in capability subclass IVw.

9—Myatt fine sandy loam. This is a very deep, poorly drained, and nearly level soil on broad flats and in depressions. Areas range from about 40 to 2,500 acres. Slopes range from 0 to 2 percent. This soil is subject to ponding.

Typically, the surface layer is very dark gray fine sandy loam to a depth of 6 inches. The subsurface layer is light brownish gray, mottled fine sandy loam to a depth of 15 inches. The subsoil is 36 inches thick. It is gray, mottled sandy clay loam to a depth of 51 inches. The substratum, to a depth of 60 inches or more, is gray, mottled sandy clay loam.

Included with this soil in mapping are small areas of Slagle and Yemassee soils in the higher places in the mapped areas and in the lower positions around the edges of the mapped areas. Also included are small depressions 1/2 acre to 2 acres in size. The depressions are usually covered by 1 foot to 3 feet of water for 3 to 7 months of the year and after prolonged rains throughout the year.

Permeability of this Myatt soil is moderately slow or moderate. The available water capacity is high. Runoff is very slow. Natural fertility and organic matter content are low. Shrink-swell potential is low. The root zone is more than 60 inches deep. In unlimed areas the surface layer and subsoil are extremely acid to strongly acid. The seasonal high water table is between the surface and a depth of 12 inches in winter and early spring.

This soil is used mainly as woodland.

If this soil is drained, it is well suited to cultivated crops. Crop production is limited by the low natural fertility, wetness, and acidity. The hazard of erosion is slight. The soil tilth is good. Crops can be damaged by ponding after heavy rains.

This soil is poorly suited to pasture grasses and legumes. The low natural fertility, wetness, and acidity are limitations. If the soil is drained, it is well suited. Suitable pasture management practices are maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizers.

Potential productivity for loblolly pine is high. Wetness and ponding limit the use of equipment and increase the rate of seedling mortality. Plant competition interferes with the establishment of desirable timber species.

Wetness and permeability are limitations to use of this soil as sites for buildings, sanitary facilities, including septic tank absorption fields, dwellings without basements, and local roads and streets.

This soil is in capability subclass IIIw.

10—Nawney loam. This is a very deep, very poorly drained, and nearly level soil on flood plains. Areas range from about 2 to 375 acres. Slopes range from 0 to 2 percent. This soil is frequently flooded.

Typically, the surface layer is very dark gray, mottled loam to a depth of 5 inches and olive gray, mottled loam to a depth of 10 inches. The substratum in the upper part is grayish brown, mottled loam to a depth of 30 inches, gray, mottled sandy loam that has pockets of sandy clay loam and clay loam to a depth of 35 inches, and gray, mottled fine sandy loam to a depth of 44 inches. In the lower part it is gray, mottled loamy sand to a depth of 54 inches and dark gray, mottled sandy clay loam that has pockets of clay loam and silty clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Chipley soils on stream terraces and small islands and Uchee and Yemassee soils along drainageways and on small islands. The included soils make up 5 to 10 percent of the map unit.

Permeability of this Nawney soil is moderate. The available water capacity is moderate. Runoff is very slow. Natural fertility is low, and organic matter content is moderate. Shrink-swell potential is moderate. Roots are limited because of wetness. In unlimed areas the surface layer and subsoil are extremely acid to slightly acid. The seasonal high water table is between 3 feet above the surface and 6 inches below the surface in winter and spring.

This soil is used mainly as woodland (fig. 5).

This soil is not suited to cultivated crops because of wetness and flooding.

This soil is not suited to pasture grasses and legumes because of wetness and flooding.

This soil is not suited to loblolly pine. Wetness and flooding limit the use of equipment and increase the rate of seedling mortality. Important timber species are cypress, water tupelo, and sweetgum.

Wetness and flooding are limitations to use of this soil for buildings, sanitary facilities, including septic tank absorption fields, dwellings without basements, and local roads and streets.

This soil is in capability subclass VIIw.

11E—Nevarc and Remlik soils, 15 to 60 percent slopes. This map unit consists of very deep, moderately steep to steep soils on side slopes along well incised drainageways and on very narrow ends of ridges. It is about 45 percent Nevarc soils, 35 percent Remlik soils, and 20 percent other soils. The Nevarc soils are moderately well drained, and the Remlik soils are well drained and somewhat excessively drained. One of these soils or both are in each mapped area. These soils were mapped together because they are similar in use and management. Areas range from about 2 to 150 acres.

Typically, the surface layer of the Nevarc soil is very dark grayish brown silt loam 4 inches thick. The subsoil is 53 inches thick. It is yellowish brown loam to a depth of 8 inches, yellowish brown, mottled silty clay to a depth of 23 inches, mottled yellowish brown, yellowish red, and gray clay loam to a depth of 36 inches, and mottled light olive brown, light brownish gray, and strong brown clay loam to a depth of 57 inches. The substratum is mottled light olive brown and gray sandy clay loam that has pockets of sandy loam to a depth of 60 inches or more.

Typically, the surface layer of the Remlik soil is mottled very dark grayish brown and brown loamy sand to a depth of 7 inches. The subsurface layer is yellowish brown, mottled loamy sand to a depth of 28 inches. The subsoil is 24 inches thick. It is yellowish brown sandy clay loam to a depth of 32 inches, yellowish brown, mottled sandy clay loam to a depth of 48 inches, and yellowish brown, mottled sandy loam to a depth of 52 inches. The substratum, to a depth of 60 inches or more, is grayish brown, mottled loamy sand.

Included with these soils in mapping are small areas of Nawney, Peawick, and Slagle soils. Peawick and Slagle soils are scattered throughout the mapped areas.

Figure 5.—Nawney loam is suited only to water-tolerant trees because of wetness.

Nawney soils are on flood plains. Also included, along streams, are narrow areas that have slopes of more than 35 percent. Most mapped areas have drainageways that are not delineated. The included soils make up 20 to 30 percent of the map unit.

Permeability of the Nevarc soils is slow and that of the Remlik soils is moderate or moderately rapid. The available water capacity is moderate. Runoff is rapid. Natural fertility and organic matter content are low. Shrink-swell potential of the Nevarc soils is moderate, and that of the Remlik soils is low. In some places root growth below a depth of 20 inches is restricted by the firm, massive layers in the subsoil. In unlimed areas the surface layer and subsoil are extremely acid to moderately acid. In winter the seasonal high water table of the Nevarc soils is 18 to 36 inches below the surface and that of the Remlik soils is more than 48 inches below the surface.

These soils are used mainly as woodland.

These soils are not suited to cultivated crops because of slope and the hazard of erosion.

These soils are poorly suited to pasture grasses and legumes. The low natural fertility, the low organic matter content, slope, droughtiness, and acidity are limitations. Suitable pasture management practices are maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizers.

Potential productivity for loblolly pine is moderately high. Slope is a limitation to use of equipment. Erosion is a severe hazard during timber harvest.

Slope, the slow permeability of the Nevarc soils, sloughing of excavation walls, wetness, the low strength, and seepage are limitations to use of this soil as sites for buildings, sanitary facilities, including septic tank absorption fields, dwellings without basements, and local roads and streets.

These soils are in capability subclass VIIe.

12A—Peawick silt loam, 0 to 2 percent slopes. This is a very deep, moderately well drained, and nearly level soil on upland flats and low ridgetops. Areas range from about 30 to 150 acres.

Typically, the surface layer is dark gray silt loam 4 inches thick. The subsoil is more than 66 inches thick. It is light olive brown silty clay loam to a depth of 8 inches, yellowish brown, mottled silty clay to a depth of 23 inches, mottled yellowish brown, yellowish red, and gray clay loam to a depth of 36 inches, mottled light olive brown, light brownish gray, and strong brown clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Chickahominy soils in depressions, Kinston soils in depressions and drainageways, and Slagle soils scattered randomly throughout the mapped areas and on points of slopes. The included soils make up 10 to 20 percent of the map unit.

Permeability of this Peawick soil is very slow. The available water capacity is medium. Runoff is slow. Natural fertility and organic matter content are low. Shrink-swell potential is high. In some places root growth is restricted below a depth of 20 inches by the firm, massive layers in the subsoil. In unlimed areas the surface layer and subsoil are extremely acid to strongly acid. The seasonal high water table is 18 to 36 inches below the surface in winter and early spring.

This soil is used mainly as woodland.

This soil is well suited to cultivated crops. Crop production is limited by the low natural fertility, the low organic matter content, and acidity. The hazard of erosion is slight. The soil tilth is fair. Working the soil when wet causes clods to form and reduces plant stands because of poor conditions for seed germination. Working the soil when wet also reduces the grade of peanuts because of higher percentages of foreign material mixed in with the peanuts.

Field losses of peanuts resulting from broken pegs are increased if the sticky surface layer and subsoil cling to the peanuts. Poor plant growth can be the result of the high content of exchangeable aluminum in this acid soil. Crop yields are increased by applications of lime and fertilizers.

This soil is moderately well suited to pasture grasses and legumes. The low natural fertility, the low organic matter content, and acidity are limitations. Suitable pasture management practices are maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizers.

Potential productivity for loblolly pine is moderately high. Wetness and the clayey subsoil limit the use of equipment in managing timber. Plant competition interferes with the establishment of desirable timber species.

Wetness, the very slow permeability in the subsoil, shrink-swell potential, and the low strength are limitations to use of this soil as sites for buildings, sanitary facilities, including septic tank absorption fields, dwellings without basements, and local roads and streets. Some areas of this soil on islands adjacent to the James River are subject to flooding.

This soil is in capability subclass IIw.

12B—Peawick silt loam, 2 to 6 percent slopes. This is a very deep, moderately well drained, and gently sloping soil on undulating ridgetops and side slopes. Areas range from about 1 to 20 acres.

Typically, the surface layer is dark gray silt loam 4 inches thick. The subsoil is more than 56 inches thick. It is light olive brown silty clay loam to a depth of 8 inches, light olive brown, mottled silty clay to a depth of 23 inches, mottled yellowish brown, yellowish red, and gray clay loam to a depth of 36 inches, mottled light olive brown, light brownish gray, and strong brown clay loam to a depth of 60 inches or more.

Included with this soil in mapping are Kinston soils in drainageways, Nawney soils on flood plains, and Slagle soils scattered randomly throughout the mapped areas and on points of slopes. The included soils make up 10 to 20 percent of the map unit.

Permeability of this Peawick soil is very slow. The available water capacity is moderate. Runoff is medium. Natural fertility and organic matter content are low. Shrink-swell potential is high. In some places root growth is restricted below a depth of 20 inches by the firm, massive layers in the subsoil. In unlimed areas the surface layer and subsoil are extremely acid through strongly acid. The seasonal high water table is 18 to 36 inches below the surface in winter and early spring.

This soil is used mainly as woodland.

This soil is well suited to cultivated crops. Crop production is limited by the low natural fertility, the low organic matter content, and acidity. The hazard of erosion is moderate. The soil tilth is fair. Working the soil when wet causes clods to form and reduces plant stands because of poor conditions for seed germination. Working the soil when wet also reduces the grade of peanuts because of the higher percentages of foreign material mixed in with the peanuts. Field losses of peanuts resulting from broken pegs are increased if the sticky surface layer and subsoil cling to the peanuts. Poor plant growth can be the result of the high levels of exchangeable aluminum in this acid soil. Crop yields are increased by applications of lime and fertilizers. Contour cultivation, conservation tillage, and a conservation cropping system that includes grasses and legumes help to reduce runoff and to control erosion. Cover crops help to control wind and water erosion.

This soil is moderately well suited to pasture grasses and legumes. The low natural fertility, the low organic matter content, and acidity are limitations. Suitable pasture management practices are maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizers.

Potential productivity for loblolly pine is moderately high. Wetness and the clayey subsoil limit the use of equipment in managing timber. Plant competition interferes with the establishment of desirable timber species.

Wetness, the very slow permeability in the subsoil, shrink-swell potential, and the low strength are limitations to use of this soil as sites for building site development, sanitary facilities, including septic tank absorption fields, dwellings without basements, and local roads and streets.

This soil is in capability subclass IIe.

12C—Peawick silt loam, 6 to 10 percent slopes. This is a very deep, moderately well drained, and strongly sloping soil on side slopes and undulating ridges. Areas range from about 2 to 50 acres.

Typically, the surface layer is dark gray silt loam 4 inches thick. The subsoil is more than 56 inches thick. It is light olive brown silty clay loam to a depth of 8 inches, yellowish brown, mottled silty clay to a depth of 23 inches, mottled yellowish brown, yellowish red, and gray clay loam to a depth of 36 inches, and mottled light olive brown, light brownish gray, and strong brown clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Nawney soils on flood plains and Slagle and Uchee soils scattered randomly throughout the mapped areas and on points of slopes.

Permeability of this Peawick soil is very slow. The available water capacity is medium. Runoff is rapid. Natural fertility and organic matter content are low. Shrink-swell potential is high. In some places the root zone is restricted below a depth of 20 inches by the firm, massive layers in the subsoil. In unlimed areas the surface layer and subsoil are extremely acid through strongly acid. The seasonal high water table is 18 to 36 inches below the surface in winter and early spring.

This soil is used mainly as woodland.

This soil is moderately well suited to cultivated crops. Crop production is limited by the low natural fertility, the low organic matter content, slope, and acidity. The hazard of erosion is severe. The soil tilth is fair. Working the soil when wet causes clods to form and reduces plant stands because of the poor conditions for seed germination. Working the soil when wet also reduces the grade of peanuts because of the higher percentages of foreign material mixed in with the peanuts. Field losses of peanuts resulting from broken pegs are increased if the sticky surface layer and subsoil cling to the peanuts. The poor plant growth can be the result of the high levels of exchangeable aluminum in this acid soil. Crop yields are increased by applications of lime and fertilizers. Contour cultivation, conservation tillage, and a conservation cropping system that includes grasses and legumes help to reduce runoff and to control erosion. Cover crops help to control wind and water erosion.

This soil is moderately well suited to pasture grasses and legumes. The low natural fertility, the low organic matter content, and acidity are limitations. Suitable pasture management practices are maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizers.

Potential productivity for loblolly pine is moderately high. Wetness and the clayey subsoil limit the use of equipment in managing timber. Plant competition interferes with the establishment of desirable timber species.

Wetness, the very slow permeability in the subsoil, shrink-swell potential, and the low strength are limitations to use of this soil as sites for buildings, sanitary facilities, including septic tank absorption fields, dwellings without basements, and local roads and streets.

This soil is in capability subclass IIIe.

13B3—Peawick clay loam, 2 to 6 percent slopes, severely eroded. This is a very deep, moderately well drained, and gently sloping soil on side slopes. Areas range from about 2 to 13 acres. Erosion has removed much of the original surface layer, and the subsoil is exposed in places.

Typically, the surface layer is dark gray clay loam 2 inches thick. The subsoil is more than 58 inches thick. It is light olive brown clay loam to a depth of 6 inches, yellowish brown, mottled silty clay to a depth of 16 inches, mottled yellowish brown, yellowish red, and gray clay loam to a depth of 31 inches, and mottled light olive brown, light brownish gray, and strong brown clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Kinston, Nawney, and Slagle soils. Also included are some areas that have steeper slopes. Kinston soils are in drainageways. Nawney soils are on flood plains. Slagle soils are located randomly throughout the mapped areas and are on points of slopes. The included soils make up 15 to 30 percent of the map unit.

Permeability of this Peawick soil is very slow. The available water capacity is low. Runoff is rapid. Natural fertility and organic matter content are low. Shrink-swell potential is high. In some places root growth is restricted by the firm, massive layers in the subsoil. In unlimed areas the surface layer and subsoil are extremely acid through strongly acid. The seasonal high water table is 18 to 36 inches below the surface in winter and early spring.

This soil is used mainly as woodland.

This soil is moderately well suited to cultivated crops. Crop production is limited by the low natural fertility, the low organic matter content, acidity, and the eroded areas. The hazard of erosion is severe. The soil tilth is poor. Most of the organic matter and many nutrients in the original surface layer have been lost through erosion; thus, seed germination is poor and yields are low. Working the soil when wet causes clods to form and reduces plant stands because of poor conditions for seed germination. Working the soil when wet also reduces the grade of peanuts because of higher percentages of foreign material mixed in with the peanuts. Field losses of peanuts resulting from broken pegs are increased if the sticky surface layer and subsoil cling to the peanuts.

Poor plant growth can be the result of the high level of exchangeable aluminum in this acid soil. Crop yields are increased by applications of lime and fertilizers. Contour cultivation, conservation tillage, and a conservation cropping system that includes grasses and legumes help to reduce runoff and to control erosion. Cover crops help to control wind and water erosion.

This soil is moderately well suited to pasture grasses and legumes. The low natural fertility, the low organic matter content, and acidity are limitations. Suitable pasture management practices are maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizers.

Potential productivity for loblolly pine is moderately high. Wetness and the clayey subsoil limit the use of equipment for managing timber. Plant competition interferes with the establishment of desirable timber species. The rate of mortality is increased by moisture stress during droughty periods.

Wetness, the very slow permeability in the subsoil, shrink-swell potential, and the low strength are limitations to use of this soil as sites for buildings, sanitary facilities, including septic tank absorption fields, dwellings without basements, and local roads and streets.

This soil is in capability subclass IIIe.

14B—Peawick-Slagle complex, 2 to 6 percent slopes. This complex consists of very deep, moderately well drained, and gently sloping soils on ridgetops and side slopes. It is about 40 percent Peawick soil, 40 percent Slagle soil, and 20 percent other soils. These soils are so intermingled or the areas of individual soils are so small that it was not practical to map them separately. Areas range from about 5 to 200 acres. Ponded areas and eroded areas in this complex are common.

Typically, the surface layer of the Peawick soil is dark gray silt loam 4 inches thick. The subsoil is more than 56 inches thick. It is yellowish brown silty clay loam to a depth of 8 inches, light olive brown, mottled silty clay to a depth of 23 inches, mottled yellowish brown, yellowish red, and gray clay loam to a depth of 36 inches, and mottled light olive brown, light brownish gray, and strong brown clay loam to a depth of 60 inches or more.

Typically, the surface layer of the Slagle soil is dark grayish brown fine sandy loam 7 inches thick. The subsurface layer is light olive brown fine sandy loam to a depth of 13 inches. The subsoil is more than 47 inches thick. It is yellowish brown, mottled sandy clay loam to a depth of 25 inches, light olive brown, mottled sandy clay loam to a depth of 37 inches, light olive brown, mottled sandy clay loam to a depth of 47 inches, and gray, mottled sandy clay loam to a depth of 60 inches or more.

Included with these soils in mapping are small areas of Kinston soils on flood plains and in depressions. Many mapped areas have small ponded areas and eroded areas. The included soils make up 5 to 10 percent of the map unit.

Permeability of the Peawick soil is very slow, and that of the Slagle soil is slow to moderate. The available water capacity is moderate. Runoff is medium. Natural fertility and organic matter content are low. Shrink-swell potential in the Peawick soils is high, and that in the Slagle soil is moderate. In some places in the Peawick soil root growth is restricted below a depth of 20 inches by the firm, massive layers in the subsoil. In unlimed areas the surface layer and subsoil are extremely acid to strongly acid. The seasonal high water table is 18 to 36 inches below the surface in winter and early spring.

These soils are used mainly for cultivation and as woodland.

These soils are well suited to cultivated crops. Crop production is limited by the low natural fertility, the low organic matter content, and acidity. The hazard of erosion is moderate. The soil tilth is good. Working the soils when wet causes clods to form and reduces plant stands because of poor conditions for seed germination. Working the soils when wet also reduces the grade of peanuts because of the higher percentages of foreign material mixed in with the peanuts. Field losses of peanuts resulting from broken pegs are increased if the sticky surface layer and subsoil cling to the peanuts. Poor plant growth can be the result of the high level of exchangeable aluminum in this acid soil. Crop yields are increased by applications of lime and fertilizers.

These soils are moderately well suited to pasture grasses and legumes. The low natural fertility, the low organic matter content, and acidity are limitations. Suitable pasture management practices are maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizers.

Potential productivity for loblolly pine is moderately high in the Peawick soil and moderate in the Slagle soil. Wetness and the clayey subsoil limit the use of equipment in woodland management. Plant competition interferes with the establishment of desirable timber species. In eroded areas the rate of seedling mortality is increased by moisture stress during droughty periods.

Wetness, permeability, shrink-swell potential, and the low strength are limitations to use of these soils as sites for buildings, sanitary facilities, including septic tank absorption fields, dwellings without basements, and local roads and streets.

These soils are in capability subclass IIe.

15—Rappahannock muck. This is a very deep, very poorly drained, and nearly level soil in tidal marshes adjacent to the James River. The soil is covered twice daily by brackish water and is continuously waterlogged. Areas range from about 25 to 625 acres. Slopes range from 0 to 1 percent.

Typically, the surface layer is 40 inches thick. It is very dark grayish brown muck to a depth of 15 inches, very dark gray muck to a depth of 33 inches, and very dark gray muck to a depth of 40 inches. The substratum is very dark gray silty clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Bohicket soils along major creeks and Peawick and Slagle soils on small islands.

Permeability of this Rappahannock soil is moderate. The available water capacity is very high. Natural fertility is low, and organic matter content is very high. Shrink-swell potential is low. Roots are limited by the high water table and by brackish water; hence, they generally remain within the organic mat. In unlimed areas the surface layer and subsoil are strongly acid to moderately alkaline. The high water table is between 24 inches above the surface and 6 inches below the surface most of the year.

This soil is used only as a marsh habitat, except in small areas that have been filled with other soil material for other uses.

This soil is well suited to use as habitat for wetland wildlife and to wetland plants. Most areas are covered by big cordgrass, reeds, cattails, arrowleaf, rushes, and other aquatic plants. The soil generally is not suitable for most other uses.

This soil is in capability subclass VIIIw.

16—Rumford loamy sand. This is a very deep, somewhat excessively drained, and nearly level and gently sloping soil on ridgetops and narrowsflats. Areas range from about 10 to 150 acres. Slopes range from 0 to 4 percent.

Typically, the surface layer is very dark grayish brown loamy sand 9 inches thick. The subsurface layer is yellowish brown loamy sand to a depth of 16 inches. The subsoil is 20 inches thick. It is strong brown sandy loam to a depth of 36 inches. The substratum is mottled yellow and olive yellow sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Alaga soils scattered randomly throughout the mapped areas, Kinston soils in drainageways, and Yemassee soils in depressions. The included soils make up 10 to 20 percent of the map unit.

Permeability of this Rumford soil is moderately rapid. The available water capacity is low. Runoff is slow. Natural fertility and organic matter content are low. Shrink-swell potential is low. The root zone is more than 60 inches deep. In unlimed areas the surface layer and subsoil are extremely acid to moderately acid.

This soil is used mainly for cultivation.

