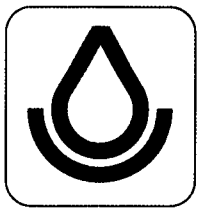
SOIL SURVEY OF

Robeson County, North Carolina



United States Department of Agriculture
Soil Conservation Service
in cooperation with
North Carolina Agricultural Experiment Station
and the
Robeson County Board of Commissioners

This is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and agencies of the States, usually the Agricultural Experiment Stations. In some surveys, other Federal and local agencies also contribute. 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 who need the information, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was completed in the period 1966–71. Soil names and descriptions were approved in 1972. Unless otherwise indicated, statements in the publication refer to conditions in the county in 1971. This survey was made cooperatively by the Soil Conservation Service, the North Carolina Agricultural Experiment Station, and the Robeson County Board of Commissioners. It is part of the technical assistance furnished to the Robeson Soil and Water Conservation District.

HOW TO USE THIS SOIL SURVEY

THIS SOIL SURVEY contains information that can be applied in managing farms, woodlands, and wildlife areas; in selecting sites for roads, ponds, buildings, and other structures; and in judging the suitability of tracts of land for farming, industry, and recreation.

Locating Soils

All the soils of Robeson County are shown on the detailed map at the back of this publication. This map consists of many sheets made from aerial photographs. Each sheet is numbered to correspond with a number on the Index to Map Sheets.

On each sheet of the detailed map, soil areas are outlined and are identified by symbols. All areas marked with the same symbol are the same kind of soil. The soil symbol is inside the area if there is enough room; otherwise, it is outside and a pointer shows where the symbol belongs.

Finding and Using Information

The "Guide to Mapping Units" can be used to find information. This guide lists all the soils of the county in alphabetic order by map symbol and gives the capability classification and woodland suitability group of each. It also shows the page where each soil is described.

Individual colored maps showing the relative suitability or degree of limitation of soils for many specific purposes can be developed by using the soil map and the information in the text. Translucent material can be used as an overlay over the soil map and colored to show soils that have the same limitation or suitability. For example, soils that have a slight limitation for a given use can be colored green, those with a moderate limitation can be colored yellow, and those with a severe limitation can be colored red.

Farmers and those who work with farmers can learn about use and management of the soils from the soil descriptions and from the discussions of the capability units and woodland groups.

Foresters and others can refer to the section "Use of the Soils for Woodland," where the soils of the county are grouped according to their suitability for trees.

Wildlife managers and others can find information about soils and wildlife in the section "Wildlife."

Community planners and others can read about soil properties that affect the choice of sites for nonindustrial buildings and for recreation areas in the sections "Engineering Uses of the Soils" and "Use of the Soils for Recreation Development."

Engineers and builders can find, under "Engineering Uses of the Soils," tables that contain test data, estimates of soil properties, and information about soil features that affect engineering practices.

Scientists and others can read about the soils in the section "Formation and Classification of the Soils."

Newcomers in the area may be especially interested in the section "General Soil Map," where broad patterns of soils are described. They may also be interested in the information about the county given in the section "General Nature of the County."

Contents

Issued January 1978

Summary of Tables

SOIL SURVEY OF ROBESON COUNTY, NORTH CAROLINA

BY CLIFFORD M. McCACHREN, SOIL CONSERVATION SERVICE

SOILS SURVEYED BY ROBERT E. HORTON, ARLIN WEAVER, DANIEL G. SPANGLER, AND CLIFFORD M. McCACHREN [1]

UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, IN COOPERATION WITH THE NORTH CAROLINA AGRICULTURAL EXPERIMENT STATION AND THE ROBESON COUNTY BOARD OF COMMISSIONERS

ROBESON COUNTY is on the Coastal Plain in the southeastern part of North Carolina (fig. 1). It covers 607,104 acres and is the second largest county in the State. Lumberton, the county seat, is on the banks of the Lumber River, just east of the center of the county. Lumberton and Fairmont, in the southern part of the county, are major tobacco-market centers of the North and South Carolina Border Belt area.

Robeson County is mainly a farming county. Of the total acreage, 345,725 acres, or 58 percent, is in farm tracts. Of the acreage in farms, 107,383 acres, about 30 percent of the land, is in woods, and 153,227 acres, about 45 percent, is in harvested crops. About 45 percent of the acreage in harvested crops is corn, 23 percent is soybeans, 15 percent is cotton, 12 percent is tobacco, and 5 percent is other crops. Tobacco brings in about three-fourths of the total income from farm crops (*7*).[2]

The soils of Robeson County are nearly level to sloping and are well suited to farming. Generally, the well-drained soils occupy broad outer rims of the interstream divides next to the drainageways, and the more poorly drained, nearly level soils are farther from the drainageways, on the flood plains of streams, and in Carolina bays.

The soils are generally acid and are low in natural fertility and organic-matter content. Lime and fertilizer should be applied according to the results of soil tests. Among good management practices generally are drainage or irrigation, if needed, crop rotation, fertilization, and conservation of plant residue.