This soil is well suited to cultivated crops. In some areas crop production is limited by droughtiness, wind erosion, the low natural fertility, the low organic matter content, and acidity. The hazard of erosion is moderate. The soil tilth is good. Applications of fertilizers and lime and seasonal moisture changes result in fluctuations in the levels of available plant nutrients in the sandy surface layer. Applications of fertilizers, especially nitrogen, during the growing season are needed rather than a single application in early spring. Calcium and magnesium levels in the soil fluctuate widely; thus, yearly or biyearly, small applications of lime are needed. Contour cultivation, conservation tillage, and conservation cropping systems that include grasses and legumes help to reduce runoff and to control erosion. Cover crops help to control wind and water erosion.

This soil is moderately well suited to pasture grasses and legumes. The low natural fertility, the low organic matter content, and acidity are limitations. Suitable pasture management practices are maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizers.

Potential productivity for loblolly pine is moderately high. This soil is easily managed for timber. The rate of seedling mortality is increased by moisture stress during droughty periods.

Seepage, sloughing of excavation walls, and the low strength are limitations to use of this soil for buildings, sanitary facilities, including septic tank absorption fields, dwellings without basements, and local roads and streets. If this soil is used for onsite sewage or waste disposal, the ground water can be polluted because of the moderately rapid permeability.

This soil is in capability subclass IIs.

17B3—Slagle sandy loam, 2 to 6 percent slopes, severely eroded. This is a very deep, moderately well drained, and gently sloping soil on toe slopes and side slopes. Some mapped areas have shallow gullies. Areas range from about 2 to 20 acres. Erosion has removed much of the original surface layer and, in places, the subsoil is exposed.

Typically, the surface layer is dark grayish brown sandy loam 4 inches thick. The subsoil is more than 56 inches thick. It is yellowish brown, mottled sandy clay loam to a depth of 15 inches, light olive brown, mottled sandy clay loam to a depth of 37 inches, and gray, mottled sandy clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Nawney soils on flood plains and Peawick soils scattered randomly throughout the mapped areas. Also included are some areas that have steeper slopes. The included soils make up 15 to 30 percent of the map unit.

Permeability of this Slagle soil is slow or moderately slow. The available water capacity is moderate. Runoff is medium. Natural fertility and organic matter content are low. Shrink-swell potential is moderate. The root zone is more than 60 inches deep. In areas where the surface layer is eroded, roots in some places are restricted. Because of the slow permeability in the subsoil, in some places there are seepage areas. In unlimed areas the surface layer and subsoil are extremely acid through strongly acid. The seasonal high water table is 18 to 36 inches below the surface in winter and early spring.

This soil is used mainly for cultivation. Some areas are reverting to woodland.

This soil is well suited to cultivated crops. Crop production is limited by the low natural fertility. The soil tilth is poor, and most of the organic matter and many nutrients in the original surface layer have been lost through erosion; consequently, conditions for seed germination are poor and yields are low. The hazard of erosion is severe. Contour cultivation, conservation tillage, and a conservation cropping system that includes grasses and legumes help to reduce runoff and to control erosion. Cover crops help to control wind and water erosion.

This soil is well suited to pasture grasses and legumes. The low natural fertility, the low organic matter content, and acidity are limitations. Suitable pasture management practices are maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizers.

Potential productivity for loblolly pine is high. Wetness limits the use of equipment in woodland management. Plant competition interferes with the establishment of desirable timber species.

Wetness, the permeability in the subsoil, and the low strength are limitations to use of this soil as sites for buildings, sanitary facilities, including septic tank absorption fields, dwellings without basements, and local roads and streets.

This soil is in capability subclass IIe.

18A—Slagle fine sandy loam, 0 to 2 percent slopes. This is a very deep, moderately well drained, and nearly level soil on broad upland flats. Areas range from about 2 to 200 acres.

Typically, the surface layer is dark grayish brown fine sandy loam to a depth of 7 inches. The subsurface layer is light olive brown fine sandy loam to a depth of 13 inches. The subsoil is more than 47 inches thick. It is yellowish brown, mottled sandy clay loam to a depth of 25 inches, light olive brown, mottled sandy clay loam to a depth of 37 inches, light olive brown, mottled sandy clay loam to a depth of 47 inches, and gray, mottled sandy clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Kinston soils in drainageways, Nawney soils on flood plains, and Peawick soils scattered randomly throughout the mapped areas. The included soils make up 10 to 20 percent of the map unit.

Permeability of this Slagle soil is slow or moderately slow. The available water capacity is moderate. Runoff is slow. Natural fertility and organic matter content are low. Shrink-swell potential is moderate. The root zone is more than 60 inches deep. In unlimed areas the surface layer and subsoil are extremely acid to strongly acid. The seasonal high water table is 18 to 36 inches below the surface in winter and early spring.

This soil is used mainly for cultivated crops (fig. 6).

This soil is well suited to cultivated crops, especially peanuts, corn, and soybeans. Crop production is limited by the low natural fertility, the low organic matter content, and acidity. The hazard of erosion is slight. The soil tilth is good.

This soil is well suited to pasture grasses and legumes. The low natural fertility, the low organic matter content, and acidity are limitations. Suitable pasture management practices are maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizers.

Potential productivity for loblolly pine is moderate. Wetness limits the use of equipment in woodland management. Plant competition interferes with the establishment of desirable timber species.

Wetness, the moderately slow or slow permeability in the subsoil, and the low strength are limitations to use of this soil as sites for buildings, sanitary facilities, including septic tank absorption fields, dwellings without basements, and local roads and streets. Some included areas of Nawney soils are subject to flooding.

This soil is in capability subclass IIw.

18B—Slagle fine sandy loam, 2 to 6 percent slopes. This is a very deep, moderately well drained, and gently sloping soil on toe slopes, in saddles, on side slopes, and along drainageways. Areas range from about 2 to 100 acres.

Typically, the surface layer is dark grayish brown fine sandy loam to a depth of 7 inches. The subsurface layer is light olive brown fine sandy loam to a depth of 13 inches. The subsoil is more than 47 inches thick. It is yellowish brown, mottled sandy clay loam to a depth of 25 inches, light olive brown, mottled sandy clay loam to a depth of 47 inches, and gray, mottled sandy clay loam to a depth of 60 inches or more.

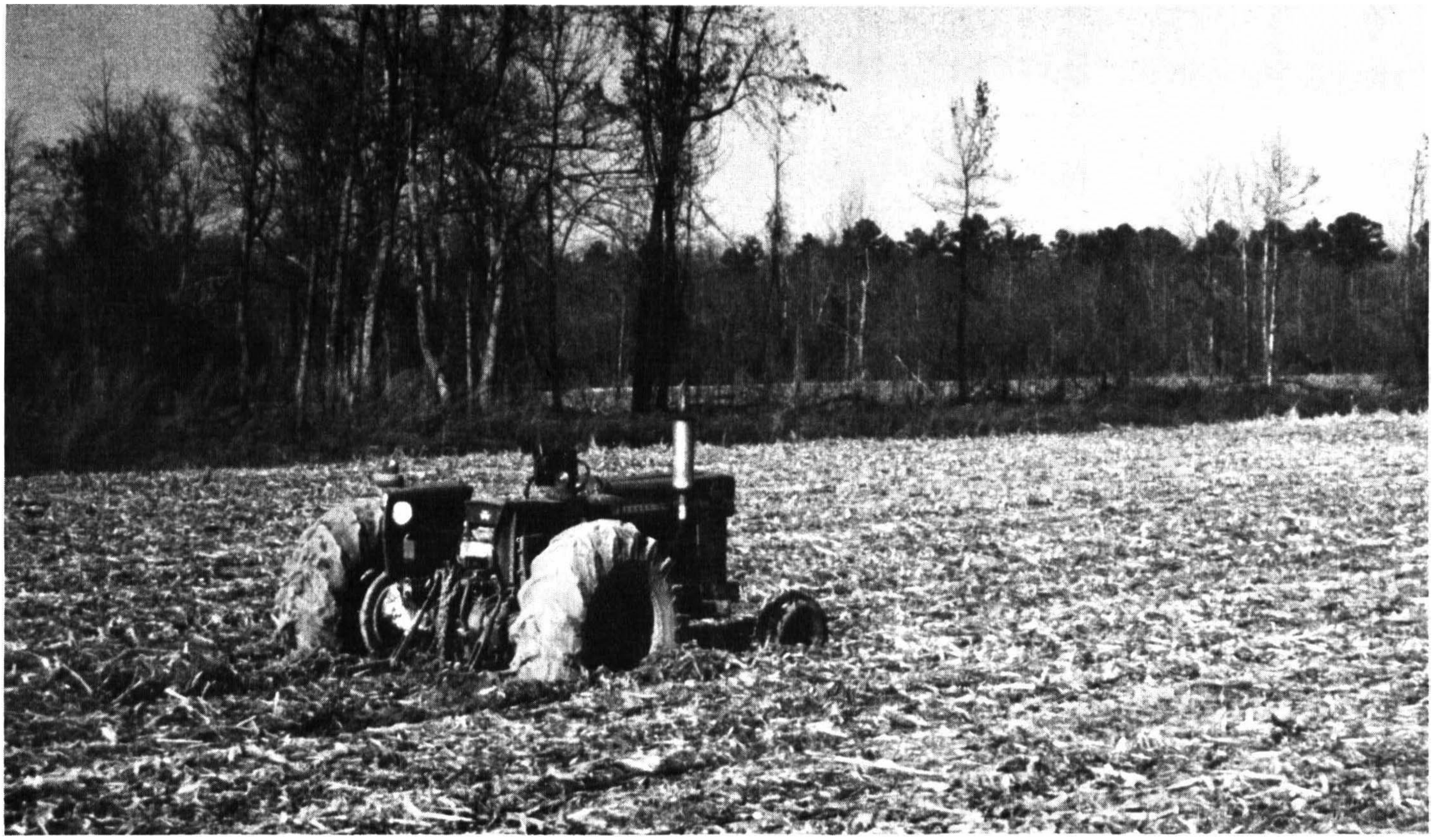


Figure 6.—Trafficability is poor on Slagle fine sandy loam when wet. The soil is used mainly for cultivated crops. Stubble mulch protects the surface in winter.

Included with this soil in mapping are small areas of Kinston soils in drainageways, Nawney soils on flood plains, and Peawick soils scattered randomly throughout the mapped areas. The included soils make up 10 to 20 percent of the map unit.

Permeability of this Slagle soil is slow or moderately slow. The available water capacity is moderate. Runoff is medium. Natural fertility and organic matter content are low. Shrink-swell potential is moderate. The root zone is more than 60 inches deep. In unlimed areas the surface layer and subsoil are extremely acid through very strongly acid. The seasonal high water table is 18 to 36 inches below the surface in winter and early spring.

This soil is used mainly as woodland.

This soil is well suited to cultivated crops, especially peanuts, corn, and soybeans. Crop production is limited by the low natural fertility, the low organic matter content, and acidity. The hazard of erosion is moderate. The soil tilth is good. Contour cultivation, conservation tillage, and a conservation cropping system that includes grasses and legumes help to reduce runoff and to control erosion. Cover crops help to control wind and water erosion.

This soil is well suited to pasture grasses and legumes. The low natural fertility, the low organic matter content, and acidity are limitations. Suitable pasture management practices are maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizers.

Potential productivity for loblolly pine is high. Wetness limits the use of equipment in woodland management. Plant competition interferes with the establishment of desirable timber species.

Wetness, the slow or moderately slow permeability in the subsoil, and the low strength are limitations to use of this soil as sites for buildings, sanitary facilities, including septic tank absorption fields, dwellings without basements, and local roads and streets.

This soil is in capability subclass IIe.

18C—Slagle fine sandy loam, 6 to 10 percent slopes. This is a very deep, moderately well drained, and strongly sloping soil on side slopes and along drainageways. Areas range from about 2 to 20 acres.

Typically, the surface layer is dark grayish brown fine sandy loam 7 inches thick. The subsurface layer is light olive brown fine sandy loam to a depth of 13 inches. The subsoil is more than 47 inches thick. It is yellowish brown, mottled sandy clay loam to a depth of 25 inches, light olive brown, mottled sandy clay loam to a depth of 37 inches, light olive brown, mottled sandy clay loam to a depth of 47 inches, and gray, mottled sandy clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Nawney soils on flood plains and Peawich soils scattered randomly throughout the mapped areas. The included soils make up 10 to 20 percent of the map unit.

Permeability of this Slagle soil is slow or moderately slow. The available water capacity is moderate. Runoff is rapid. Natural fertility and organic matter content are low. Shrink-swell potential is moderate. The root zone is more than 60 inches deep. In unlimed areas the surface layer and subsoil are extremely acid through strongly acid. The seasonal high water table is 18 to 36 inches below the surface in winter and early spring.

This soil is used mainly as woodland.

This soil is moderately well suited to cultivated crops. Crop production is limited by the low natural fertility, slope, the low organic matter content, and acidity. The hazard of erosion is severe. The soil tilth is good. Contour cultivation, conservation tillage, and a conservation cropping system that includes grasses and legumes help to reduce runoff and to control erosion. Cover crops also help to control wind and water erosion.

This soil is well suited to pasture grasses and legumes. The low natural fertility, the low organic matter content, and acidity are limitations. Suitable pasture management practices are maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizers.

Potential productivity for loblolly pine is high. Wetness limits the use of equipment in woodland management. Plant competition interferes with the establishment of desirable timber species.

Wetness, the moderately slow or slow permeability in the subsoil, slope, and the low strength are limitations to use of this soil as sites for buildings, sanitary facilities, including septic tank absorption fields, dwellings without basements, and local roads and streets.

This soil is in capability subclass IIIe.

19A—Uchee loamy sand, 0 to 2 percent slopes. This is a very deep, well drained, and nearly level soil in broad, interstream areas. Areas range from about 2 to 30 acres.

Typically, the surface layer is mottled very dark grayish brown and brown loamy sand 7 inches thick. The subsurface layer is yellowish brown, mottled loamy sand to a depth of 28 inches. The subsoil is 24 inches thick. It is yellowish brown sandy clay loam to a depth of 32 inches, yellowish brown, mottled sandy clay loam to a depth of 48 inches, and mottled yellowish brown, light gray, strong brown, and red sandy clay loam to a depth of 52 inches. The substratum is grayish brown, mottled sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Kinston soils in drainageways, Nawney soils on flood plains, and Yemassee soils in depressions and along drainageways. The included soils make up 10 to 20 percent of the map unit.

Permeability of this Uchee soil is moderately slow. The available water capacity is moderate. Runoff is slow. Natural fertility and organic matter content are low. Shrink-swell potential is moderate. The root zone is more than 60 inches deep. In unlimed areas the surface layer and subsoil are very strongly acid or strongly acid. The seasonal high water table is 42 to 60 inches below the surface in winter.

This soil is used mainly for cultivated crops.

This soil is well suited to cultivated crops, such as peanuts, corn, and soybeans. Crop production is limited by the low available water capacity in the thick, sandy surface layer, the low natural fertility, the low organic matter content, and acidity. The hazard of erosion is slight. The soil tilth is good. Applications of fertilizers and lime and seasonal moisture changes result in fluctuations in the levels of available plant nutrients in the sandy surface layer. Applications of fertilizers, especially nitrogen, during the growing season are needed rather than a single application in early spring. Calcium and magnesium levels in the soil fluctuate widely; thus, yearly or biyearly, small applications of lime are needed. Cover crops help to control wind erosion.

This soil is poorly suited to pasture grasses and legumes. The low natural fertility, the low organic matter content, the low available water capacity, and acidity are limitations. Suitable pasture management practices are maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizers.

Potential productivity for loblolly pine is moderately high. This soil is easily managed for timber. The rate of seedling mortality is increased by moisture stress during droughty periods.

Wetness, the moderately slow permeability in the subsoil, the sandy surface layer, and the low strength are limitations to use of this soil as sites for building site development, sanitary facilities, including septic tank absorption fields, dwellings without basements; and local roads and streets.

This soil is in capability subclass IIs.

19B—Uchee loamy sand, 2 to 6 percent slopes. This is a very deep, well drained, and gently sloping soil on low ridges. Areas range from about 2 to 30 acres.

Typically, the surface layer is mottled very dark grayish brown and brown loamy sand to a depth of 7 inches.

The subsurface layer is yellowish brown, mottled loamy sand to a depth of 28 inches. The subsoil is 24 inches thick. It is yellowish brown sandy clay loam to a depth of 32 inches, yellowish brown, mottled sandy clay loam to a depth of 48 inches, and mottled yellowish brown, light gray, strong brown, and red sandy clay loam to a depth of 52 inches. The substratum is grayish brown mottled, sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Kinston soils in drainageways, Nawney soils on flood plains, and Yemassee soils in depressions and along drainageways. The included soils make up 10 to 20 percent of the map unit.

Permeability of this Uchee soil is moderately slow. The available water capacity is moderate. Runoff is medium. Natural fertility and organic matter content are low. Shrink-swell potential is moderate. The root zone is more than 60 inches deep. In unlimed areas the surface layer and subsoil are very strongly acid through strongly acid. The seasonal high water table is 42 to 60 inches below the surface in winter.

This soil is used mainly for cultivated crops.

This soil is well suited to cultivated crops, such as peanuts, corn, and soybeans. Crop production is limited by the low available water capacity in the thick, sandy surface layer, the low natural fertility, the low organic matter content, and acidity. The hazard of erosion is moderate. The soil tilth is good. Applications of fertilizers and lime and seasonal moisture changes result in fluctuations in the amount of available plant nutrients in the sandy surface layer. Applications of fertilizers, especially nitrogen, are needed during the growing season rather than a single application in early spring. Calcium and magnesium levels in the soil fluctuate widely; thus, yearly or biyearly, small applications of lime are needed. Cover crops help to control wind and water erosion. Contour cultivation, conservation tillage, and a conservation cropping system that includes grasses and legumes help to reduce runoff and to control erosion.

This soil is poorly suited to pasture grasses and legumes. The low natural fertility, the low organic matter content, the low available water capacity in the thick, sandy surface layer, and acidity are limitations. Suitable pasture management practices are maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizers.

Potential productivity for loblolly pine is moderately high. This soil is easily managed for timber. The rate of seedling mortality is increased by moisture stress during droughty periods.

Wetness, the moderately slow permeability in the subsoil, the thickness of the surface layer, and the low strength are limitations to use of this soil as sites for buildings, sanitary facilities, including septic tank absorption fields, dwellings without basements, and local roads and streets.

This soil is in capability subclass IIs.

19C—Uchee loamy sand, 6 to 10 percent slopes. This is a very deep, well drained, and strongly sloping soil on side slopes and ridges. Areas range from about 2 to 15 acres.

Typically, the surface layer is mottled very dark grayish brown and brown loamy sand to a depth of 7 inches. The subsurface layer is yellowish brown, mottled loamy sand to a depth of 28 inches. The subsoil is 24 inches thick. It is yellowish brown sandy clay loam to a depth of 32 inches, yellowish brown, mottled sandy clay loam to a depth of 48 inches, and mottled yellowish brown, light gray, strong brown, and red sandy clay loam to a depth of 52 inches. The substratum is grayish brown, mottled sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Kinston soils in drainageways, Nawney soils on flood plains, and Yemassee soils in depressions and along drainageways. The included soils make up 10 to 20 percent of the map unit.

Permeability of this Uchee soil is moderately slow. The available water capacity is moderate. Runoff is moderate. Natural fertility and organic matter content are low. Shrink-swell potential is moderate. The root zone is more than 60 inches deep. In unlimed areas the surface layer and subsoil are very strongly acid or strongly acid. The seasonal high water table is 42 to 60 inches below the surface in winter.

This soil is used mainly as woodland.

This soil is moderately well suited to cultivated crops because of short, steep slopes. The slopes limit access of machinery and cause a hazard of erosion. Crop production is limited by the low available water capacity in the thick sandy surface layer, the low natural fertility, the low organic matter content, and acidity. The hazard of erosion is severe. The soil tilth is good. Applications of fertilizers and lime and seasonal moisture changes result in fluctuations in the levels of available plant nutrients in the sandy surface layer. Applications of fertilizers, especially nitrogen, during the growing season are needed rather than a single application in early spring. Calcium and magnesium levels in the soil fluctuate widely; thus, yearly or biyearly, small applications of lime are needed. Contour cultivation, conservation tillage, and a conservation cropping system that includes grasses and legumes help to reduce runoff and to control erosion. Cover crops help to control wind and water erosion.

This soil is poorly suited to pasture grasses and legumes. The low natural fertility, the low organic matter content, the low available water capacity in the sandy surface layer, and acidity are limitations. Suitable pasture management practices are maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizers.

Potential productivity for loblolly pine is moderately high. This soil is easily managed for timber. The rate of seedling mortality is increased by moisture stress during droughty periods.

Wetness, the moderately slow permeability in the subsoil, the sandy surface layer, slope, and the low strength are limitations to use of this soil for sites for buildings, sanitary facilities, including septic tank absorption fields, dwellings without basements, and local roads and streets.

This soil is in capability subclass IIIs.

20B—Uchee-Peawick complex, 2 to 6 percent slopes. This complex consists of very deep and gently sloping soils on side slopes and toe slopes. It is about 40 percent Uchee soil, 40 percent Peawick soil, and 20 percent other soils. The Uchee soil is well drained, and the Peawick soil is moderately well drained. The soils are so intermingled or the areas of individual soils are so small that it was not practical to map them separately. Areas range from about 2 to 20 acres.

Typically, the surface layer of the Uchee soil is mottled very dark grayish brown and brown loamy sand 7 inches thick. The subsurface layer is yellowish brown, mottled loamy sand to a depth of 28 inches. The subsoil is yellowish brown sandy clay loam to a depth of 32 inches, yellowish brown, mottled sandy clay loam to a depth of 48 inches, and mottled yellowish brown, light gray, strong brown, and red sandy clay loam to a depth of 52 inches. The substratum is grayish brown, mottled sandy loam to a depth of 60 inches or more.

The surface layer of the Peawick soil is dark gray silt loam 4 inches thick. The subsoil is more than 56 inches thick. It is light olive brown silty clay loam to a depth of 8 inches, yellowish brown, mottled silty clay to a depth of 23 inches, mottled yellowish brown, yellowish red, and gray clay loam to a depth of 36 inches, and mottled light olive brown, light brownish gray, and strong brown clay loam to a depth of 60 inches or more.

Included with these soils in mapping are small areas of Kinston soils in drainageways and Slagle soils scattered randomly throughout the mapped areas. Also included are areas that have a broken iron pan. Angular and subrounded gravel and cobbles of quartzite, sandstone, basalt, and chert range, by volume, from 0 to 60 percent in some layers. The included soils make up 20 to 30 percent of the map unit.

Permeability of the Uchee soil is moderately slow, and that of the Peawick soil is slow. The available water capacity is moderate. Runoff is medium. Natural fertility and organic matter content are low. Shrink-swell potential of the Uchee soil is moderate, and that of the Peawick soil is high. The root zone is more than 60 inches deep. In unlimed areas the surface layer and subsoil of the Uchee soil are very strongly acid or strongly acid, and those of the Peawick soil are extremely acid through strongly acid. The seasonal high water table of the Uchee soil is 42 to 60 inches below the surface, and that of the Peawick soil is 18 to 36 inches below the surface in winter.

These soils are used mainly as woodland.

These soils are well suited to cultivated crops. Crop production is limited by the low natural fertility, the low organic matter content, and acidity. The hazard of erosion is moderate. The soil tilth is good. Applications of fertilizers and lime and seasonal moisture changes result in fluctuations in the levels of available plant nutrients in the sandy surface layer. Applications of fertilizers, especially nitrogen, during the growing season are needed rather than a single application in early spring. Calcium and magnesium levels in the soils fluctuate widely; thus, yearly or biyearly, small applications of lime are needed. Contour cultivation, conservation tillage, and a conservation cropping system that includes grasses and legumes help to reduce runoff and to control erosion. Cover crops help to control wind and water erosion.

These soils are moderately well suited to pasture grasses and legumes. The low natural fertility, the low organic matter content, and acidity are limitations. Suitable pasture management practices are maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizers.

Potential productivity for loblolly pine is moderately high. Plant competition interferes with the establishment of desirable timber species. Windthrow is a moderate hazard.

Wetness, depth to a restrictive layer, seepage, and the low strength are limitations to use of these soils as sites for buildings, sanitary facilities, including septic tank absorption fields, dwellings without basements, and local roads and streets.

These soils are in capability subclass IIe.

20C—Uchee-Peawick complex, 6 to 10 percent slopes. This complex consists of very deep and strongly sloping soils on side slopes and toe slopes. It is about 40 percent Uchee soil, 40 percent Peawick soil, and 20 percent other soils. The Uchee soil is well drained, and the Peawick soil is moderately well drained. These soils are so intermingled or the areas of individual soils are so small that it was not practical to map them separately. Areas range from about 2 to 20 acres.

Typically, the surface layer of the Uchee soil is mottled very dark grayish brown and brown loamy sand 7 inches thick. The subsurface layer is yellowish brown, mottled loamy sand to a depth of 28 inches. The subsoil is yellowish brown sandy clay loam to a depth of 32 inches, yellowish brown, mottled sandy clay loam to a depth of 48 inches, and mottled yellowish brown, light gray, strong brown, and red sandy clay loam to a depth of 52 inches. The substratum is grayish brown, mottled sandy loam to a depth of 60 inches or more.

Typically, the surface layer of the Peawick soil is dark gray silt loam 4 inches thick. The subsoil is more than 56 inches thick. It is light olive brown silty clay loam to a depth of 8 inches, yellowish brown, mottled silty clay to a depth of 23 inches, mottled yellowish brown, yellowish red, and gray clay loam to a depth of 36 inches, and mottled light olive brown, light brownish gray, and strong brown clay loam to a depth of 60 inches or more.

Included with these soils in mapping are small areas of Kinston soils in drainageways and Slagle soils scattered randomly throughout the mapped areas. Also included are areas that have a broken iron pan. Angular and subrounded gravel and cobbles of quartzite, sandstone, basalt, and chert range, by volume, from 0 to 60 percent in some layers. The included soils make up 20 to 30 percent of the map unit.

Permeability of the Uchee soil is moderately slow, and that of the Peawick soil is slow. The available water capacity is moderate. Runoff is medium. Natural fertility and organic matter content are low. Shrink-swell potential is moderate in the Uchee soil and high in the Peawick soil. The root zone is more than 60 inches deep unless restricted by compact, brittle layers. In unlimed areas the surface layer and subsoil of the Uchee soil are very strongly acid or strongly acid, and those of the Peawick soil are extremely acid through strongly acid. The seasonal high water table of the Uchee soil is 42 to 60 inches below the surface, and that of the Peawick soil is 18 to 36 inches below the surface in winter.

These soils are used mainly as woodland.

These soils are moderately well suited to cultivated crops. Crop production is limited by the low natural fertility, the low organic matter content, acidity, and slope. The hazard of erosion is moderate. The soil tilth is good. Applications of fertilizers and lime and seasonal moisture changes result in fluctuations in the levels of available plant nutrients in the sandy surface layer. Applications of fertilizers, especially nitrogen, during the growing season are needed rather than a single application in early spring. Calcium and magnesium levels in the soils fluctuate widely; thus, yearly or biyearly, small applications of lime are needed. Contour cultivation, conservation tillage, and a conservation cropping system that includes grasses and legumes help to reduce runoff and to control erosion. Cover crops help to reduce wind and water erosion.

These soils are moderately well suited to pasture grasses and legumes. The low natural fertility, the low organic matter content, and acidity are limitations. Suitable pasture management practices are maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizers.

Potential productivity for loblolly pine is moderately high. Plant competition interferes with the establishment of desirable timber species. Windthrow is a moderate hazard.

Wetness, depth to a restrictive layer, seepage, and the low strength are limitations to use of these soils as sites for buildings, sanitary facilities, including septic tank absorption fields, dwellings without basements, and local roads and streets.

These soils are in capability subclass IIIe.

21—Udorthents, loamy. These soils are very deep and well drained to moderately well drained. They consist mainly of areas that have been excavated in construction. The excavations are mostly 2 to 15 feet deep and have steep sides and a nearly level floor. A few areas have been smoothed after the addition of fill material. The areas of excavations generally are irregular in shape and range from 2 to 30 acres or more. A few areas are covered by water, and most areas are seasonally wet because of seepage.

The soil properties of Udorthents differ from place to place; thus, a typical profile cannot be given. They generally consist of brown or yellowish brown loamy material throughout.

The available water capacity generally is low, and the soils tend to be droughty. Runoff generally is slow. Permeability varies, but it is mainly slow.

These soils generally are not suitable for farming or for use as woodland because of the low available water capacity. Most abandoned areas have scattered growths of trees. Onsite investigation is needed to determine the potential of the soils for most uses.

These soils are not assigned to a capability subclass.

22—Urban land. This map unit consists of areas where more than 85 percent of the surface is covered by asphalt, concrete, buildings, or other impervious surfaces. Some examples are parking lots and industrial parks. Areas range from about 2 to 250 acres.

Included with this unit in mapping are areas of undisturbed soils. These soils make up about 15 percent of the unit.

Onsite investigation is needed to determine the suitability and limitations of the unit for a particular use.

This unit is not assigned to a capability subclass.

23—Yemassee fine sandy loam. This is a very deep, somewhat poorly drained soil on broad flats and along shallow drainageways. Areas range from about 3 to 65 acres. Slopes range from 0 to 2 percent.

Typically, the surface layer is dark grayish brown, mottled fine sandy loam 10 inches thick. The subsoil is 42 inches thick. It is light yellowish brown, mottled sandy clay loam to a depth of 18 inches, light olive brown, mottled sandy clay loam to a depth of 34 inches, and gray, mottled sandy clay loam to a depth of 52 inches. The substratum is mottled light gray, light olive gray, and light olive brown fine sandy loam to a depth of 60 inches or more.

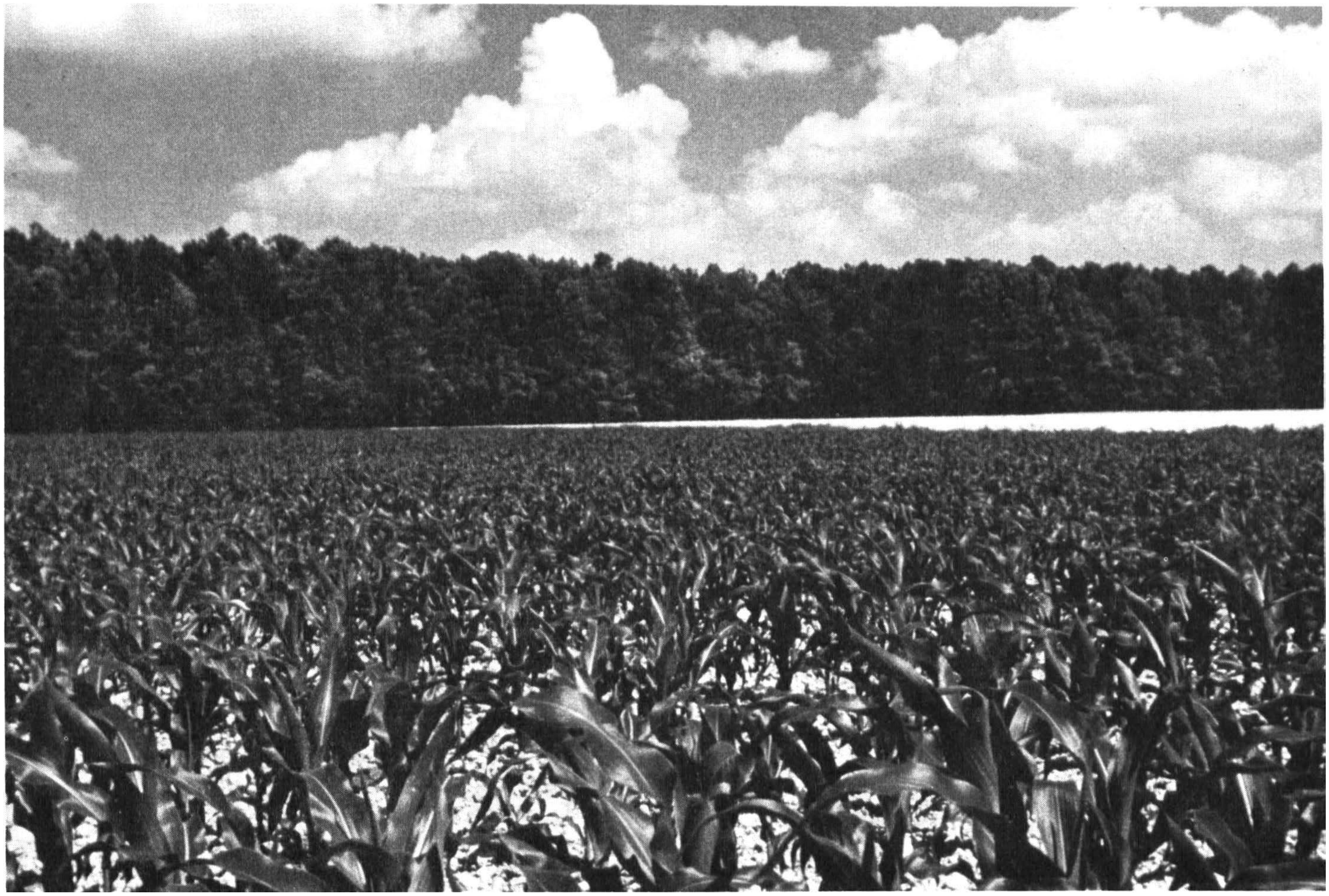


Figure 7.—Corn is on the somewhat poorly drained Yemassee fine sandy loam in the foreground, and mixed hardwoods and pine are on the poorly drained Myatt fine sandy loam in the background.

Included with this soil in mapping are small areas of Myatt soils in depressions and Slagle soils on higher landscapes within the mapped areas and in lower positions around the edges of the mapped areas. The included soils make up 10 to 20 percent of the map unit.

Permeability is moderate. The available water capacity is moderate. Runoff is slight. Natural fertility is low, and organic matter content is moderate. Shrink-swell potential is low. The root zone is more than 60 inches deep. In unlimed areas the surface layer and subsoil are very strongly acid or strongly acid. The seasonal high water table is 12 to 18 inches below the surface in winter and early spring.

This soil is used mainly for cultivated crops (fig. 7).

This soil is well suited to cultivated crops. Crop production is limited by the low natural fertility, wetness, and acidity. The hazard of erosion is slight. The soil tilth is good.

This soil is well suited to pasture grasses and legumes. The low natural fertility, wetness, and acidity are limitations. Suitable pasture management practices are maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizers.

Potential productivity for loblolly pine is high. Wetness limits the use of equipment in woodland management. Plant competition interferes with the establishment of desirable timber species.

Wetness, the moderate permeability in the subsoil, and the low strength are limitations to use of this soil as sites for buildings, sanitary facilities, including septic tank absorption fields, dwellings without basements, and local roads and streets. Some areas of this soil adjacent to waterways are subject to flooding.

This soil is in capability subclass IIw.

Prime Farmland

In this section, prime farmland is defined and discussed. The prime farmland soils in Isle of Wight County are listed in table 15.

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

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

Prime farmland soils may presently be in use as cropland, pasture, or woodland, or they may be in other uses. They either are used for producing food or fiber or are available for these uses. Urban or built-up land and water areas cannot be considered prime farmland.

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

Soils that have a high water table may qualify as prime farmland soils if the limitation is overcome by drainage. Onsite evaluation is necessary to determine the effectiveness of corrective measures. More information on the criteria for prime farmland soils can be obtained at the local office of the Soil Conservation Service.

About 109,280 acres in Isle of Wight County, or nearly 54 percent of the county, is prime farmland. The largest areas are in map units 4 and 6 on the general soil map. Many scattered areas of prime farmland are in the other map units.

A recent trend in land use in some parts of the county has been the conversion of some prime farmland to urban and industrial uses. The loss of prime farmland tends to encourage farming of marginal lands, which are less productive than prime farmland.

Table 5 lists the map units, or soils, that make up prime farmland in Isle of Wight County. If a soil is considered to be prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name. This list does not constitute a recommendation for a particular land use. 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."

Use and Management of the Soils

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

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

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

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

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

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

Crops and Pasture

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

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

In 1982, about 67,000 acres, or 33 percent of the land area in the county, was used for close-growing crops, according to the Virginia Crop Reporting Service. Cash-grain farming is the main type of farming in the county. The main crops are corn, soybeans, peanuts, and small grains, including wheat and barley. A small acreage is used for truck crops, particularly tomatoes, but the acreage in these crops has decreased substantially in the past 10 years.

In recent years the acreage of grassland and pasture has decreased and the acreage of cash-grain crops has increased. The acreage of soybeans has increased through the practice of double cropping soybeans in barley and wheat stubble.

Many nearly level soils in the county are well suited to the commonly grown crops, such as peanuts, corn, and soybeans, and to the less commonly grown truck crops and ornamentals. Such soils include Emporia and Slagle soils (fig. 8).

Erosion is a major hazard in gently sloping areas. If the surface layer is lost through erosion, most available nutrients and most of the organic matter are lost. The organic matter content affects the soil structure, the rate of water infiltration, the available water capacity, and the soil tilth. The hazard of erosion is generally most severe on soils that have a subsoil of firm clay, such as Peawick soils, because water infiltrates slowly and runoff is excessive. In many areas soil erosion on farmland results further in the sedimentation of streams. Erosion control practices minimize sedimentation and improve the quality of water for fish and wildlife.

Erosion control practices provide a protective surface cover, reduce runoff, and increase infiltration. One such practice is a cropping system that keeps a plant cover on the soil for extended periods. This practice helps to control erosion and to sustain the productive capacity of the soil. Minimum tillage, contouring, and a cropping system in which grass or close-growing crops is rotated with row crops help to control erosion. Contouring is an especially effective practice in areas that are chisel plowed.

Drainage is needed on some acreage used for crops. On uplands, drainage is needed to eliminate seeps and wet spots in drainageways and depressions and to lower the water table in such soils as Peawick, Slagle, Myatt, and Yemassee soils.

The design of surface and subsurface drainage systems varies with the kind of soil. Generally, the system used is based on the elevation, the available outlets, the permeability of the subsoil, and the planned cropping system.

On some soils, soil blowing, or wind erosion, is a hazard (fig. 9). Maintaining a plant cover or leaving crop residue on the surface helps to control soil blowing.

Most of the arable soils in the county respond well to nitrate and phosphate fertilizers and potash. These soils are moderately acid to strongly acid; thus, periodic applications of ground limestone are needed to maintain reaction at a level sufficient for good growth of corn, peanuts, soybeans, and small grains. On all soils, applications of lime and fertilizers should be based on the results of soil tests, on the needs of crops, and on expected yields.

Yields Per Acre

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

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

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion

Figure 8.—Peanuts are easily and cleanly dug on Slagle fine sandy loam, 2 to 6 percent slopes, because the soil tilth is good.

Figure 9.—Wind erosion is a hazard on Emporia fine sandy loam, 0 to 2 percent slopes. Wind erosion can be controlled by maintaining a plant cover or leaving crop residue on the surface.

control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green-manure crops; and harvesting that insures the smallest possible loss.

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 Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops (*9*). Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor does it consider possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland and for engineering purposes.

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

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

Class I soils have 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 have other limitations, impractical to remove, that limit their use.

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

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

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

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

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

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

Woodland Management and Productivity

Woodland is one of the major land uses in the survey area. About 55 percent, about 115,000 acres, of the survey area is wooded. Most of the woodland consists of second growth hardwoods, loblolly pine, and Virginia pine.

Originally, the forest consisted mainly of mixed stands of white oak, post oak, scarlet oak, black oak, northern red oak, southern red oak, and hickory. Yellow poplar grew on sites that were more moist. The stands of loblolly pine and Virginia pine were scattered throughout the stands of hardwoods. Green ash, sweetgum, blackgum, boxelder, and red maple grew in stands in poorly drained areas.

Most of the upland areas were cleared of trees and were cultivated as the areas were settled and farmed. Gradually, as the soils became eroded and as fertility levels decreased, the soils were allowed to return to woodland. Some soils were too steep or too wet for farming to be practical. Much of the woodland in the survey area once was cultivated. A large part of the woodland is managed for loblolly pine.

Some management practices are thinning, clearcutting, drum-chopping, controlled burning for site preparation, and reforestation using seeds or seedlings (fig. 10). Soil erosion is a major management concern during timber harvest and reforestation.

The soils have been assigned to woodland suitability groups to assist owners in planning the use of soils for wood crops (*6*). The Virginia Division of Forestry, the Cooperative Extension Service, and the Soil Conservation Service can help to determine specific needs in woodland management.

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

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *w* indicates excessive water in or on the soil; *d*, restricted root depth; *c*, clay in the upper part of the soil; *s*, sandy texture; and *r*, steep slopes. The letter *o* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: w, d, c, s, and r.

In table 7, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Ratings of the *erosion hazard* indicate the risk of loss of soil in well managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or in equipment; and *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree to which the soil affects the mortality of tree seedlings. Plant competition is not considered in the ratings. The ratings apply to seedlings from good stock that are properly planted during a period of sufficient rainfall. A rating of *slight* indicates that the expected mortality is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

Ratings of *windthrow hazard* are based on soil characteristics that affect the development of tree roots and the ability of the soil to hold trees firmly. A rating of *slight* indicates that few trees may be blown down by strong winds; *moderate*, that some trees will be blown down during periods of excessive soil wetness and strong winds; and *severe*, that many trees are blown down during periods of excessive soil wetness and moderate or strong winds.

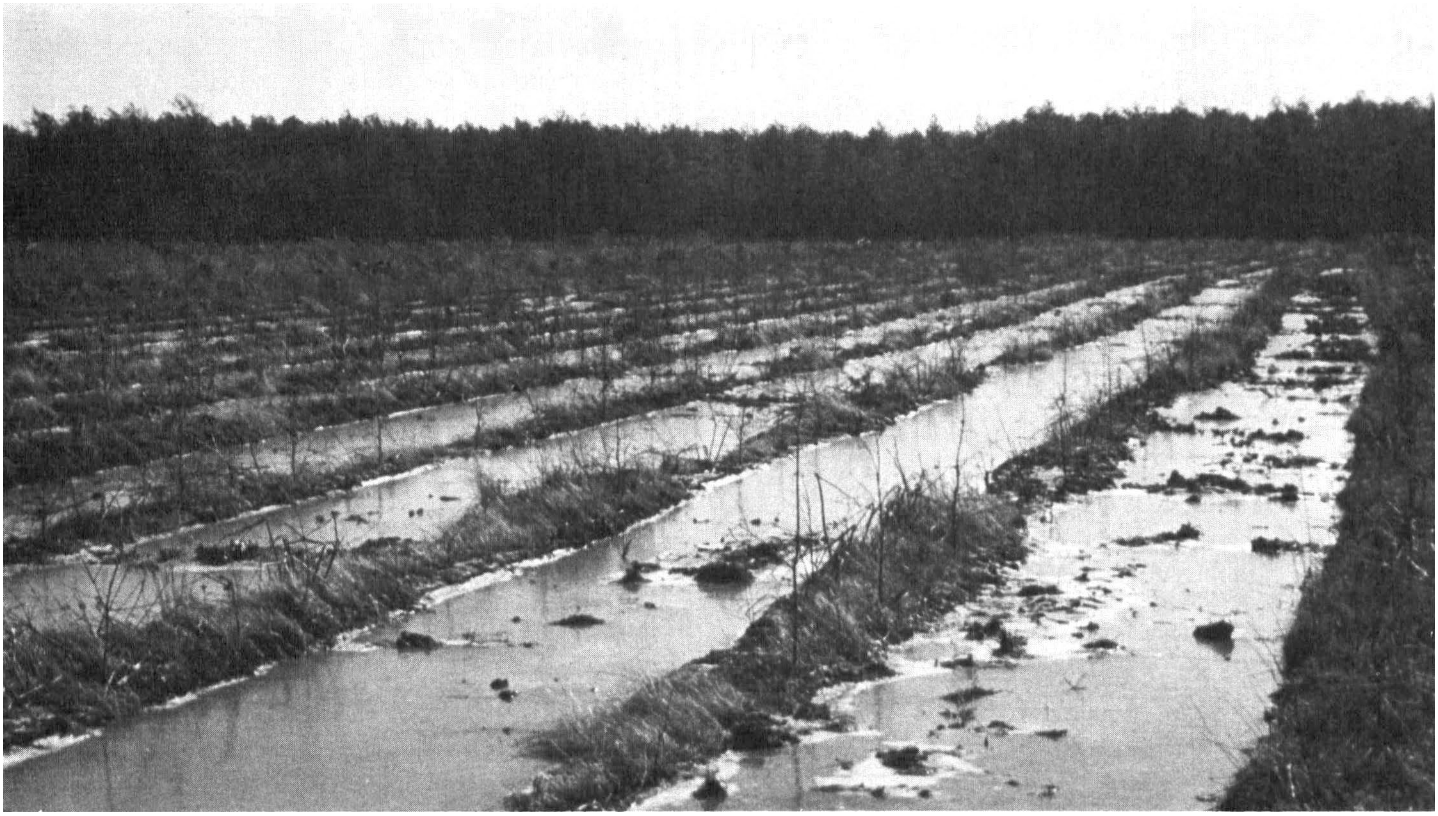


Figure 10.—Planting these oak seedlings on constructed ridges helps to overcome the limitation of wetness resulting from the seasonal high water table. The soil is Myatt fine sandy loam.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

Trees to plant are those that are suited to the soils and to commercial wood production.

Recreation

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

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

The information in table 8 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table

11 and interpretations for dwellings without basements and for local roads and streets in table 10.

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

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

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

Paths and trails for hiking 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 and few or no stones on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones on the surface. 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 9, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife (*11*). 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, 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 goldenrod, beggar-ticks, ragweed, and pokeweed.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, the available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, holly, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are silky dogwood, tatarian honeysuckle, elderberry, 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, cattail, pickerel weed, 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 and ponds.

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

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include bobwhite quail, woodchuck, 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, ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, and white-tailed deer.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, snipe, shore birds, muskrat, 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 must be considered in planning, in site selection, and in design.

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

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 10 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

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

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

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

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

Sanitary Facilities

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

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

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

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

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

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

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

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

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

The ratings in table 11 are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, slope, and flooding affect both types of landfill. Texture, stones, 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, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to 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 plant growth. Material from the surface layer, therefore, should be stockpiled for use as the final cover.

Construction Materials

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

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

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

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

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

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

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

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source.

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

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

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

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

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

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

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

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

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

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

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

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

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

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

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

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

Soil Properties

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

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

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

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

Engineering Index Properties

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

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

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (*1*).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in table 14.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

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

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

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

Physical and Chemical Properties

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

Clay as a soil separate 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, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earth-moving operations.

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

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

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

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

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

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

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

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

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition.

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

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

Soil and Water Features

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

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

The four hydrologic soil groups are:

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

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

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

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

Some soils in table 16 are assigned to two hydrologic soil groups. The dual grouping is used for the soils that have a seasonal high water table but can be drained. The first letter applies to the soil when drained and the second letter to the soil when undrained.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, nor is water in swamps and marshes.

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

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, common, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *common* that it is likely under normal conditions; *occasional* that it occurs, on the average, no more than once in 2 years; and *frequent* that it occurs, on the average, more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

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

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

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

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

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

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

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

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*10*). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 17 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is 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 Fluvaquents (*Fluv*, meaning flood plain, plus *aquent*, the suborder of the Entisols that have an aquic moisture regime).

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

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

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

Soil Series and Their Morphology

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

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the Soil Survey Manual (*8*). Many of the technical terms used in the descriptions are defined in Soil Taxonomy (*11*). 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."

Alaga Series

The Alaga series consists of very deep and somewhat excessively drained soils. These soils formed in sandy, unconsolidated marine sediment on uplands and stream terraces. Slopes range from 0 to 4 percent.

Alaga soils are near Chipley, Kenansville, Leon, and Nawney soils. Alaga soils have more sand than Kenansville and Nawney soils and are better drained than Chipley, Leon, and Nawney soils.

Typical pedon of Alaga fine sand, about 0.3 mile north-northwest of junction of VA-619 and abandoned Norfolk and Western Railway, 1.5 miles south-southwest of junction of VA-614 and VA-648, and about 1.3 miles west of Walters:

A—0 to 3 inches; mottled brown (10YR 5/3) and dark grayish brown (10YR 4/2) fine sand; single grain; loose; many fine and medium roots; strongly acid; clear smooth boundary.

C1—3 to 30 inches; light yellowish brown (2.5Y 6/4) loamy fine sand; single grain; loose; few fine, medium, and coarse roots; strongly acid; gradual smooth boundary.

C2—30 to 50 inches; pale brown (10YR 6/3) loamy fine sand; single grain; loose; few fine roots; strongly acid; diffuse smooth boundary.

C3—50 to 60 inches; pale brown (10YR 6/3) loamy fine sand; single grain; loose; few fine and medium roots; strongly acid.

The sandy material is more than 80 inches thick. Unless the soils are limed, reaction is strongly acid through moderately acid.

The A horizon has hue of 10YR or 2.5Y, value of 3 through 5, and chroma of 2 or 3. It is fine sand or sand.

The C horizon has hue of 7.5YR through 2.5Y, value of 5 through 7, and chroma of 3 through 8. In some pedons the horizon in the lower part has gray mottles. It is loamy sand or loamy fine sand.

Bohicket Series

The Bohicket series consists of very deep, very poorly drained soils that are inundated twice daily by brackish water. These soils formed in fine textured fluvial sediment in tidal marshes and backwater areas. Slopes are 0 to 1 percent.

Bohicket soils are near Alaga, Chipley, Kenansville, Nawney, and Rappahannock soils. Alaga, Chipley, and Kenansville soils are in higher positions on the landscape, generally small islands and points, and are better drained than Bohicket soils. Nawney soils are flooded frequently, but not daily, by brackish water. Rappahannock soils have a thick organic layer over a mineral layer.

Typical pedon of Bohicket silty clay loam, about 0.6 mile northwest of junction of US-10 bypass and US-10-258 business, about 0.6 mile south of Smithfield:

Ag—0 to 11 inches; dark gray (5Y 4/1) silty clay loam; massive; sticky; many fine, medium, and coarse fibrous roots; neutral; gradual smooth boundary.

Cg1—11 to 19 inches; very dark gray (2.5Y 3/1) silty clay; pockets of silt loam; massive; very sticky; many medium roots; neutral; gradual wavy boundary.

Cg2—19 to 43 inches; greenish gray (5GY 5/1) silty clay; pockets of light gray (10YR 7/1) sandy loam; massive; very sticky; few fine roots; neutral; clear wavy boundary.

Cg3—43 to 60 inches; dark greenish gray (5GY 4/1) clay; few coarse distinct greenish gray (5BG 6/1) mottles; few pockets of light gray (10YR 7/1) fine sandy loam; massive; sticky; mildly alkaline.

These soils are continuously saturated by brackish water. The soil salinity is high. The *n* value is greater than 1.0. Reaction is slightly acid through moderately alkaline.

The A horizon is neutral or has hue of 10YR, 2.5Y, 5Y, or 5G; value is 2 through 5, and chroma is 0 through 2. It is silty clay loam or silty clay.

The Cg horizon is neutral or has hue of 10YR, 2.5Y, 5Y, 5GY, or 5BG; value is 2 through 7, and chroma is 0 through 2. The Cg horizon in the upper part is clay, silty clay, or clay loam. Some pedons do not have pockets of silt loam or sandy loam. The Cg horizon in the lower part ranges from sand to clay.

Chickahominy Series

The Chickahominy series consists of very deep, poorly drained soils. These soils formed in clayey and loamy unconsolidated marine sediment on uplands. Slopes range from 0 to 2 percent.

Chickahominy soils are near Yemassee, Kinston, Nawney, and Peawick soils. Chickahominy soils are wetter than Yemassee and Peawick soils. They have more clay in the subsoil than Yemassee, Kinston, and Nawney soils.

Typical pedon of Chickahominy silt loam, 1.2 miles north-northeast of junction of VA-616 and US-58, 1 mile north-northwest of junction of US-58 and US-258, and 4.1 miles west of Carrsville:

Ap—0 to 2 inches; very dark gray (10YR 3/1) silt loam; moderate fine and medium subangular blocky structure; friable; slightly sticky and slightly plastic; many fine, medium, and coarse roots; very strongly acid; abrupt smooth boundary.

Btg1—2 to 18 inches; gray (N 6/0) silty clay; common medium distinct strong brown (7.5YR 5/8) and red (2.5YR 4/8) mottles; strong medium and coarse angular blocky structure; firm, sticky and plastic; common fine, medium, and coarse roots; few faint clay films on faces of peds; extremely acid; clear wavy boundary.

Btg2—18 to 33 inches; dark gray (N 4/0) clay; few fine distinct yellowish brown (10YR 5/8) and yellowish red (5YR 5/8) mottles; moderate fine, medium, and coarse angular blocky structure; firm, sticky and plastic; common fine and medium roots; common distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg3—33 to 58 inches; light brownish gray (2.5Y 6/2) silty clay; many coarse faint gray (N 5/0) and brownish yellow (10YR 6/8) mottles; moderate coarse prismatic structure parting to moderate fine and medium angular blocky; firm, sticky and plastic; few fine and medium roots; common distinct clay films on faces of peds; few fine mica flakes; very strongly acid; clear smooth boundary.

Btg4—58 to 65 inches; light brownish gray (2.5Y 6/2) silty clay; many medium distinct olive yellow (2.5Y 6/6) and yellowish red (5YR 5/8) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; common distinct clay films on faces of peds; common fine mica flakes; very strongly acid.

The solum is 60 or more inches thick. The content of coarse fragments ranges from 0 to 2 percent throughout. Unless the soils are limed, reaction is extremely acid through strongly acid.

The A horizon has hue of 10YR through 5Y, value of 3 through 6, and chroma of 1 or 2. Where value is 3, the horizon is less than 6 inches thick. It is loam or silt loam.

The Btg horizon is neutral or has hue of 10YR through 5Y, value of 4 through 7, and chroma of 0 through 2. It is clay, clay loam, or silty clay.

Some pedons have a Cg horizon that has colors similar to those of the Btg horizon or that is mottled. It is commonly stratified and ranges from sand to clay.

Chipley Series

The Chipley series consists of very deep, moderately well drained soils. These soils formed in sandy unconsolidated marine sediment on upland and terraces. Slopes range from 0 to 4 percent.

Chipley soils are near Alaga, Chickahominy, and Nawney soils. Chipley soils are not as well drained as Alaga soils. Chipley soils have more sand and are better drained than Chickahominy and Nawney soils.

Typical pedon of Chipley sand, about 0.7 mile north-northeast of eastern junction of VA-614 and VA-603, 0.8 mile northeast of where VA-603 crosses the Blackwater River, and about 2.8 miles northwest of Walters:

Ap—0 to 6 inches; mottled dark gray (10YR 4/1), gray (10YR 5/1), and dark grayish brown (10YR 4/2) sand; weak fine granular structure; very friable; common fine and medium roots; very strongly acid; clear wavy boundary.

C1—6 to 12 inches; pale yellow (2.5Y 7/4) sand; many fine and medium faint light olive brown (2.5Y 5/4) mottles; single grain; loose; common fine and medium roots; strongly acid; clear wavy boundary.

C2—12 to 25 inches; light yellowish brown (2.5Y 6/4) sand; common fine and medium faint pale yellow (2.5Y 8/4) mottles; single grain; loose; common fine and medium roots; strongly acid; clear wavy boundary.

C3—25 to 36 inches; pale yellow (2.5Y 7/4) sand; many fine and medium distinct light gray (2.5Y 7/2) mottles; single grain; loose; common fine and medium roots; strongly acid; clear wavy boundary.

C4—36 to 60 inches; very pale brown (10YR 7/3) sand; common coarse distinct pinkish gray (7.5YR 7/2) mottles; single grain; loose; few fine and medium roots; moderately acid.

The sandy material is more than 80 inches thick. Unless the soils are limed, reaction is very strongly acid through moderately acid.

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

The C horizon has hue of 10YR or 2.5Y, value of 6 through 8, and chroma of 1 through 8 or it is mottled in shades of brown, yellow, white, and gray.

Emporia Series

The Emporia series consists of very deep, well drained soils. These soils formed in loamy unconsolidated marine sediment on uplands. Slopes range from 0 to 6 percent.

Emporia soils are near Nawney, Slagle, Uchee, and Yemassee soils. Emporia soils are better drained than Nawney, Slagle, and Yemassee soils and have less sand in the surface layer than Uchee soils.

Typical pedon of Emporia fine sandy loam, 0 to 2 percent slopes, about 0.2 mile east-southeast of junction of VA-612 and VA-611, 53 feet south of VA-611, and about 2.5 miles east of Walters:

A—0 to 3 inches; mottled dark grayish brown (10YR 4/2) and light brownish gray (2.5Y 6/2) fine sandy loam; weak fine granular structure; very friable; many fine, medium, and coarse roots; very strongly acid; clear smooth boundary.

E—3 to 15 inches; light yellowish brown (2.5Y 6/4) fine sandy loam; many medium faint light gray (2.5Y 7/2) mottles; massive; friable; common fine, medium, and coarse roots; very strongly acid; clear smooth boundary.

Bt1—15 to 33 inches; yellowish brown (10YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; common fine and medium roots; many sand grains coated and bridged with clay; very strongly acid; clear wavy boundary.

Bt2—33 to 40 inches; yellowish brown (10YR 5/8) sandy loam; common fine faint strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; common fine and medium roots; common sand grains coated and bridged with clay; very strongly acid; gradual smooth boundary.

Bt3—40 to 50 inches; yellowish brown (10YR 5/8) sandy loam; many medium and coarse faint strong brown (7.5YR 5/8) and light brownish gray (2.5Y 6/2) mottles; weak medium subangular blocky structure;

firm, slightly sticky and slightly plastic; few fine roots; common sand grains coated and bridged with clay; strongly acid; gradual smooth boundary.

Bt4—50 to 60 inches; yellowish brown (10YR 5/8) sandy loam; many medium and coarse distinct gray (10YR 6/1) and yellowish red (5YR 5/8) mottles; weak medium subangular blocky structure; friable and firm, slightly sticky and slightly plastic; few fine and medium roots; common sand grains coated and bridged with clay; strongly acid; diffuse smooth boundary.

The solum ranges from 40 to 75 inches in thickness. The content of coarse fragments ranges from 0 to 15 percent in the solum and from 0 to 35 percent in the C horizon. Unless the soils are limed, reaction is very strongly acid or strongly acid.

The A horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 1 through 4. The E horizon has hue of 10YR or 2.5Y, value of 5 through 8, and chroma of 3 or 4. The A and E horizons are fine sandy loam, sandy loam, or loamy sand.

The Bt1 and Bt2 horizons have hue of 5YR through 10YR, value of 4 through 6, and chroma of 3 through 8. The Bt3 and Bt4 horizons are neutral or have hue of 5YR through 2.5Y, value of 4 through 8, and chroma of 0 through 8, or they are mottled. The B horizon is fine sandy loam, sandy loam, sandy clay loam, or sandy clay.

Some pedons have a C horizon that is neutral or has hue of 10YR through 5Y, value of 3 through 8, and chroma of 0 through 8. Most pedons have mottles of high and low chroma. The horizon ranges from sandy loam to clay.

Kenansville Series

The Kenansville series consists of very deep, well drained soils. These soils formed in loamy unconsolidated marine sediment on uplands. Slopes range from 0 to 4 percent.

Kenansville soils are near Alaga, Chipley, Nawney, Rumford, Slagle, and Uchee soils. Kenansville soils are better drained than Nawney, Slagle, and Uchee soils. They have a thicker, sandier surface layer than that of Rumford and Slagle soils and have more clay in the subsoil than Alaga and Chipley soils.

Typical pedon of Kenansville loamy sand, 0.4 mile southwest of the intersection of US-460 and VA-645, 99 feet southeast of VA-638, and about 1.6 miles southeast of Zuni:

Ap—0 to 5 inches; brown (10YR 5/3) loamy sand; few fine and medium faint dark brown (10YR 3/3) mottles; single grain; loose; common fine, medium, and coarse roots; strongly acid; clear smooth boundary.

E—5 to 28 inches; light yellowish brown (2.5Y 6/4) loamy sand; single grain; loose; few fine and medium roots; strongly acid; clear smooth boundary.

Bt1—28 to 32 inches; yellowish brown (10YR 5/4) sandy loam; few fine and medium faint yellowish brown (10YR 5/6) mottles; weak medium and coarse subangular blocky structure; friable; few fine and medium roots; few faint clay films on faces of peds; very strongly acid; clear smooth boundary.

Bt2—32 to 41 inches; yellowish brown (10YR 5/6) sandy loam; weak medium and coarse subangular blocky structure; friable, slightly sticky; few fine and medium roots; common faint clay films on faces of peds; very strongly acid; clear smooth boundary.

BC—41 to 49 inches; yellowish brown (10YR 5/6) loamy sand; weak coarse subangular blocky structure; very friable; few fine and medium roots; strongly acid; clear broken boundary.

C—49 to 60 inches; brownish yellow (10YR 6/6) sand; single grain; loose; few fine and medium roots; strongly acid; clear smooth boundary.

The solum ranges from 40 to 60 inches in thickness. Unless the soils are limed, reaction ranges from very strongly acid through moderately acid.

The A horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 1 through 3. The E horizon has hue of 10YR or 2.5Y, value of 5 through 8, and chroma of 3 through 8. The A and E horizons are fine sand or loamy sand.

The Bt horizon has hue of 7.5YR through 2.5Y, value of 5 or 6, and chroma of 4 through 8. It is sandy loam or fine sandy loam.

The BC and C horizons have hue of 10YR, value of 5 through 8, and chroma of 1 through 8. They are loamy sand or sand.

Kinston Series

The Kinston series consists of very deep, poorly drained soils. These soils formed in loamy fluvial sediment on flood plains. Slopes range from 0 to 4 percent.

Kinston soils are near Alaga, Nawney, Slagle, and Uchee soils. Nawney soils are flooded for a longer period of time than Kinston soils. Alaga, Slagle, and Uchee soils are better drained than Kinston soils.

Typical pedon of Kinston loam, about 1.2 miles north-northwest of junction of VA-646 and VA-638, 1.0 mile south-southeast of junction of VA-646 and VA-645, and about 3.7 miles northwest of Windsor:

A1—0 to 4 inches; dark grayish brown (10YR 4/2) loam; weak fine, medium, and coarse subangular blocky structure; very friable; many fine, medium, and coarse roots; strongly acid; clear smooth boundary.

A2—4 to 9 inches; dark grayish brown (10YR 4/2) fine sandy loam; many fine distinct dark yellowish brown (10YR 3/6) and gray (10YR 5/1) mottles; moderate fine, medium, and coarse subangular blocky structure; very friable; common fine, medium, and coarse roots; very strongly acid; gradual wavy boundary.

Cg1—9 to 22 inches; grayish brown (2.5Y 5/2) sandy clay loam; common fine and medium distinct dark grayish brown (10YR 4/2) and reddish brown (5YR 4/4) mottles; weak coarse subangular blocky structure; very friable; common fine, medium, and coarse roots; strongly acid; gradual smooth boundary.

Cg2—22 to 28 inches; very dark grayish brown (10YR 3/2) sandy clay loam; many fine and medium distinct grayish brown (10YR 5/2) mottles; weak fine, medium, and coarse subangular blocky structure; very friable; common fine, medium, and coarse roots; strongly acid; clear smooth boundary.

Cg3—28 to 34 inches; grayish brown (2.5Y 5/2) sandy loam; many medium and coarse faint dark grayish brown (10YR 4/2) mottles; weak coarse subangular blocky structure; very friable; common fine, medium, and coarse roots; strongly acid; gradual wavy boundary.

Cg4—34 to 47 inches; very dark grayish brown (10YR 3/2) sandy loam; many medium distinct grayish brown (10YR 5/2) mottles; weak coarse subangular blocky structure; very friable; common fine, medium, and coarse roots; strongly acid; gradual wavy boundary.

Cg5—47 to 60 inches; gray (10YR 5/1) sandy clay loam; pockets of sandy loam; massive; friable, sticky and plastic; common fine, medium, and coarse roots; strongly acid; gradual wavy boundary.

The loamy sediment ranges from 40 to 60 inches in thickness. Organic carbon content decreases irregularly to a depth of 50 inches. Reaction is very strongly acid or strongly acid.

The A horizon is neutral or has hue of 10YR, value of 3 through 5, and chroma of 1 through 3. It is fine sandy loam, loam, or silt loam.

The C horizon is neutral or has hue of 10YR or 2.5Y, value of 3 through 7, and chroma of 1 or 2 and, in some pedons, few or common mottles of high chroma. The horizon is sandy loam, sandy clay loam, clay loam, and silt loam.

Leon Series

The Leon series consists of very deep, poorly drained soils. These soils formed in sandy unconsolidated marine sediment on uplands and terraces. Slopes range from 0 to 4 percent.

Leon soils are near Alaga, Chickahominy, Chipley, and Nawney soils. Leon soils have a spodic horizon; these other soils do not.

Typical pedon of Leon sand, in an area of Leon-Chipley sands, about 0.3 mile northeast of where VA-603 crosses the Blackwater River and 2.5 miles northwest of Walters:

A—0 to 6 inches; dark gray (10YR 4/1) sand; single grain; loose; many fine, medium, and coarse roots; extremely acid; clear wavy boundary.

E—6 to 22 inches; light gray (10YR 7/1) sand; common medium faint light brownish gray (10YR 6/2) mottles; single grain; loose; common fine, medium, and coarse roots; very strongly acid; clear wavy boundary.

Bh1—22 to 29 inches; dark reddish brown (5YR 3/2) sand; massive; firm and very firm, brittle in approximately 50 percent of the horizon; 1 to 2 percent cemented nodules; 1/16 to 1/2 inch in diameter; few thin roots; extremely acid; clear wavy boundary.

Bh2—29 to 36 inches; yellowish brown (10YR 5/4) sand; common fine and medium dark brown (10YR 3/3) mottles; massive; very friable, brittle in approximately 20 percent of the horizon; 2 to 5 percent cemented nodules, 1/16 to 1 inch in diameter; few fine and medium roots; very strongly acid; clear smooth boundary.

Bh3—36 to 41 inches; dark brown (7.5YR 3/2) sand; massive; friable; 5 percent angular and subangular quartz gravel; very strongly acid; clear broken boundary.

BC—41 to 60 inches; brown (10YR 5/3) sand; common medium faint dark grayish brown (10YR 4/2) mottles; single grain; loose; strongly acid; clear wavy boundary.

The sandy material is more than 80 inches thick. Unless the soils are limed, reaction is extremely acid through strongly acid. In most areas the Bh horizon is weakly cemented.

The A horizon is neutral or has hue of 10YR, value of 2 through 4, and chroma of 0 or 1. The E horizon is neutral or has hue of 10YR or 2.5Y, value of 5 through 8, and chroma of 0 through 2.

The Bh horizon has hue of 5YR through 10YR, value of 2 through 5, and chroma of 1 through 4. It is 10 to 60 percent brittle.

The BC horizon has hue of 7.5YR or 10YR, value of 3 through 5, and chroma of 2 through 4 and, in some pedons, gray, brown, or yellow mottles.

Myatt Series

The Myatt series consists of very deep, poorly drained soils. These soils formed in loamy unconsolidated marine sediment on uplands. Slopes range from 0 to 2 percent.

Myatt soils are near Kinston, Slagle, and Yemassee soils. Kinston soils do not have an argillic horizon. Myatt soils are wetter than Slagle and Yemassee soils.

Typical pedon of Myatt fine sandy loam, about 0.1 mile south-southwest of the junction of VA-619 and VA-641, 0.3 mile south-southwest of junction of VA-614 and VA-641, and 1.7 miles southeast of Walters:

Ap—0 to 6 inches; very dark gray (10YR 3/1) fine sandy loam; weak fine granular structure; friable; many fine, medium, and coarse roots; very strongly acid; clear wavy boundary.

Eg—6 to 15 inches; light brownish gray (2.5Y 6/2) fine sandy loam; few medium faint pale olive (5Y 6/4) mottles; massive; friable; many fine and medium roots; very strongly acid; clear wavy boundary.

Btg1—15 to 35 inches; gray (10YR 6/1) sandy clay loam; many medium distinct yellowish brown (10YR 5/8) and reddish yellow (7.5YR 6/8) mottles; weak fine and medium subangular blocky structure; friable; slightly sticky and slightly plastic; few fine and medium roots; common faint clay films on faces of peds; very strongly acid; diffuse smooth boundary.

Btg2—35 to 51 inches; gray (10YR 6/1) sandy clay loam; many medium distinct strong brown (7.5YR 5/8) and reddish yellow (7.5YR 6/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; common faint clay films on faces of peds; very strongly acid; diffuse smooth boundary.

Cg—51 to 60 inches; gray (10YR 6/1) sandy clay loam; many medium distinct brownish yellow (10YR 6/8) and yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; friable, slightly sticky; very strongly acid.

The solum ranges from 40 to 60 inches in thickness. Unless the soils are limed, reaction in the A, E, and Bt horizons is very strongly acid or strongly acid and that in the Cg horizon is very strongly acid to extremely acid.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 3 through 6, and chroma of 1 or 2. The Eg horizon has hue of 10YR or 2.5Y, value of 6, and chroma of 1 or 2, or value of 5, and chroma of 1. The A and E horizons are fine sandy loam or loam.

The Btg horizon has hue of 10YR, value of 6 or 7, and chroma of 1. It is mottled in shades of brown and yellow. It is sandy clay loam, loam, or clay loam.

The Cg horizon has the same colors as the Btg horizon or it is mottled gray, brown, and yellow. It is sandy clay loam or clay loam.

Nawney Series

The Nawney series consists of very deep, very poorly drained soils. These soils formed in loamy fluvial and marine sediment on flood plains. Slopes range from 0 to 2 percent.

Nawney soils are near Alaga, Chipley, Kinston, Slagle, and Yemassee soils. Alaga, Chipley, Kinston, Slagle, and Yemassee soils are better drained than Nawney soils.

Typical pedon of Nawney loam, about 0.2 mile west of junction of VA-657 and VA-638, 0.7 mile east-northeast of junction of VA-638 and VA-641, and about 2.5 miles northwest of Windsor:

A1—0 to 5 inches; very dark gray (5Y 3/1) loam, gray (5Y 6/1) dry; few fine distinct strong brown (7.5YR 5/6) mottles; moderate fine and medium granular structure; friable, slightly sticky; many fine, medium, and coarse roots; strongly acid; clear wavy boundary.

A2—5 to 10 inches; olive gray (5Y 4/2) loam, few fine distinct strong brown (7.5YR 5/6) mottles; moderate fine and medium granular structure; friable, slightly sticky; many fine and medium roots; strongly acid; clear smooth boundary.

Cg1—10 to 30 inches; grayish brown (2.5Y 5/2) loam; many fine distinct strong brown (7.5YR 4/6) mottles; weak fine and medium granular structure; friable, slightly sticky; many fine, medium, and coarse roots; strongly acid; gradual wavy boundary.

Cg2—30 to 35 inches; gray (10YR 5/1) sandy loam; pockets of sandy clay loam and clay loam; many fine and medium distinct reddish brown (5YR 4/4) and dark yellowish brown (10YR 4/4) mottles; massive; friable, sticky and plastic; common fine, medium, and coarse roots; strongly acid; clear wavy boundary.

Cg3—35 to 44 inches; gray (10YR 6/1) fine sandy loam; few fine and medium distinct strong brown (7.5YR 4/6) mottles; massive; very friable; strongly acid; gradual wavy boundary.

Cg4—44 to 54 inches; gray (10YR 6/1) loamy sand; many fine and medium distinct yellowish brown (10YR 5/4) mottles; massive; very friable; strongly acid; clear wavy boundary.

Cg5—54 to 60 inches; dark gray (10YR 4/1) sandy clay loam; pockets of clay loam and silty clay loam; common medium faint gray (10YR 6/1) mottles; massive; friable; few fine, medium, and coarse roots; strongly acid.

Depth to sandy horizons ranges from 40 to 60 inches. The content of coarse fragments ranges from 0 to 15 percent throughout. Organic carbon content decreases irregularly to a depth of 30 inches. Reaction is extremely acid through strongly acid above a depth of 40 inches and extremely acid through slightly acid below a depth of

40 inches. Some pedons have one or more buried A horizons.

The A horizon is neutral or has hue of 7.5YR through 5Y, value of 2 through 5, and chroma of 0 through 2. It is fine sandy loam, sandy loam, loam, or silt loam.

The C horizon is neutral or has hue of 10YR through 5GY, value of 4 through 7, and chroma of 0 through 2. The C horizon in the upper part is sandy loam, fine sandy loam, loam, sandy clay loam, clay loam, or silty clay loam. Some pedons have pockets or strata of coarser or finer texture. The C horizon in the lower part is stratified and ranges from sand to clay.

Nevarc Series

The Nevarc series consists of very deep, moderately well drained soils. These soils formed in fine and medium textured unconsolidated marine sediment on uplands and terraces. Slopes range from 15 to 60 percent.

Nevarc soils are near Alaga, Nawney, Peawick, Remlik, and Slagle soils. Unlike Nevarc soils, Alaga, Nawney, Peawick, and Slagle soils are on slopes of 10 percent or less. Nevarc soils have more clay than Nawney, Remlik, and Slagle soils.

Typical pedon of Nevarc silt loam, in an area of Nevarc and Remlik soils, 15 to 60 percent slopes, about 0.4 mile southeast of junction of VA-673 and VA-672, 1.1 miles east of junction of VA-672 and VA-674, and about 3.1 miles northeast of Smithfield:

A—0 to 4 inches; very dark grayish brown (10YR 3/2) silt loam; weak, fine, and medium subangular blocky structure; friable, slightly sticky and slightly plastic; many fine, medium, and coarse roots; extremely acid; clear wavy boundary.

Bt1—4 to 8 inches; yellowish brown (10YR 5/4) silty clay loam; weak fine and medium subangular blocky structure; friable, slightly sticky and slightly plastic; common fine, medium, and coarse roots; few faint dry films on faces of peds; very strongly acid; abrupt smooth boundary.

Bt2—8 to 23 inches; yellowish brown (10YR 5/6) silty clay; few fine distinct strong brown (7.5YR 5/8) mottles; moderate fine subangular blocky structure parting to weak, thin platy; friable, sticky and plastic; common fine, medium, and coarse roots; few faint clay films on faces of peds; extremely acid; gradual smooth boundary.

Bt3—23 to 36 inches; mottled yellowish brown (10YR 5/6), yellowish red (5YR 5/8), and gray (10YR 6/1) clay loam; moderate medium and coarse subangular blocky structure parting to weak thin platy; friable, sticky and plastic; common fine and medium roots; few faint clay films on faces of peds; extremely acid; clear wavy boundary.

Bt4—36 to 57 inches; mottled light olive brown (2.5Y 5/4), light brownish gray (2.5Y 6/2), and strong brown (7.5YR 5/8) clay loam; weak thick prismatic structure parting to weak medium and coarse angular blocky parting to weak thick platy; friable, sticky and plastic; common fine and medium roots; few faint clay films on faces of peds; extremely acid; abrupt smooth boundary.

C—57 to 64 inches; mottled light olive brown (2.5Y 5/4) and gray (10YR 6/1) sandy clay loam; pockets of sandy loam; massive; friable, slightly sticky and slightly plastic; extremely acid.

The solum ranges from 30 to about 60 inches in thickness. Unless the soils are limed, reaction is extremely acid through moderately acid.

The A horizon has hue of 7.5YR through 2.5Y, value of 2 through 7, and chroma of 2 through 8. It is loamy sand, sandy loam, loam, or silt loam.

The Bt horizon in the upper part has hue of 5YR through 10YR, value of 4 through 7, and chroma of 4 through 8 and, in some pedons, mottles of high chroma. The Bt horizon in the lower part has hue of 5YR through 2.5Y, value of 4 through 7, and chroma of 1 through 8 and few to many mottles of high and low chroma. The Bt horizon is clay loam, silty clay loam, silty clay, or clay.

The C horizon is mottled in shades of gray, brown, yellow, or red. It ranges from loamy sand to sandy clay loam.

Peawick Series

The Peawick series consists of very deep, moderately well drained soils. These soils formed in clayey and silty unconsolidated marine sediment on uplands. Slopes range from 0 to 10 percent.

Peawick soils are near Chickahominy, Nawney, Slagle, and Yemassee soils. Peawick soils have more clay than Nawney, Slagle, and Yemassee soils and are better drained than Chickahominy and Nawney soils.

Typical pedon of Peawick silt loam, 0 to 2 percent slopes, about 2.4 miles north-northeast of junction of VA-676 and US-10 and about 2.8 miles northeast of Rushmere:

Ap—0 to 4 inches; dark gray (10YR 4/1) silt loam; weak fine and medium subangular blocky structure; friable, slightly sticky and slightly plastic; many fine, medium, and coarse roots; extremely acid; clear wavy boundary.

Bt1—4 to 8 inches; light olive brown (2.5Y 5/4) silty clay loam; weak fine and medium subangular blocky structure; friable, slightly sticky and slightly plastic; common fine, medium, and coarse roots; few thin clay films on faces of peds; very strongly acid; abrupt smooth boundary.

Bt2—8 to 23 inches; yellowish brown (10YR 5/6) silty clay; few fine distinct strong brown (7.5YR 5/8) mottles; moderate fine subangular blocky structure parting to weak thin platy; friable, sticky and plastic; common fine, medium, and coarse roots; few distinct clay films on faces of peds; extremely acid; gradual smooth boundary.

Bt3—23 to 36 inches; mottled yellowish brown (10YR 5/6), yellowish red (5YR 5/8), and gray (10YR 6/1) clay loam; moderate medium and coarse subangular blocky structure parting to weak thin platy; friable, sticky and plastic; common fine and medium roots; few distinct clay films on faces of peds; extremely acid; clear wavy boundary.

Bt4—36 to 70 inches; mottled light olive brown (2.5Y 5/4), light brownish gray (2.5Y 6/2), and strong brown (7.5YR 5/8) clay loam; weak coarse prismatic structure parting to weak medium and coarse angular blocky; friable, sticky and plastic; common fine and medium roots; few faint clay films on faces of prisms; extremely acid.

The solum is more than 60 inches thick. Unless the soils are limed, reaction is extremely acid through strongly acid.

The Ap horizon has hue of 10YR through 5Y, value of 2 through 6, and chroma of 1 through 4. Where value is 2 or 3, the horizon is less than 6 inches thick. It is loam or silt loam and, in eroded areas, clay loam.

The Bt horizon in the upper part has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 4 through 8. The Bt horizon in the lower part is neutral or has hue of 10YR through 5Y, value of 5 through 7, and chroma of 0 through 8, or it is multicolored. The Bt horizon is clay loam, silty clay loam, silty clay, or clay.

Some pedons have a C horizon that is neutral or has hue of 10YR through 5Y, value of 4 through 7, and chroma of 0 through 2. It ranges from fine sandy loam to clay.

Rappahannock Series

The Rappahannock series consists of very deep, very poorly drained soils. These soils are inundated twice daily by brackish water. They formed in stratified, highly decomposed plant remains and fluvial sediment. They are in tidal marsh areas along the James River. Slopes are less than 1 percent.

Rappahannock soils are near Bohicket, Peawick, and Slagle soils. Peawick and Slagle soils are on higher positions on the landscape, generally small islands, and are better drained than Rappahannock soils. Bohicket soils do not have a thick organic layer.

Typical pedon of Rappahannock muck, about 0.6 mile east of junction of US-17, US-258, and the Carrisbrook entrance, 1.2 miles northeast of junction of VA-662 and VA-663, about 0.9 mile south of the bridge over the James River:

Oa1—0 to 15 inches; very dark grayish brown (2.5Y 3/2) muck (sapric material); massive; nonsticky; many fine and medium roots; mild sulfide odor; mildly alkaline; clear smooth boundary.

Oa2—15 to 33 inches; very dark gray (2.5Y 3/1) muck (sapric material); massive; nonsticky; many fine and medium roots; mild sulfide odor; mildly alkaline; clear smooth boundary.

Oa3—33 to 40 inches; very dark gray (2.5Y 3/0) muck (sapric material); massive; slightly sticky; many fine roots; moderate sulfide odor; moderately alkaline; gradual smooth boundary.

Cg—40 to 60 inches; very dark gray (2.5Y 3/1) silty clay loam; massive; sticky and slightly plastic; few fine roots; moderate sulfide odor; moderately alkaline.

Sulfur content is more than 0.75 percent in some horizons within 40 inches of the surface. The organic layers in the control section consist of sapric or hemic material. Some pedons have a surface tier that consists of fibric material. Some pedons have mineral strata below the surface tier. Reaction is strongly acid through moderately alkaline.

The organic material is neutral or has hue of 10YR through 5GY, value of 2 or 3, and chroma of 0 through 2. It is muck or mucky peat. The *n* value is commonly less than 1.

The mineral strata are neutral or have hue of 10YR through 5GY, value of 2 through 5, and chroma of 0 through 2. They are silt loam through clay above a depth of 35 inches and are sandy loam and loamy sand below a depth of 35 inches. The *n* value ranges from less than 0.4 to 2.0.

Remlik Series

The Remlik series consists of very deep, well drained and somewhat excessively drained soils. These soils formed in loamy unconsolidated marine sediment on steep side slopes along well incised drainageways, on very narrow ends of ridges, points, and on terrace breaks. Slopes range from 15 to 60 percent.

Remlik soils are near Alaga, Nawney, Nevarc, Peawick, and Slagle soils. Unlike Remlik soils, Alaga, Nawney, Peawick, and Slagle soils are on slopes of 10 percent or less. Remlik soils have less clay in the profile than Nevarc and Peawick soils.

Typical pedon of Remlik loamy sand, in an area of Nevarc and Remlik soils, 15 to 60 percent slopes, about 0.3 mile north of junction of US-10 and VA-677 and 0.6 mile north of junction of US-10 bypass and US-10 business, about 4.4 miles north of Smithfield:

A—0 to 7 inches; mottled very dark grayish brown (10YR 5/2) and brown (10YR 5/3) loamy sand; weak fine and medium granular structure; friable; many fine, medium, and coarse roots; strongly acid; clear smooth boundary.

E—7 to 28 inches; yellowish brown (10YR 5/4) loamy sand; many faint coarse light yellowish brown (2.5Y 6/4) mottles; massive; friable; common fine, medium, and coarse roots; strongly acid; clear smooth boundary.

Bt1—28 to 32 inches; yellowish brown (10YR 5/8) sandy clay loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; common fine, medium, and coarse roots; many sand grains bridged with clay; strongly acid; clear smooth boundary.

Bt2—32 to 48 inches; yellowish brown (10YR 5/8) sandy clay loam; many fine and medium faint strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine and medium roots; many sand grains bridged with clay; strongly acid; common wavy boundary.

Bt3—48 to 52 inches; yellowish brown (10YR 5/8) sandy loam; many medium prominent strong brown (7.5YR 5/6) and red (10R 4/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine and medium roots; common sand grains bridged with clay; strongly acid; clear smooth boundary.

C—52 to 60 inches; grayish brown (10YR 5/2) loamy sand; many medium and coarse prominent yellowish brown (10YR 5/6) and red (10R 5/8) mottles; massive; friable, slightly sticky and slightly plastic; few sand grains bridged with clay; strongly acid.

The solum ranges from 30 to 60 inches in thickness. Unless the soils are limed, reaction is extremely acid through moderately acid.

The A horizon has hue of 10YR or 2.5Y, value of 2 through 5, and chroma of 2 through 4. The E horizon has hue of 10YR or 2.5Y, value of 5 through 7, and chroma of 3 through 8. The A and E horizons are fine sand, loamy sand, or loamy fine sand.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 through 6, and chroma of 4 through 8. The Bt horizon in the lower part is mottled and, in some pedons, has hue of 2.5Y. The Bt horizon is sandy loam, fine sandy loam, or sandy clay loam.

The C horizon has hue of 7.5YR or 10YR, value of 5 through 7, and chroma of 2 through 8, or it is mottled. It is sand or loamy sand and commonly has lamellae of sandy loam.

Rumford Series

The Rumford series consists of very deep, somewhat excessively drained soils. These soils formed in loamy unconsolidated marine sediment on uplands. Slopes range from 0 to 4 percent.

Rumford soils are near Alaga, Chickahominy, Chipley, Emporia, Kenansville, and Kinston soils. Rumford soils are better drained than Chickahominy, Chipley, and Kinston soils. Unlike Rumford soils, Kenansville soils have a thick sandy surface layer. Unlike Alaga and Chipley soils, Rumford soils have a horizon of accumulated clay.

Typical pedon of Rumford loamy sand, about 0.29 mile north-northwest of intersection of US-10 and VA-644, 0.98 mile south of US-10 and Smithfield Boulevard, and 2.5 miles southeast of Smithfield:

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) loamy sand; weak fine granular structure; very friable; strongly acid; abrupt smooth boundary.

E—9 to 16 inches; yellowish brown (10YR 5/4) loamy sand; massive; very friable; strongly acid; gradual smooth boundary.

Bt—16 to 36 inches; strong brown (7.5YR 5/6) sandy loam; weak medium subangular blocky structure; friable; few sand grains bridged with clay; very strongly acid; diffuse smooth boundary.

C—36 to 60 inches; mottled yellow (2.5Y 7/6) and olive yellow (2.5Y 6/6) sand; single grain; loose; very strongly acid; gradual smooth boundary.

The solum ranges from 28 to 55 inches in thickness. The content of quartz pebbles ranges from 0 to 50 percent in the C horizon. Unless the soils are limed, reaction is very strongly acid or strongly acid.

The Ap horizon has hue of 10YR, value of 3 through 6, and chroma of 2 through 4. The E horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 3 or 4. The Ap and E horizons are loamy sand or loamy fine sand.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 through 8. It is sandy loam, fine sandy loam, or sandy clay loam.

The C horizon has hue of 10YR or 2.5Y, value of 5 through 8, and chroma of 3 through 8, or it is mottled. It is sand, gravelly sand, or very gravelly sand. Some pedons have thin strata of sandy clay loam.

Slagle Series

The Slagle series consists of very deep, moderately well drained soils. These soils formed in loamy unconsolidated marine sediment on uplands. Slopes range from 0 to 10 percent.

Slagle soils are near Kinston, Myatt, Nawney, Uchee, and Yemassee soils. Slagle soils are wetter than the Uchee soils and are better drained than Kinston, Myatt, Nawney, and Yemassee soils.

Typical pedon of Slagle fine sandy loam, 0 to 2 percent slopes, about 1.0 mile north-northwest of junction of VA-600 and VA-700, 1.3 miles northeast of junction of VA-600 and VA-606, and 3.1 miles northeast of Windsor:

Ap—0 to 7 inches; dark grayish brown (2.5Y 4/2) fine sandy loam; weak fine and medium subangular blocky structure; friable; many medium and coarse roots; very strongly acid; clear smooth boundary.

E—7 to 13 inches; light olive brown (2.5Y 5/4) fine sandy loam; weak fine and medium subangular blocky structure; friable, slightly sticky; many fine and medium roots; many sand grains coated and bridged with clay; very strongly acid; clear smooth boundary.

Bt1—13 to 25 inches; yellowish brown (10YR 5/6) sandy clay loam; few medium and coarse distinct strong brown (7.5YR 5/6) mottles; weak fine and medium subangular blocky structure; friable, slightly sticky and slightly plastic; common fine and medium roots; many sand grains coated and bridged with clay; extremely acid; clear smooth boundary.

Bt2—25 to 37 inches; light olive brown (2.5Y 5/4) sandy clay loam; common fine, medium, and coarse distinct strong brown (7.5YR 5/6) and grayish brown (10YR 5/2) mottles; weak medium and coarse subangular blocky structure; friable, slightly sticky and slightly plastic; common sand grains coated and bridged with clay; common fine and medium roots; root channels coated with clay; very strongly acid; clear wavy boundary.

Bt3—37 to 47 inches; light olive brown (2.5Y 5/4) sandy clay loam; many medium and coarse strong brown (7.5YR 5/6) and gray (10YR 5/1) mottles; weak coarse prismatic structure parting to weak coarse subangular blocky; friable, slightly sticky and slightly plastic; few fine roots; common sand grains coated and bridged with clay; root channels coated with clay; very strongly acid; gradual wavy boundary.

Bt4—47 to 60 inches; gray (10YR 5/1) sandy clay loam; many medium and coarse distinct light olive brown (2.5Y 5/4) and strong brown (7.5YR 5/6) mottles; weak coarse prismatic structure; friable, slightly sticky and slightly plastic; few sand grains coated and bridged with clay; root channels coated with clay; very strongly acid.

The solum is 40 inches or more thick. Unless the soils are limed, reaction is extremely acid through strongly acid.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 2 through 6, and chroma of 1 through 4. Where the value is 2 or 3, the A horizon is less than 6 inches thick. It is sandy loam or fine sandy loam. The E horizon has hue of 10YR or 2.5Y, value of 5 through 7, and chroma of 3 or 4. It is fine sandy loam or loamy fine sand.

The Bt horizon in the upper part has hue of 5YR through 2.5Y, value of 5 through 7, and chroma of 3 through 8. The Bt horizon in the lower part has hue of 7.5YR through 5Y, value of 4 through 7, and chroma of 1 through 8, or it is mottled in shades of red, brown, yellow, olive, or gray. It is sandy loam, fine sandy loam, sandy clay loam, loam, or clay loam.

Some pedons have a C horizon that is gray or that is mottled in shades of red, yellow, brown, olive, and gray. It ranges from loamy sand through clay.

Uchee Series

The Uchee series consists of very deep, well drained soils. These soils formed in loamy unconsolidated marine sediment on uplands and terraces. Slopes range from 0 to 10 percent.

Uchee soils are near Emporia, Nawney, Slagle, and Yemassee soils. Uchee soils have more sand in the surface layer than these other soils.

Typical pedon of Uchee loamy sand, 2 to 6 percent slopes (fig. 11), about 0.3 mile north-northwest of the south junction of VA-612 and VA-632, and 2.2 miles southeast of Collosse:

Ap—0 to 7 inches; mottled very dark grayish brown (10YR 5/2) and brown (10YR 5/3) loamy sand; weak fine and medium granular structure; friable; many fine, medium, and coarse roots; strongly acid; clear smooth boundary.

E—7 to 28 inches; yellowish brown (10YR 5/4) loamy sand; many faint coarse light yellowish brown (2.5Y 6/4) mottles; massive; friable; common fine, medium, and coarse roots; strongly acid; clear smooth boundary.

Bt1—28 to 32 inches; yellowish brown (10YR 5/8) sandy clay loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; common fine, medium, and coarse roots; many sand grains bridged with clay; strongly acid; clear smooth boundary.

Bt2—32 to 48 inches; yellowish brown (10YR 5/8) sandy clay loam; many fine and medium faint strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine and medium roots; many sand grains bridged with clay; strongly acid; common wavy boundary.

Bt3—48 to 52 inches; mottled yellowish brown (10YR 5/8) light gray (10YR 6/1), strong brown (10YR 5/6), and red (10R 4/8) sandy clay loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine and medium roots; common sand grains bridged with clay; strongly acid; clear smooth boundary.

Cg—52 to 60 inches; grayish brown (10YR 5/2) sandy loam; many medium and coarse prominent yellowish brown (10YR 5/6) and red (10R 4/8) mottles; massive; friable, slightly sticky and slightly plastic; few sand grains bridged with clay; strongly acid.

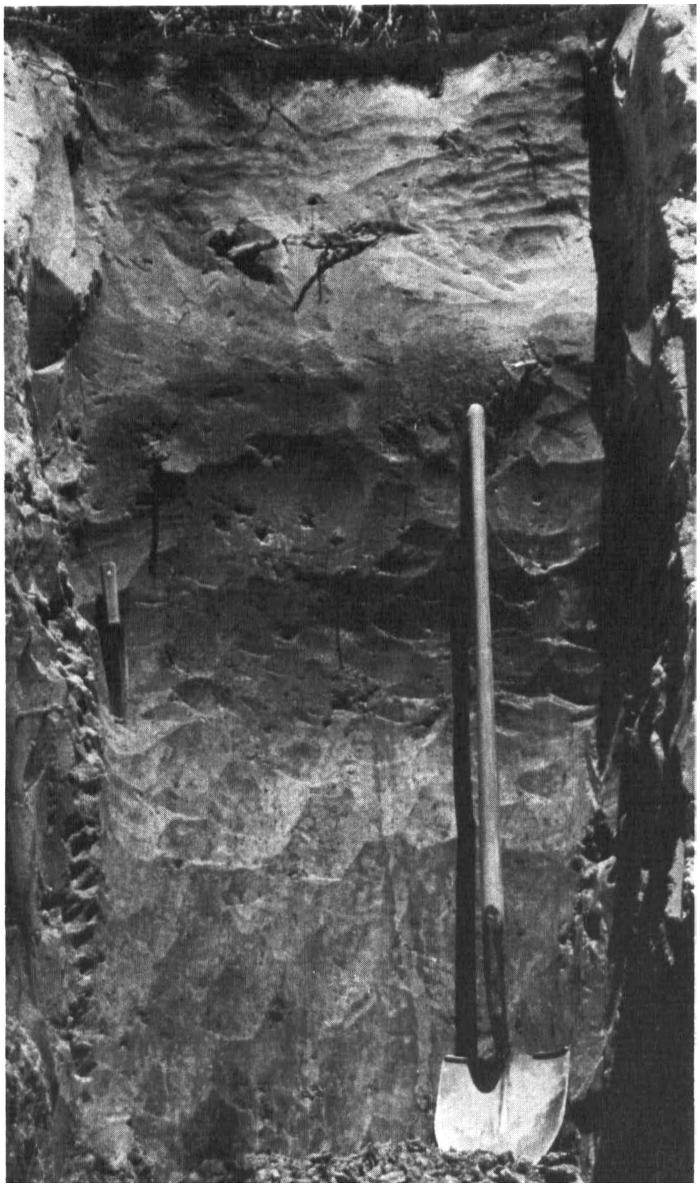


Figure 11.—Profile of Uchee loamy sand, 2 to 6 percent slopes, showing the thick, light-colored, sandy surface and subsurface layers, the darker colored subsoil, and the light-colored substratum.

The solum ranges from 40 to 60 inches in thickness. Unless the soils are limed, reaction is very strongly acid or strongly acid.

The Ap or A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 through 4. Where value is 3 or 4 and chroma is 1 or 2, the A horizon is less than 5 inches thick. The E horizon has hue of 10YR, value of 4 through 6, and chroma of 4 or 6. It is sand or loamy sand.

The Bt horizon in the upper part has hue of 10YR, value of 5 through 7, and chroma of 4 through 8. It is sandy loam or sandy clay loam. The Bt horizon in the lower part has colors similar to those in the upper part, or it is mottled in shades of red, brown, yellow, and gray. It is sandy clay loam, sandy clay, or clay.

The C horizon is mottled in shades of red, yellow, brown, and gray. It is sandy loam or sandy clay loam. Some pedons have strata of clay. Some pedons have a IIC horizon that ranges from white to red. It is loamy sand or sandy loam. Some pedons have pockets or strata of clayey material.

Udorthents

Udorthents consist of very deep, well drained to moderately well drained soils. They are in areas where the soil material has been excavated, filled in, or reworked by machinery. Most areas have been reshaped and smoothed or consist of cuts and excavations that extend several feet into the underlying unconsolidated marine sediment. Most areas are in or near urban and industrial centers. Slopes range from 0 to 50 percent.

The soil properties of Udorthents differ from place to place; thus, a typical pedon cannot be given. Typically, Udorthents are brown, strong brown, or yellowish brown sandy loam, sandy clay loam, or clay loam. Some pedons have layers of loamy sand or clay. Reaction ranges from very strongly acid through moderately acid throughout. Some areas contain trash and rubble.

Yemassee Series

The Yemassee series consists of very deep, somewhat poorly drained soils. These soils formed in loamy unconsolidated sediment on uplands. Slopes range from 0 to 2 percent.

Yemassee soils are near Kinston, Myatt, Nawney, and Slagle soils. Yemassee soils are wetter than Slagle soils and are better drained than Kinston, Myatt, and Nawney soils.

Typical pedon of Yemassee fine sandy loam, about 0.6 mile east-southeast of junction of VA-629 and VA-641, 0.4 mile south-southeast of junction of VA-634 and VA-633, and about 2.5 miles east of Walters:

Ap—0 to 10 inches; dark grayish brown (10YR 4/2) fine sandy loam; common medium faint light olive brown (2.5Y 5/4) mottles; weak fine granular structure; friable; many fine roots; strongly acid; clear wavy boundary.

Bt1—10 to 18 inches; light yellowish brown (2.5Y 6/4) sandy clay loam; common medium faint yellowish brown (10YR 5/6) and light olive gray (5Y 6/2) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; common sand grains coated and bridged with clay; many fine roots; strongly acid; gradual smooth boundary.

Bt2—18 to 34 inches; light olive brown (2.5Y 5/4) sandy clay loam; common medium distinct gray (10YR 6/1) and yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to weak medium subangular blocky; friable, slightly sticky and slightly plastic; common sand grains coated and bridged with clay; common fine roots; very strongly acid; gradual smooth boundary.

BCtg—34 to 52 inches; gray (10YR 6/1) sandy clay loam; common medium distinct yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure parting to weak medium subangular blocky; friable, slightly sticky and slightly plastic; few sand grains coated and bridged with clay; few fine roots; very strongly acid; gradual smooth boundary.

Cg—52 to 60 inches; mottled light gray (N 6/0), light olive gray (5Y 6/2), and light olive brown (2.5Y 5/4) fine sandy loam; massive; friable; 10 percent rounded and subrounded quartz pebbles; strongly acid.

The solum ranges from 40 to 60 inches in thickness. Unless the soils are limed, reaction is very strongly acid or strongly acid.

The A or Ap horizon is neutral or has hue of 10YR through 5Y, value of 2 through 5, and chroma of 0 through 2. Where value is less than 3.5, these horizons are less than 10 inches thick. Some pedons have an E horizon that has hue of 10YR or 2.5Y, value of 5 through 7, and chroma of 2 through 4. The A, Ap, and E horizons are sandy loam or fine sandy loam.

The Bt horizon in the upper part has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 through 8 and mottles in shades of gray, yellow, brown, or red. The Bt horizon in the lower part has hue of 10YR through 5Y, value of 5 through 7, and chroma of 1 or 2 and mottles in shades of yellow, brown, or red. The Bt horizon is fine sandy loam or sandy clay loam.

The BC horizon has hue of 10YR through 5Y, value of 5 through 7, and chroma of 1 or 2 and mottles in shades of olive, yellow, brown, or red. It is sandy loam or sandy clay loam.

The C horizon has colors similar to those of the BC horizon or has mottles in shades of gray, yellow, brown, or red. It is fine sandy loam, loamy sand, or sandy loam. In some pedons the C horizon has pockets of sandy clay loam.

Formation of the Soils

This section describes the factors of soil formation as related to the soils in Isle of Wight County. It also explains the major processes in the development of soil horizons.

Factors of Soil Formation

The five major factors of soil formation are climate, living organisms, parent material, time, and relief (*4*). Relief and parent material are modified over time by the active factors, climate and living organisms. Generally, the continuing interaction of all the factors determines the kinds of soils that form. In some soils, a single, dominant soil-forming factor may determine most of their properties.

Climate

Climate influences the rate of weathering of rocks. Weathering takes place more rapidly under a warm, humid climate than under a cold climate or a dry climate. The type and abundance of vegetation are influenced by the amount of precipitation and the length of the growing season. Precipitation also affects the translocation and the leaching of some products of weathering. Hard rains and frequent showers may cause excessive erosion.

The climate typical of the county causes intense downward leaching of soluble and colloidal material. The soils are seldom frozen for extended periods and never to great depths; thus, the weathering and the translocation of material continue most of the year. On uplands the soils have been leached of free carbonates of lime and other soluble material. Examples of such soils are Emporia, Remlik, and Uchee soils.

Local variations in climate are caused by relief and the degree and the orientation of slope. The climate of the county is relatively uniform. Therefore, other factors account for the significant differences among soils. A more detailed discussion of the climate in the county is given in the section "Climate" in "General Nature of the Survey Area."

Living Organisms

Plant and animal life has had an important role in the formation of soils in the county. Trees, shrubs, grasses, and other herbaceous plants, micro-organisms, earthworms, and various other forms of plant and animal life are active agents in the soil-forming process. The kinds of plants and animals that live on and in the soils are determined by environmental factors, including climate, parent material, relief, and the age of the soil. In areas where the climate or the vegetation varies significantly, the soils vary accordingly.

Plants add organic matter to the soil and transfer moisture and plant nutrients from the lower horizons to the upper horizons. Organic matter decomposes and is mixed into the soils by the action of micro-organisms and earthworms and by chemical reaction. The rate of decomposition is fairly rapid because of the favorable temperature, the generally abundant moisture, the condition of the organic matter, and the favorable population of micro-organisms in the soil. Organic matter in the upland soils has accumulated to little extent; it ranges, by volume, from about 1 to 3 percent in the surface layer. In contrast, organic matter in the soils in tidal marshes ranges, by volume, to as much as 50 percent.

The original vegetation in the county was a dense forest of pines or of mixed pines and hardwoods. The density of stands and the proportion of different species do not likely account for all the differences in soil properties throughout the county. Deciduous trees usually have deep roots, and their leaves vary in content of plant nutrients. They generally recycle more bases and more phosphorus to the soils than coniferous trees.

As agriculture developed in the county, the activities of man influenced soil formation. Forests were cleared, and new kinds of plants were introduced. Cultivation and artificial drainage, as well as applications of lime and fertilizers, changed some characteristics of the soils in the county. In some areas the activities of man have accelerated soil erosion. Because of erosion, these soils have lost nutrients, organic matter, and much of the original surface layer. Some of the material washed from sloping areas has been deposited in depressions and on flood plains. The soils that formed in such material in depressions and on flood plains are young, or immature, soils, such as Kinston and Nawney soils.

Parent Material

Parent material is the unconsolidated residual or transported material in which a soil forms. In this survey area all the parent material was transported.

The transported material is comprised of marine and alluvial sediments and includes eolian material. Marine sediment was deposited by ancient seas. Upland soils, including Emporia, Peawick, and Slagle soils, formed in marine sediment. Alluvial sediment was deposited by water as mixtures or layers of rock fragments, sand, silt, and clay on flood plains and stream terraces. Kinston and Nawney soils formed in recent alluvial sediment on flood plains.

Time

Over time, the factors of soil formation form well defined, genetically related horizons in a soil. Such a soil is in equilibrium with its environment and is considered mature. Emporia, Myatt, and Peawick soils are mature soils. However, if a soil shows little or no horizonation and if the soil-forming processes are still active, a soil is considered immature. Alaga and Nawney soils are immature soils. Many other soils range in maturity between these stages.

Soils that formed in the same kind of parent material but in areas of different topography do not necessarily mature in the same length of time. In some soils on steep slopes, for example, definite horizons have not developed because the soil material has been removed by erosion almost as rapidly as it has formed. In less sloping areas, the soil material has remained in place long enough for horizons to form, as in Slagle soils.

Relief

Relief or lay of the land affects the formation of soils by causing differences in internal drainage, runoff, soil temperature, and geologic erosion. It also affects the amount of radiant energy absorbed by the soils; this energy in turn affects the native vegetation. It can alter the effects of parent material on the development of soils to the extent that several different kinds of soils may form in the same kind of parent material.

In this county, slope ranges from nearly level to very steep. In the steep areas the effects of relief are rapid runoff, minimal percolation of water through the soil, minimal movement of clay in the soil, minimal translocation of soil bases, and erosion that has removed the soil material as rapidly as it has formed. The soils that formed on steep and very steep slopes have weakly expressed horizons. In the gently sloping and the strongly sloping areas the soils are well drained and moderately well drained, and erosion is generally moderate. The soils in such areas are mature and have well defined horizons.

Low flat areas or depressions are wet and often ponded, and drainage is restricted. The soils in these positions have a seasonal high water table that is generally close to the surface. Tidal marshes and flood plains are wet because they are frequently flooded and have a seasonal high water table. The soils in such areas are gray and mottled because of excess water.

Processes of Soil Formation

Soils form as a result of the physical weathering of parent rock, the chemical weathering of rock fragments and organic matter, the transfer of material, and the gains and losses of organic matter and minerals.

Soil formation begins with the physical weathering of rocks. Large rocks are broken into smaller pieces by frost action and other forces. The rocks and rock fragments are further reduced to sand- and silt-sized particles. These particles were transported and deposited by ancient seas. They form an unconsolidated layer of material that supports plants. Plants and animals, while alive and when they die, add organic matter to the mineral material.

Rock fragments and organic matter are chemically weathered by solution, carbonation, oxidation, reduction, and the action of weak acids. Such processes release iron, aluminum, calcium, and other elements in a form that plants can use.

The transfer of material from one part of the soil to another is common in most soils. Organic matter is suspended in solution and moved. Calcium and other elements are leached from the surface layer. To some extent, these elements are held by the clay in the subsoil or in the lower part of the profile, but some is leached out of the soil.

In most of the soils in the county, the translocation and the development in place of clay minerals have had a strong influence on the development of soil horizons. As the soil develops, horizons gradually develop characteristics that are recognizable and that distinguish one layer from another.

Major Soil Horizons

The soil-forming factors result in the development of layers, or horizons, in a soil profile. The soil profile extends from the surface downward to material that is little altered by the soil-forming processes.

Most mature soils contain three major horizons called the A, the B, and the C horizons. These horizons may be further subdivided by the use of subscripts and letters that indicate changes within one horizon. For example, a Bt2 horizon indicates that a layer is within the Bt horizon and has translocated clay eluviated from the A horizon.

The A horizon is the surface layer. It has the largest accumulation of organic matter.

If considerable leaching has taken place, an E horizon is formed. It is the layer of maximum leaching, or of eluviation, of clay and iron. The E horizon of some soils has light colors resulting from the loss of iron, aluminum, and clay minerals. Some soils in the county do not have an E horizon. Some soils have a transitional horizon, such as a BE horizon, between the E and B horizons.

The B horizon, or subsoil, underlies the A horizon or the E horizon in soils that have an E horizon. It is the horizon of maximum accumulation, or of illuviation, of clay, iron, aluminum, or other compounds leached from the A or E horizon. In some soils the B horizon is formed by alteration in place rather than from illuviation. The alteration may have occurred because of the oxidation and the reduction of iron or because of the weathering of clay minerals. The B horizon is generally firmer and has a finer texture, a stronger structure, and darker or redder colors than the E horizon. Most young soils do not have a developed B horizon.

The C horizon is below the A or B horizon. It consists of material that has been little altered by the soil-forming processes but that may have been modified by weathering.

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Glossary

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

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

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

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

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

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

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

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.

Bottom land. The normal flood plain of a stream, subject to flooding.

Broad-base terrace. A ridge-type terrace built to control erosion by diverting runoff along the contour at a nonscouring velocity. The terrace is 10 to 20 inches high and 15 to 30 feet wide and has gently sloping sides, a rounded crown, and a dish-shaped channel along the upper side. It may be nearly level or have a grade toward one or both ends.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity, but is more precise in meaning.

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.

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.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Climax vegetation. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.5 to 25 centimeters) in diameter.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Compressible (in tables). Excessive decrease in volume of soft soil under load.

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

Conservation tillage. A form of noninversion tillage that retains protective amounts of residue mulch on the surface throughout the year.

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

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

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

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

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

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

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

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

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

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.

Deferred grazing. Postponing grazing or resting grazingland for a prescribed period.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

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

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

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

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

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

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

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

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

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

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

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

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

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

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Excess sulfur (in tables). Excessive amount of sulfur in the soil. The sulfur causes extreme acidity if the soil is drained, and the growth of most plants is restricted.

Fast intake (in tables). The rapid movement of water into the soil.

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

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

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

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

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Fragile (in tables). A soil that is easily damaged by use or disturbance.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.5 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

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

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

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

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

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

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

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

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Arabic numeral 2 precedes the letter C.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake in inches per hour is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—

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.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Sandy loam and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Muck. Dark colored, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

Parent material. The unconsolidated organic and mineral material in which soil forms.

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 affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor filter (in tables). Because of rapid permeability the soil may not adequately filter effluent from a waste disposal system.

Poor outlets (in tables). 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 acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5

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

Relief. The elevations or inequalities of a land surface, considered collectively.

Rill. A steep sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

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.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

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 insure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.5 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

	Millimeters
Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stone line. A concentration of coarse fragments in a soil. Generally it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Toxicity (in tables). Excessive amount of toxic substances, such as sodium or sulfur, that severely hinder establishment of vegetation or severely restrict plant growth.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, are in soils in extremely small amounts. They are essential to plant growth.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Recorded in the period 1951-81 at Holland, Virginia]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days[1]	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	49.6	28.6	39.1	74	6	123	3.77	2.38	5.02	7	3.4
February---	51.4	30.2	40.8	74	10	105	3.78	2.10	5.14	8	1.3
March------	58.9	36.9	48.0	85	20	272	3.77	2.71	4.74	8	1.5
April------	70.2	45.7	58.0	90	27	540	3.00	1.99	3.91	7	.0
May--------	77.8	54.8	66.3	94	34	815	3.75	2.23	5.11	7	.0
June-------	84.7	62.8	73.8	98	45	1,014	4.35	2.01	6.25	6	.0
July-------	87.9	67.1	77.5	98	52	1,163	5.41	3.01	7.37	8	.0
August-----	86.6	66.2	76.4	97	50	1,128	5.90	2.47	8.68	7	.0
September--	81.6	59.8	70.7	94	39	921	4.09	1.69	6.03	5	.0
October----	71.8	48.5	60.2	88	26	626	3.96	1.42	5.99	5	.0
November---	62.3	38.7	50.5	83	20	315	2.86	1.50	3.96	6	.0
December---	52.4	31.0	41.7	75	11	174	3.50	2.34	4.55	7	1.5
Yearly:											
Average--	69.6	47.5	58.6	---	---	---	---	---	---	---	---
Extreme--	---	---	---	99	5	---	---	---	---	---	---
Total----	---	---	---	---	---	7,196	48.14	43.30	52.84	81	7.7

[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 (40° F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Recorded in the period 1951-81 at Holland, Virginia]

Probability	Temperature		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	March 30	April 13	April 30
2 years in 10 later than--	March 23	April 8	April 25
5 years in 10 later than--	March 11	March 29	April 16
First freezing temperature in fall:			
1 year in 10 earlier than--	November 5	October 24	October 12
2 years in 10 earlier than--	November 10	October 28	October 17
5 years in 10 earlier than--	November 21	November 7	October 25

TABLE 3.--GROWING SEASON

[Recorded in the period 1951-81 at Holland, Virginia]

Probability	Length of growing season if daily minimum temperature is--		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	231	202	174
8 years in 10	239	209	180
5 years in 10	254	222	192
2 years in 10	270	234	203
1 year in 10	278	241	209

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
1	Alaga fine sand	1,730	0.9
2	Bohicket silty clay loam	3,550	1.7
3	Chickahominy silt loam	2,730	1.3
4	Chipley sand	2,465	1.2
5A	Emporia fine sandy loam, 0 to 2 percent slopes	6,110	3.0
5B	Emporia fine sandy loam, 2 to 6 percent slopes	3,200	1.6
6	Kenansville loamy sand	2,020	1.0
7	Kinston loam	11,555	5.7
8	Leon-Chipley sands	790	0.4
9	Myatt fine sandy loam	30,770	15.2
10	Nawney loam	16,955	8.4
11E	Nevarc and Remlik soils, 15 to 60 percent slopes	8,395	4.1
12A	Peawick silt loam, 0 to 2 percent slopes	5,440	2.7
12B	Peawick silt loam, 2 to 6 percent slopes	2,080	1.0
12C	Peawick silt loam, 6 to 10 percent slopes	280	0.1
13B3	Peawick clay loam, 2 to 6 percent slopes, severely eroded	290	0.1
14B	Peawick-Slagle complex, 2 to 6 percent slopes	3,340	1.6
15	Rappahannock muck	1,970	1.0
16	Rumford loamy sand	1,595	0.8
17B3	Slagle sandy loam, 2 to 6 percent slopes, severely eroded	1,605	0.8
18A	Slagle fine sandy loam, 0 to 2 percent slopes	35,310	17.5
18B	Slagle fine sandy loam, 2 to 6 percent slopes	19,215	9.5
18C	Slagle fine sandy loam, 6 to 10 percent slopes	945	0.5
19A	Uchee loamy sand, 0 to 2 percent slopes	6,190	3.0
19B	Uchee loamy sand, 2 to 6 percent slopes	9,620	4.7
19C	Uchee loamy sand, 6 to 10 percent slopes	425	0.2
20B	Uchee-Peawick complex, 2 to 6 percent slopes	3,535	1.7
20C	Uchee-Peawick complex, 6 to 10 percent slopes	720	0.4
21	Udorthents, loamy	985	0.5
22	Urban land	230	0.1
23	Yemassee fine sandy loam	14,675	7.2
	Water	4,280	2.1
	Total	203,000	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
5A	Emporia fine sandy loam, 0 to 2 percent slopes
5B	Emporia fine sandy loam, 2 to 6 percent slopes
9	Myatt fine sandy loam (where drained)
18A	Slagle fine sandy loam, 0 to 2 percent slopes
18B	Slagle fine sandy loam, 2 to 6 percent slopes
23	Yemassee fine sandy loam (where drained)

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. 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	Peanuts	Grass hay	Pasture
		Bu	Bu	Bu	Lbs	Tons	AUM*
1 Alaga	IIIs	50	---	---	2,000	1.5	3.0
2 Bohicket	VIIIw	---	---	---	---	---	---
3 Chickahominy	IVw	---	---	---	---	3.0	6.0
4 Chipley	IIIs	55	15	---	2,200	2.0	4.0
5A Emporia	I	120	35	55	4,500	5.0	8.5
5B Emporia	IIe	115	30	50	4,000	5.0	8.5
6 Kenansville	IIs	90	20	20	3,500	4.0	7.0
7 Kinston	VIw	---	---	---	---	---	6.0
8 Leon-Chipley	IVw	---	---	---	---	1.5	3.0
9 Myatt	IIIw	130	35	20	3,000	3.0	6.0
10 Nawney	VIIw	---	---	---	---	---	---
11E Nevarc and Remlik	VIIe	---	---	---	---	---	---
12A Peawick	IIw	90	30	30	2,000	3.5	7.0
12B Peawick	IIe	80	25	30	2,600	3.5	7.0
12C Peawick	IIIe	60	20	25	---	2.5	6.0
13B3 Peawick	IIIe	50	20	25	1,400	2.0	4.0
14B Peawick-Slagle	IIe	100	30	35	2,500	4.0	8.0
15 Rappahannock	VIIIw	---	---	---	---	---	---
16 Rumford	IIs	95	20	25	3,500	4.0	7.0
17B3 Slagle	IIe	80	20	35	2,500	2.5	5.0
18A Slagle	IIw	125	35	45	3,500	4.0	8.0

See footnote at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Wheat	Peanuts	Grass hay	Pasture
		Bu	Bu	Bu	Lbs	Tons	AUM*
18B------------- Slagle	IIe	120	35	40	3,500	4.0	8.0
18C------------- Slagle	IIIe	100	25	35	3,000	3.0	6.0
19A, 19B-------- Uchee	IIs	105	30	25	3,500	4.5	7.5
19C------------- Uchee	IIIs	85	25	20	3,000	4.0	7.0
20B------------- Uchee-Peawick	IIe	75	25	25	2,500	3.0	6.0
20C------------- Uchee-Peawick	IIIe	65	20	20	---	2.5	5.5
21. Udorthents							
22**. Urban land							
23-------------- Yemassee	IIw	130	40	40	3,000	4.0	8.0

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
1----------------- Alaga	3s	Slight	Moderate	Moderate	Slight	Loblolly pine-------	66	Loblolly pine.
3----------------- Chickahominy	2w	Slight	Severe	Severe	Slight	Loblolly pine------- Sweetgum------------ Water oak----------- Willow oak---------- Red maple-----------	88 95 --- --- ---	Loblolly pine, sweetgum.
4----------------- Chipley	2s	Slight	Moderate	Slight	Slight	Loblolly pine------- Post oak------------	80 ---	Loblolly pine.
5A, 5B------------ Emporia	3o	Slight	Slight	Slight	Slight	Loblolly pine------- Southern red oak----	76 70	Loblolly pine, sweetgum.
6----------------- Kenansville	3s	Slight	Moderate	Moderate	Slight	Loblolly pine-------	75	Loblolly pine.
7----------------- Kinston	1w	Slight	Severe	Severe	Moderate	Loblolly pine------- Sweetgum------------ White oak----------- Eastern cottonwood--	100 95 90 100	Loblolly pine, American sycamore, yellow-poplar, eastern cottonwood, green ash.
8*:								
Leon--------------	4w	Slight	Moderate	Moderate	Moderate	Loblolly pine-------	70	Loblolly pine.
Chipley-----------	2s	Slight	Moderate	Slight	Slight	Loblolly pine------- Post oak------------	90 ---	Loblolly pine.
9----------------- Myatt	2w	Slight	Severe	Severe	Moderate	Loblolly pine------- Sweetgum------------ Water oak----------- Southern red oak---- White oak----------- American sycamore---	88 92 85 --- --- ---	Loblolly pine, sweetgum.
10---------------- Nawney	4w	Slight	Severe	Severe	Severe	Baldcypress--------- Water tupelo-------- Red maple----------- Sweetgum------------ Water oak-----------	--- --- --- --- ---	Loblolly pine, water oak.
11E*:								
Nevarc------------	3r	Severe	Severe	Slight	Slight	Loblolly pine------- Southern red oak---- White oak----------- Sweetgum------------ Yellow-poplar-------	77 70 70 76 80	Loblolly pine.

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
11E*:								
Remlik	3r	Moderate	Severe	Moderate	Slight	Loblolly pine Virginia pine Yellow-poplar Southern red oak	80 74 80 74	Loblolly pine.
12A, 12B Peawick	3w	Slight	Moderate	Slight	Slight	Loblolly pine Sweetgum Yellow-poplar Water oak White oak	77 --- --- --- ---	Loblolly pine.
12C Peawick	3r	Slight	Moderate	Slight	Slight	Loblolly pine Sweetgum Yellow-poplar Water oak White oak	77 --- --- --- ---	Loblolly pine.
13B3 Peawick	3w	Slight	Moderate	Slight	Slight	Loblolly pine Sweetgum Yellow-poplar Water oak White oak	77 --- --- --- ---	Loblolly pine.
14B*:								
Peawick	3w	Slight	Moderate	Slight	Slight	Loblolly pine Sweetgum Yellow-poplar Water oak White oak	77 --- --- --- ---	Loblolly pine.
Slagle	2w	Slight	Moderate	Slight	Slight	Loblolly pine Sweetgum Southern red oak Water oak Yellow-poplar	75 86 76 76 90	Loblolly pine, sweetgum, yellow-poplar.
16 Rumford	3o	Slight	Slight	Slight	Slight	Southern red oak Virginia pine Loblolly pine	65 70 80	Loblolly pine.
17B3, 18A, 18B, 18C Slagle	2w	Slight	Moderate	Slight	Slight	Loblolly pine Sweetgum Southern red oak Water oak Yellow-poplar	86 86 76 76 90	Loblolly pine, sweetgum, yellow-poplar.
19A, 19B, 19C Uchee	3s	Slight	Moderate	Moderate	Slight	Loblolly pine Shortleaf pine	82 ---	Loblolly pine.
20B*:								
Uchee	3s	Slight	Moderate	Moderate	Slight	Loblolly pine Shortleaf pine	82 ---	Loblolly pine.
Peawick	3w	Slight	Moderate	Slight	Slight	Loblolly pine Sweetgum Yellow-poplar Water oak White oak	77 --- --- --- ---	Loblolly pine.
20C*:								
Uchee	3s	Slight	Moderate	Moderate	Slight	Loblolly pine Shortleaf pine	82 ---	Loblolly pine.

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordi-nation symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equip-ment limita-tion	Seedling mortal-ity	Wind-throw hazard	Common trees	Site index	
20C*:								
Peawick-----------	3r	Slight	Moderate	Slight	Slight	Loblolly pine-------	77	Loblolly pine.
						Sweetgum------------	---	
						Yellow-poplar-------	---	
						Water oak-----------	---	
						White oak-----------	---	
23----------------- Yemassee	2w	Slight	Moderate	Slight	Slight	Loblolly pine-------	90	Loblolly pine, American sycamore, yellow-poplar.
						Sweetgum------------	95	
						Southern red oak----	---	
						White oak-----------	---	
						Yellow-poplar-------	100	

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
1-------------------- Alaga	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty.
2-------------------- Bohicket	Severe: flooding, ponding, percs slowly.	Severe: ponding, excess salt, flooding.	Severe: ponding, flooding.	Severe: ponding, flooding.	Severe: excess salt, excess sulfur, ponding.
3-------------------- Chickahominy	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
4-------------------- Chipley	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
5A------------------- Emporia	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: small stones, percs slowly.	Slight----------	Slight.
5B------------------- Emporia	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones, percs slowly.	Slight----------	Slight.
6-------------------- Kenansville	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, too sandy.	Moderate: too sandy.	Moderate: droughty.
7-------------------- Kinston	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
8*:					
Leon----------------	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
Chipley-------------	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
9-------------------- Myatt	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
10------------------- Nawney	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: wetness, flooding.
11E*:					
Nevarc--------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Remlik--------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
12A, 12B------------- Peawick	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Moderate: wetness.	Moderate: wetness.
12C------------------ Peawick	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Severe: erodes easily.	Moderate: wetness, slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
13B3: Peawick	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Moderate: wetness.	Moderate: wetness.
14B*:					
Peawick	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Moderate: wetness.	Moderate: wetness.
Slagle	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
15: Rappahannock	Severe: flooding, ponding, excess humus.	Severe: ponding, excess humus, excess salt.	Severe: excess humus, ponding, flooding.	Severe: ponding, excess humus.	Severe: excess salt, excess sulfur, ponding.
16: Rumford	Slight	Slight	Moderate: slope, small stones.	Slight	Moderate: droughty.
17B3: Slagle	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
18A: Slagle	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
18B: Slagle	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
18C: Slagle	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Moderate: wetness.	Moderate: wetness, slope.
19A: Uchee	Slight	Slight	Moderate: small stones.	Slight	Moderate: droughty.
19B: Uchee	Slight	Slight	Moderate: slope, small stones.	Slight	Moderate: droughty.
19C: Uchee	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: droughty, slope.
20B*:					
Uchee	Slight	Slight	Moderate: slope, small stones.	Slight	Moderate: droughty.
Peawick	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Moderate: wetness.	Moderate: wetness.
20C*:					
Uchee	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: droughty, slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
20C*: Peawick	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Severe: erodes easily.	Moderate: wetness, slope.
21. Udorthents					
22*. Urban land					
23 Yemassee	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
1----------------- Alaga	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
2----------------- Bohicket	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
3----------------- Chickahominy	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
4----------------- Chipley	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
5A, 5B------------- Emporia	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
6----------------- Kenansville	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
7----------------- Kinston	Very poor.	Poor	Poor	Poor	Poor	Good	Fair	Poor	Poor	Fair.
8*:										
Leon--------------	Poor	Fair	Good	Poor	Fair	Fair	Poor	Fair	Fair	Poor.
Chipley-----------	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
9----------------- Myatt	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
10---------------- Nawney	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
11E*:										
Nevarc------------	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Remlik------------	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Very poor.	Fair	Very poor.
12A, 12B----------- Peawick	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
12C--------------- Peawick	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
13B3-------------- Peawick	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
14B*:										
Peawick-----------	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Slagle------------	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
15---------------- Rappahannock	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
16---------------- Rumford	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba-ceous plants	Hardwood trees	Conif-erous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
17B3----------------- Slagle	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
18A------------------ Slagle	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
18B------------------ Slagle	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
18C------------------ Slagle	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
19A, 19B------------ Uchee	Poor	Fair	Good	Fair	Fair	Poor	Very poor.	Fair	Fair	Very poor.
19C------------------ Uchee	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
20B*:										
Uchee---------------	Poor	Fair	Good	Fair	Fair	Poor	Very poor.	Fair	Fair	Very poor.
Peawick------------	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
20C*:										
Uchee---------------	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Peawick------------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
21. Udorthents										
22*. Urban land										
23------------------- Yemassee	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
1 Alaga	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Moderate: droughty.
2 Bohicket	Severe: ponding.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: low strength, ponding, flooding.	Severe: excess salt, excess sulfur, ponding.
3 Chickahominy	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, wetness, shrink-swell.	Severe: wetness.
4 Chipley	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Severe: droughty.
5A Emporia	Moderate: wetness.	Slight	Moderate: wetness, shrink-swell.	Slight	Moderate: low strength.	Slight.
5B Emporia	Moderate: wetness.	Slight	Moderate: wetness, shrink-swell.	Moderate: slope.	Moderate: low strength.	Slight.
6 Kenansville	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Moderate: droughty.
7 Kinston	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding, low strength.	Severe: wetness, flooding.
8*:						
Leon	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
Chipley	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Severe: droughty.
9 Myatt	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
10 Nawney	Severe: cutbanks cave, wetness, flooding.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
11E*:						
Nevarc	Severe: cutbanks cave, wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Remlik	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
12A, 12B Peawick	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Moderate: wetness.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
12C-------------- Peawick	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.	Moderate: wetness, slope.
13B3------------- Peawick	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Moderate: wetness.
14B*:						
Peawick----------	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Moderate: wetness.
Slagle-----------	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Moderate: low strength, wetness.	Moderate: wetness.
15--------------- Rappahannock	Severe: excess humus, ponding.	Severe: flooding, ponding, low strength.	Severe: flooding, ponding.	Severe: flooding, ponding, low strength.	Severe: ponding, flooding.	Severe: excess salt, excess sulfur, ponding.
16--------------- Rumford	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Moderate: droughty.
17B3------------- Slagle	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Moderate: low strength, wetness.	Moderate: wetness.
18A-------------- Slagle	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Moderate: low strength, wetness.	Moderate: wetness.
18B-------------- Slagle	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Moderate: low strength, wetness.	Moderate: wetness.
18C-------------- Slagle	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Moderate: low strength, wetness, slope.	Moderate: wetness, slope.
19A-------------- Uchee	Severe: cutbanks cave.	Slight---------	Moderate: wetness, shrink-swell.	Slight---------	Slight---------	Moderate: droughty.
19B-------------- Uchee	Severe: cutbanks cave.	Slight---------	Moderate: wetness, shrink-swell.	Moderate: slope.	Slight---------	Moderate: droughty.
19C-------------- Uchee	Severe: cutbanks cave.	Moderate: slope.	Moderate: wetness, shrink-swell, slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
20B*:						
Uchee------------	Severe: cutbanks cave.	Slight---------	Moderate: wetness, shrink-swell.	Moderate: slope.	Slight---------	Moderate: droughty.
Peawick----------	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Moderate: wetness.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
20C*:						
Uchee------------	Severe: cutbanks cave.	Moderate: slope.	Moderate: wetness, shrink-swell, slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
Peawick----------	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.	Moderate: wetness, slope.
21. Udorthents						
22*. Urban land						
23---------------- Yemassee	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1 Alaga	Severe: poor filter.	Severe: seepage, flooding.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
2 Bohicket	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding, too clayey.	Severe: flooding, ponding.	Poor: too clayey, hard to pack, ponding.
3 Chickahominy	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
4 Chipley	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: too sandy, seepage.
5A, 5B Emporia	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Moderate: wetness, too clayey.	Slight	Fair: too clayey, wetness.
6 Kenansville	Slight	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: seepage.
7 Kinston	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
8*:					
Leon	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
Chipley	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: too sandy, seepage.
9 Myatt	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
10 Nawney	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.	Poor: wetness.
11E*:					
Nevarc	Severe: wetness, percs slowly, slope.	Severe: seepage, slope, wetness.	Severe: seepage, wetness, slope.	Severe: seepage, slope.	Poor: too clayey, hard to pack, slope.
Remlik	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
12A, 12B Peawick	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
12C Peawick	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness, too clayey.	Moderate: wetness, slope.	Poor: too clayey, hard to pack.
13B3 Peawick	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
14B*:					
Peawick	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
Slagle	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: seepage, wetness.	Moderate: wetness.	Fair: too clayey, wetness.
15 Rappahannock	Severe: flooding, ponding.	Severe: flooding, excess humus, ponding.	Severe: flooding, ponding, excess humus.	Severe: flooding, ponding.	Poor: ponding, excess humus.
16 Rumford	Slight	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
17B3, 18A, 18B Slagle	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: seepage, wetness.	Moderate: wetness.	Fair: too clayey, wetness.
18C Slagle	Severe: wetness, percs slowly.	Severe: seepage, slope, wetness.	Severe: seepage, wetness.	Moderate: wetness, slope.	Fair: too clayey, slope, wetness.
19A, 19B Uchee	Severe: wetness, percs slowly.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: too sandy.
19C Uchee	Severe: wetness, percs slowly.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: too sandy, slope.
20B*:					
Uchee	Severe: wetness, percs slowly.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: too sandy.
Peawick	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
20C*:					
Uchee	Severe: wetness, percs slowly.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: too sandy, slope.
Peawick	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness, too clayey.	Moderate: wetness, slope.	Poor: too clayey, hard to pack.
21. Udorthents					

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
22*. Urban land					
23------------------- Yemassee	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness.	Severe: seepage, wetness.	Poor: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
1 Alaga	Good	Probable	Improbable: too sandy.	Poor: too sandy.
2 Bohicket	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess salt, wetness.
3 Chickahominy	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
4 Chipley	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
5A, 5B Emporia	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
6 Kenansville	Good	Probable	Improbable: too sandy.	Fair: too sandy.
7 Kinston	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
8*:				
Leon	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
Chipley	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
9 Myatt	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
10 Nawney	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
11E*:				
Nevarc	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
Remlik	Poor: slope.	Probable	Improbable: too sandy.	Poor: slope.
12A, 12B, 12C, 13B3 Peawick	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
14B*:				
Peawick	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Slagle	Fair: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
15: Rappahannock	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, excess salt, wetness.
16: Rumford	Good	Improbable: thin layer.	Probable	Fair: small stones, area reclaim.
17B3, 18A, 18B: Slagle	Fair: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
18C: Slagle	Fair: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
19A, 19B: Uchee	Fair: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy, small stones.
19C: Uchee	Fair: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy, small stones, slope.
20B*:				
Uchee	Fair: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy, small stones.
Peawick	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
20C*:				
Uchee	Fair: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy, small stones, slope.
Peawick	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
21. Udorthents				
22*. Urban land				
23: Yemassee	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation]

Soil name and map symbol	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Limitations for-- Aquifer-fed excavated ponds	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Grassed waterways
1 Alaga	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake.	Droughty.
2 Bohicket	Slight	Severe: hard to pack, ponding, excess salt.	Severe: slow refill.	Ponding, percs slowly, flooding.	Ponding, percs slowly.	Wetness, excess salt, percs slowly.
3 Chickahominy	Slight	Severe: hard to pack, wetness.	Severe: slow refill.	Percs slowly	Wetness, percs slowly, erodes easily.	Wetness, percs slowly.
4 Chipley	Severe: seepage.	Severe: seepage.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Droughty.
5A Emporia	Moderate: seepage.	Moderate: thin layer, piping.	Severe: no water.	Deep to water	Soil blowing	Percs slowly.
5B Emporia	Moderate: seepage, slope.	Moderate: thin layer, piping.	Severe: no water.	Deep to water	Soil blowing, slope.	Percs slowly.
6 Kenansville	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake.	Droughty.
7 Kinston	Moderate: seepage.	Severe: wetness.	Slight	Flooding	Wetness, flooding.	Wetness.
8*:						
Leon	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.
Chipley	Severe: seepage.	Severe: seepage.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Droughty.
9 Myatt	Moderate: seepage.	Severe: piping, wetness.	Severe: slow refill.	Favorable	Wetness	Wetness.
10 Nawney	Severe: seepage.	Severe: wetness.	Slight	Flooding	Flooding	Wetness.
11E*:						
Nevarc	Severe: slope.	Severe: hard to pack.	Severe: no water.	Percs slowly, slope.	Wetness, percs slowly, slope.	Slope, erodes easily, percs slowly.
Remlik	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, soil blowing.	Slope, droughty.
12A Peawick	Slight	Severe: hard to pack.	Severe: no water.	Percs slowly	Wetness, percs slowly, erodes easily.	Percs slowly.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Grassed waterways
12B----------------- Peawick	Moderate: slope.	Severe: hard to pack.	Severe: no water.	Percs slowly, slope.	Wetness, percs slowly, slope.	Percs slowly.
12C----------------- Peawick	Severe: slope.	Severe: hard to pack.	Severe: no water.	Percs slowly, slope.	Wetness, percs slowly, slope.	Slope, percs slowly.
13B3---------------- Peawick	Moderate: slope.	Severe: hard to pack.	Severe: no water.	Percs slowly, slope.	Wetness, percs slowly, slope.	Percs slowly.
14B*:						
Peawick------------	Moderate: slope.	Severe: hard to pack.	Severe: no water.	Percs slowly, slope.	Wetness, percs slowly, slope.	Percs slowly.
Slagle-------------	Moderate: seepage, slope.	Moderate: wetness.	Severe: no water.	Percs slowly, slope.	Wetness, slope.	Percs slowly.
15------------------ Rappahannock	Slight------------	Severe: excess humus, ponding.	Moderate: salty water.	Ponding, flooding, excess salt.	Ponding, flooding, excess salt.	Wetness, excess salt.
16------------------ Rumford	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, soil blowing.	Droughty.
17B3---------------- Slagle	Moderate: seepage, slope.	Moderate: wetness.	Severe: no water.	Percs slowly, slope.	Wetness, slope.	Percs slowly.
18A----------------- Slagle	Moderate: seepage.	Moderate: wetness.	Severe: no water.	Percs slowly---	Wetness--------	Percs slowly.
18B----------------- Slagle	Moderate: seepage, slope.	Moderate: wetness.	Severe: no water.	Percs slowly, slope.	Wetness, slope.	Percs slowly.
18C----------------- Slagle	Severe: slope.	Moderate: wetness.	Severe: no water.	Percs slowly, slope.	Wetness, slope.	Slope, percs slowly.
19A----------------- Uchee	Moderate: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake.	Droughty.
19B----------------- Uchee	Moderate: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, slope.	Droughty.
19C----------------- Uchee	Moderate: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, slope.	Slope, droughty.
20B*:						
Uchee--------------	Moderate: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, slope.	Droughty.
Peawick------------	Moderate: slope.	Severe: hard to pack.	Severe: no water.	Percs slowly, slope.	Wetness, percs slowly, slope.	Percs slowly.
20C*:						
Uchee--------------	Moderate: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, slope.	Slope, droughty.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Grassed waterways
20C*:						
Peawick----------	Severe: slope.	Severe: hard to pack.	Severe: no water.	Percs slowly, slope.	Wetness, percs slowly, slope.	Slope, percs slowly.
21. Udorthents						
22*. Urban land						
23---------------- Yemassee	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Favorable------	Wetness, soil blowing.	Wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
1----------------- Alaga	0-3	Fine sand---------	SM, SW-SM, SP-SM	A-2, A-1-B	0	100	100	40-70	10-35	---	NP
	3-60	Loamy sand, loamy fine sand, fine sand.	SM, SW-SM, SP-SM	A-2	0	100	100	50-80	10-35	---	NP
2----------------- Bohicket	0-11	Silty clay loam	CH, MH	A-7	0	100	99-100	90-100	80-100	60-100	15-60
	11-60	Silty clay, clay, sandy clay.	CH, MH	A-7	0	100	99-100	80-100	70-95	50-100	16-60
3----------------- Chickahominy	0-2	Silt loam---------	SM, SC, CL-ML	A-4	0	95-100	90-100	75-95	45-90	<25	NP-8
	2-65	Clay loam, silty clay, clay.	CL, CH	A-7	0	95-100	90-100	85-100	70-90	40-75	15-45
4----------------- Chipley	0-6	Sand--------------	SP-SM	A-3, A-2-4	0	100	100	80-100	6-12	---	NP
	6-60	Sand, fine sand	SP-SM	A-3, A-2-4	0	100	100	80-100	6-12	---	NP
5A, 5B------------ Emporia	0-15	Fine sandy loam	CL, SC, SM, ML	A-2, A-4, A-6	0-3	90-100	80-100	50-95	25-65	<25	NP-15
	15-60	Sandy clay loam, sandy loam, clay loam.	SC, CL	A-2, A-4, A-6, A-7	0-2	90-100	80-100	45-95	25-70	20-50	8-30
6----------------- Kenansville	0-28	Loamy sand--------	SM, SP-SM	A-1, A-2	0	100	95-100	45-99	10-25	---	NP
	28-41	Sandy loam, fine sandy loam.	SM, SC, SM-SC	A-2, A-4	0	100	95-100	50-99	20-40	<30	NP-10
	41-60	Sand, loamy sand	SP-SM, SM	A-1, A-2, A-3	0	100	95-100	40-99	5-30	---	NP
7----------------- Kinston	0-14	Loam--------------	ML, CL, CL-ML	A-4, A-6	0	100	98-100	85-100	50-97	17-40	4-15
	14-60	Variable----------	---	---	0	---	---	---	---	---	---
8*:											
Leon-------------	0-22	Sand--------------	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	2-12	---	NP
	22-41	Sand, fine sand, loamy sand.	SM, SP-SM, SP	A-3, A-2-4	0	100	100	80-100	3-20	---	NP
	41-60	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	2-12	---	NP
Chipley----------	0-6	Sand--------------	SP-SM	A-3, A-2-4	0	100	100	80-100	6-12	---	NP
	6-60	Sand, fine sand	SP-SM	A-3, A-2-4	0	100	100	80-100	6-12	---	NP
9----------------- Myatt	0-15	Fine sandy loam	SM, SM-SC, ML, CL-ML	A-2, A-4	0	95-100	95-100	60-90	30-70	<25	NP-5
	15-51	Loam, sandy clay loam, clay loam.	SM, SC, ML, CL	A-4	0	95-100	95-100	80-100	40-80	<30	NP-10
	51-60	Gravelly fine sandy loam, sandy clay loam, clay loam.	SM-SC, SC, CL-ML, CL	A-6, A-4, A-2	0	75-100	60-90	60-80	30-70	15-40	5-20
10---------------- Nawney	0-30	Loam--------------	SM, SC, SM-SC	A-2, A-4	0	100	98-100	60-90	30-50	<28	NP-9
	30-44	Stratified sandy loam to silty clay loam.	SM, SC, ML, CL	A-4, A-6, A-7	0	100	98-100	60-100	35-95	14-46	3-25
	44-60	Variable----------	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
11E*:											
Nevarc----------	0-4	Silt loam--------	SM, SC, CL-ML	A-4	0	90-100	80-100	50-100	40-90	<30	NP-8
	4-57	Clay loam, clay, silty clay.	CL, CH	A-6, A-7	0	90-100	80-100	70-100	70-95	35-60	15-41
	57-64	Stratified loamy sand to sandy clay loam.	SM, SC, ML, CL	A-1, A-2, A-4, A-6	0-2	70-100	55-100	30-90	20-60	<40	NP-25
Remlik----------	0-28	Loamy sand-------	SM, SW-SM, SM-SC	A-1, A-2	0	90-100	80-100	40-70	10-35	<10	NP-5
	28-52	Sandy loam, loam, sandy clay loam.	SM, SC, SM-SC	A-2, A-4, A-6	0	98-100	95-100	60-95	30-75	<30	NP-15
	52-60	Stratified sand to loamy sand.	SM, SP-SM, SM-SC	A-2, A-3	0	95-100	95-100	50-90	5-35	<18	NP-7
12A, 12B, 12C---- Peawick	0-4	Silt loam--------	SM, SC, CL-ML	A-4	0	90-100	75-100	50-100	40-90	<30	NP-8
	4-70	Clay loam, silty clay, clay.	CL, CH	A-6, A-7	0	90-100	75-100	70-100	70-95	35-80	12-50
13B3------------- Peawick	0-2	Clay loam--------	CL, CH	A-6, A-7	0	90-100	75-100	70-100	70-80	30-55	12-30
	2-70	Clay loam, silty clay, clay.	CL, CH	A-6, A-7	0	90-100	75-100	70-100	70-95	35-80	12-50
14B*:											
Peawick---------	0-4	Silt loam--------	SM, SC, CL-ML	A-4	0	90-100	75-100	50-100	40-90	<30	NP-8
	4-70	Clay loam, silty clay, clay.	CL, CH	A-6, A-7	0	90-100	75-100	70-100	70-95	35-80	12-50
Slagle----------	0-13	Fine sandy loam	SM, SC, ML, CL	A-2, A-4, A-6	0-3	95-100	90-100	55-95	30-75	<35	NP-15
	13-25	Fine sandy loam, sandy clay loam, loam.	SC, SM-SC, CL, CL-ML	A-4, A-6	0-2	95-100	90-100	65-85	35-60	20-40	5-20
	25-60	Sandy clay loam, loam, clay loam.	SC, CL	A-4, A-6, A-7	0-2	95-100	90-100	75-95	40-75	25-50	8-30
15--------------- Rappahannock	0-15	Sapric material	PT	A-8	0	---	---	---	---	---	---
	15-40	Sapric material, hemic material.	PT	A-8	0	---	---	---	---	---	---
	40-60	Stratified loamy sand to clay.	CL, SC, ML, SM	A-6, A-4, A-2	0	100	100	95-100	15-95	<40	NP-20
16--------------- Rumford	0-16	Loamy sand-------	SM	A-2, A-1	0	90-100	85-100	45-75	15-30	<20	NP
	16-36	Fine sandy loam, sandy loam, sandy clay loam.	SM, SC, SM-SC	A-2, A-4, A-6	0	80-100	75-100	55-85	30-50	<34	NP-12
	36-60	Stratified sandy loam to gravelly sand.	SM, SP, GP, GM	A-1, A-2, A-3, A-4	0	50-100	35-100	20-85	2-40	<25	NP-6
17B3------------- Slagle	0-4	Sandy loam-------	SM, SC, ML, CL	A-2, A-4, A-6	0-3	95-100	90-100	55-95	30-75	<35	NP-15
	4-15	Fine sandy loam, sandy clay loam, loam.	SC, SM-SC, CL, CL-ML	A-4, A-6	0-2	95-100	90-100	65-85	35-60	20-40	5-20
	15-60	Sandy clay loam, loam, clay loam.	SC, CL	A-4, A-6, A-7	0-2	95-100	90-100	75-95	40-75	25-50	8-30
18A, 18B, 18C---- Slagle	0-13	Fine sandy loam	SM, SC, ML, CL	A-2, A-4, A-6	0-3	95-100	90-100	55-95	30-75	<35	NP-15
	13-25	Fine sandy loam, sandy clay loam, loam.	SC, SM-SC, CL, CL-ML	A-4, A-6	0-2	95-100	90-100	65-85	35-60	20-40	5-20
	25-60	Sandy clay loam, loam, clay loam.	SC, CL	A-4, A-6, A-7	0-2	95-100	90-100	75-95	40-75	25-50	8-30

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
19A, 19B, 19C---- Uchee	0-28	Loamy sand-------	SM	A-2, A-1-B	0	90-100	80-100	40-70	15-30	---	NP
	28-32	Sandy loam, sandy clay loam.	SC, SM-SC	A-2, A-4, A-6	0	90-100	80-100	50-80	25-50	20-40	6-20
	32-52	Sandy clay loam, sandy clay, clay.	MH, CH, CL, SC	A-7	0	90-100	80-100	65-90	40-70	41-70	18-38
	52-60	Sandy loam, sandy clay loam, sandy clay.	MH, CH, CL, SC	A-6, A-7, A-2-6, A-2-7	0	85-100	80-100	50-80	30-65	35-65	15-35
20B*, 20C*: Uchee-----------	0-28	Loamy sand-------	SM	A-2, A-1-B	0	90-100	80-100	40-70	15-30	---	NP
	28-32	Sandy loam, sandy clay loam.	SC, SM-SC	A-2, A-4, A-6	0	90-100	80-100	50-80	25-50	20-40	6-20
	32-52	Sandy clay loam, sandy clay, clay.	MH, CH, CL, SC	A-7	0	90-100	80-100	65-90	40-70	41-70	18-38
	52-60	Sandy loam, sandy clay loam, sandy clay.	MH, CH, CL, SC	A-6, A-7, A-2-6, A-2-7	0	85-100	80-100	50-80	30-65	35-65	15-35
Peawick---------	0-4	Silt loam--------	SM, SC, CL-ML	A-4	0	90-100	75-100	50-100	40-90	<30	NP-8
	4-70	Clay loam, silty clay, clay.	CL, CH	A-6, A-7	0	90-100	75-100	70-100	70-95	35-80	12-50
21. Udorthents											
22*. Urban land											
23--------------- Yemassee	0-10	Fine sandy loam	SM	A-2, A-4	0	100	100	75-100	25-50	<30	NP-7
	10-52	Sandy clay loam, clay loam, fine sandy loam.	CL, SC, CL-ML, SM-SC	A-2, A-4, A-6	0	100	100	75-100	30-70	16-38	4-18
	52-60	Sandy clay loam, fine sandy loam, sandy clay.	SC, SM, CL-ML, SM-SC	A-2, A-4, A-6	0	100	100	75-100	25-55	<35	NP-15

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	G/cm^3	In/hr	In/in	pH				Pct
1----------------- Alaga	0-3	2-12	1.30-1.50	>6.0	0.05-0.09	4.5-6.0	Low----------	0.17	5	.5-1
	3-60	2-12	1.40-1.60	>6.0	0.05-0.09	4.5-6.0	Low----------	0.17		
2----------------- Bohicket	0-11	30-60	1.20-1.40	0.06-0.2	0.02-0.06	6.1-8.4	High---------	0.28	5	5-25
	11-60	35-60	1.30-1.60	<0.06	0.02-0.06	6.1-8.4	High---------	0.24		
3----------------- Chickahominy	0-2	10-25	1.20-1.30	0.6-2.0	0.10-0.17	3.6-5.5	Low----------	0.37	4	.5-2
	2-65	35-60	1.30-1.50	<0.06	0.10-0.19	3.6-5.5	High---------	0.24		
4----------------- Chipley	0-6	1-5	1.35-1.45	6.0-20	0.05-0.10	3.6-6.0	Low----------	0.10	5	2-5
	6-60	1-7	1.45-1.60	6.0-20	0.03-0.08	4.5-6.5	Low----------	0.10		
5A, 5B----------- Emporia	0-15	7-18	1.30-1.40	2.0-6.0	0.10-0.17	4.5-5.5	Low----------	0.28	4	.5-3
	15-60	18-35	1.35-1.45	0.2-2.0	0.10-0.18	4.5-5.5	Low----------	0.28		
6----------------- Kenansville	0-28	3-10	1.50-1.70	6.0-20	0.04-0.10	4.5-6.0	Low----------	0.15	5	.5-2
	28-41	5-18	1.30-1.50	2.0-6.0	0.10-0.14	4.5-6.0	Low----------	0.15		
	41-60	1-10	1.50-1.70	6.0-20	<0.05	4.5-6.0	Low----------	0.10		
7----------------- Kinston	0-14	5-27	1.30-1.50	0.6-2.0	0.14-0.20	4.5-6.0	Low----------	0.37	5	2-5
	14-60	18-35	1.30-1.50	0.6-2.0	0.14-0.18	4.5-5.5	Low----------	0.32		
8*:										
Leon------------	0-22	1-6	1.40-1.65	6.0-20	0.02-0.05	3.6-5.5	Low----------	0.10	5	.5-4
	22-41	2-8	1.50-1.70	0.6-6.0	0.05-0.10	3.6-5.5	Low----------	0.15		
	41-60	1-6	1.40-1.65	0.6-6.0	0.02-0.05	3.6-5.5	Low----------	0.10		
Chipley---------	0-6	1-5	1.35-1.45	6.0-20	0.05-0.10	3.6-6.0	Low----------	0.10	5	2-5
	6-60	1-7	1.45-1.60	6.0-20	0.03-0.08	4.5-6.5	Low----------	0.10		
9----------------- Myatt	0-15	7-20	1.30-1.50	0.6-2.0	0.11-0.20	4.5-5.5	Low----------	0.28	5	.5-2
	15-51	18-35	1.40-1.60	0.2-2.0	0.12-0.20	3.6-5.5	Low----------	0.28		
	51-60	7-30	1.40-1.60	0.2-2.0	0.10-0.20	3.6-5.0	Low----------	0.24		
10---------------- Nawney	0-30	5-18	1.25-1.35	2.0-6.0	0.10-0.15	3.6-5.5	Low----------	0.24	5	2-6
	30-44	18-35	1.25-1.50	0.6-2.0	0.10-0.22	3.6-5.5	Moderate-----	0.28		
	44-60	---	---	---	---	---	-------------	----		
11E*:										
Nevarc----------	0-4	10-25	1.20-1.30	0.6-2.0	0.10-0.15	3.6-6.0	Low----------	0.37	3	.5-2
	4-57	35-55	1.30-1.50	0.06-0.2	0.10-0.17	3.6-6.0	Moderate-----	0.24		
	57-64	10-35	1.30-1.50	0.6-6.0	0.06-0.12	3.6-6.0	Low----------	0.20		
Remlik----------	0-28	0-10	1.20-1.50	>6.0	0.06-0.10	3.6-6.0	Low----------	0.10	5	.5-1
	28-52	8-25	1.20-1.35	0.6-6.0	0.10-0.17	3.6-6.0	Low----------	0.20		
	52-60	2-12	1.35-1.55	>6.0	0.04-0.10	3.6-6.0	Low----------	0.17		
12A, 12B, 12C---- Peawick	0-4	10-25	1.20-1.30	0.6-2.0	0.10-0.17	3.6-5.5	Low----------	0.37	4	.5-2
	4-70	35-60	1.30-1.50	<0.06	0.10-0.17	3.6-5.5	High---------	0.24		
13B3------------- Peawick	0-2	25-40	1.25-1.35	0.2-0.6	0.12-0.19	3.6-5.5	Moderate-----	0.37	3	.5-1
	2-70	35-60	1.30-1.50	<0.06	0.10-0.17	3.6-5.5	High---------	0.24		
14B*:										
Peawick---------	0-4	10-25	1.20-1.30	0.6-2.0	0.10-0.17	3.6-5.5	Low----------	0.37	4	.5-2
	4-70	35-60	1.30-1.50	<0.06	0.10-0.17	3.6-5.5	High---------	0.24		
Slagle----------	0-13	8-22	1.30-1.45	2.0-6.0	0.10-0.17	3.6-5.5	Low----------	0.24	3	.5-2
	13-25	12-35	1.30-1.45	0.6-2.0	0.10-0.18	3.6-5.5	Low----------	0.24		
	25-60	18-40	1.35-1.60	0.06-0.6	0.12-0.18	3.6-5.5	Moderate-----	0.24		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	G/cm^3	In/hr	In/in	pH				Pct
15---------------- Rappahannock	0-15	---	0.10-0.60	0.6-2.0	0.22-0.26	5.1-8.4	Low-----------	----	---	20-65
	15-40	---	0.10-1.00	0.6-2.0	0.22-0.26	5.1-8.4	Low-----------	----		
	40-60	5-40	1.20-1.50	0.6-2.0	0.08-0.20	5.1-8.4	Low-----------	0.17		
16---------------- Rumford	0-16	2-12	1.25-1.45	>6.0	0.06-0.10	3.6-5.5	Low-----------	0.17	4	.5-1
	16-36	8-18	1.25-1.45	2.0-6.0	0.10-0.15	3.6-6.0	Low-----------	0.17		
	36-60	2-18	1.25-1.50	>2.0	0.04-0.10	3.6-6.5	Low-----------	0.17		
17B3-------------- Slagle	0-4	8-22	1.30-1.45	2.0-6.0	0.10-0.17	3.6-5.5	Low-----------	0.24	3	.5-2
	4-15	12-35	1.30-1.45	0.6-2.0	0.10-0.18	3.6-5.5	Low-----------	0.24		
	15-60	18-40	1.35-1.60	0.06-0.6	0.12-0.18	3.6-5.5	Moderate------	0.24		
18A, 18B, 18C----- Slagle	0-13	8-22	1.30-1.45	2.0-6.0	0.10-0.17	3.6-5.5	Low-----------	0.24	3	.5-2
	13-25	12-35	1.30-1.45	0.6-2.0	0.10-0.18	3.6-5.5	Low-----------	0.24		
	25-60	18-40	1.35-1.60	0.06-0.6	0.12-0.18	3.6-5.5	Moderate------	0.24		
19A, 19B, 19C----- Uchee	0-28	3-10	1.30-1.50	6.0-20	0.05-0.10	4.5-5.5	Low-----------	0.20	5	.5-1
	28-32	8-30	1.40-1.60	0.6-2.0	0.10-0.15	4.5-5.5	Low-----------	0.24		
	32-52	25-50	1.35-1.50	0.2-0.6	0.10-0.16	4.5-5.5	Moderate------	0.28		
	52-60	15-40	1.35-1.50	0.2-2.0	0.10-0.16	4.5-5.5	Moderate------	0.28		
20B*, 20C*:										
Uchee------------	0-28	3-10	1.30-1.50	6.0-20	0.05-0.10	4.5-5.5	Low-----------	0.20	5	.5-1
	28-32	8-30	1.40-1.60	0.6-2.0	0.10-0.15	4.5-5.5	Low-----------	0.24		
	32-52	25-50	1.35-1.50	0.2-0.6	0.10-0.16	4.5-5.5	Moderate------	0.28		
	52-60	15-40	1.35-1.50	0.2-2.0	0.10-0.16	4.5-5.5	Moderate------	0.28		
Peawick----------	0-4	10-25	1.20-1.30	0.6-2.0	0.10-0.17	3.6-5.5	Low-----------	0.37	4	.5-2
	4-70	35-60	1.30-1.50	<0.06	0.10-0.17	3.6-5.5	High----------	0.24		
21. Udorthents										
22*. Urban land										
23---------------- Yemassee	0-10	10-20	1.30-1.60	2.0-6.0	0.10-0.15	3.6-6.0	Low-----------	0.20	5	.5-4
	10-52	18-35	1.30-1.50	0.6-2.0	0.11-0.18	3.6-5.5	Low-----------	0.20		
	52-60	12-40	1.30-1.50	0.6-2.0	0.11-0.17	3.6-5.5	Low-----------	0.20		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated]

Soil name and map symbol	Hydrologic group	Flooding			High water table			Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Uncoated steel	Concrete
					Ft				
1 Alaga	A	Rare	---	---	>6.0	---	---	Low	Moderate.
2** Bohicket	D	Frequent	Very brief	Jan-Dec	+3-0	Apparent	Jan-Dec	High	High.
3 Chickahominy	D	None	---	---	0-0.5	Apparent	Nov-Apr	High	High.
4 Chipley	C	None	---	---	2.0-3.0	Apparent	Dec-Apr	Low	High.
5A, 5B Emporia	C	None	---	---	3.0-4.5	Perched	Nov-Apr	Moderate	High.
6 Kenansville	A	None	---	---	>6.0	---	---	Low	High.
7 Kinston	B/D	Frequent	Brief	Nov-Jun	0-1.0	Apparent	Nov-Jun	High	High.
8*:									
Leon	B/D	None	---	---	0-1.0	Apparent	Jun-Feb	High	High.
Chipley	C	None	---	---	2.0-3.0	Apparent	Dec-Apr	Low	High.
9 Myatt	D	None	---	---	0-1.0	Apparent	Nov-Apr	High	High.
10 Nawney	D	Frequent	Very long	Jan-Dec	0-0.5	Apparent	Jan-Dec	High	High.
11E*:									
Nevarc	C	None	---	---	1.5-3.0	Perched	Dec-Apr	High	High.
Remlik	A	None	---	---	>4.0	Perched	Dec-Mar	Low	Moderate.
12A, 12B, 12C, 13B3 Peawick	D	None	---	---	1.5-3.0	Perched	Nov-Mar	High	High.
14B*:									
Peawick	D	None	---	---	1.5-3.0	Perched	Nov-Mar	High	High.
Slagle	C	None	---	---	1.5-3.0	Perched	Nov-Apr	Moderate	High.
15** Rappahannock	D	Frequent	Very brief	Jan-Dec	+2-0.5	Apparent	Jan-Dec	High	High.
16 Rumford	B	None	---	---	>6.0	---	---	Low	High.
17B3, 18A, 18B, 18C Slagle	C	None	---	---	1.5-3.0	Perched	Nov-Apr	Moderate	High.
19A, 19B, 19C Uchee	A	None	---	---	3.5-5.0	Perched	Jan-Apr	Low	High.
20B*, 20C*:									
Uchee	A	None	---	---	3.5-5.0	Perched	Jan-Apr	Low	High.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Uncoated steel	Concrete
					Ft				
20B*, 20C*:									
Peawick----------	D	None--------	---	---	1.5-3.0	Perched	Nov-Mar	High-----	High.
21. Udorthents									
22*. Urban land									
23---------------- Yemassee	C	None--------	---	---	1.0-1.5	Apparent	Dec-Mar	High-----	High.

* See description of the map unit for composition and behavior characteristics of the map unit.

** In the "High water table--Depth" column, a plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

TABLE 17.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Alaga	Thermic, coated Typic Quartzipsamments
Bohicket	Fine, mixed, nonacid, thermic Typic Sulfaquents
Chickahominy	Clayey, mixed, thermic Typic Ochraquults
Chipley	Thermic, coated Aquic Quartzipsamments
Emporia	Fine-loamy, siliceous, thermic Typic Hapludults
Kenansville	Loamy, siliceous, thermic Arenic Hapludults
Kinston	Fine-loamy, siliceous, acid, thermic Typic Fluvaquents
Leon	Sandy, siliceous, thermic Aeric Haplaquods
Myatt	Fine-loamy, siliceous, thermic Typic Ochraquults
Nawney	Fine-loamy, mixed, acid, thermic Typic Fluvaquents
Nevarc	Clayey, mixed, thermic Aquic Hapludults
Peawick	Clayey, mixed, thermic Aquic Hapludults
Rappahannock	Loamy, mixed, euic, thermic Terric Sulfihemists
Remlik	Loamy, siliceous, thermic Arenic Hapludults
Rumford	Coarse-loamy, siliceous, thermic Typic Hapludults
Slagle	Fine-loamy, siliceous, thermic Aquic Hapludults
Uchee	Loamy, siliceous, thermic Arenic Hapludults
Udorthents	Udorthents
Yemassee	Fine-loamy, siliceous, thermic Aeric Ochraquults

☆U.S. GOVERNMENT PRINTING OFFICE : 1986—477-020/40011

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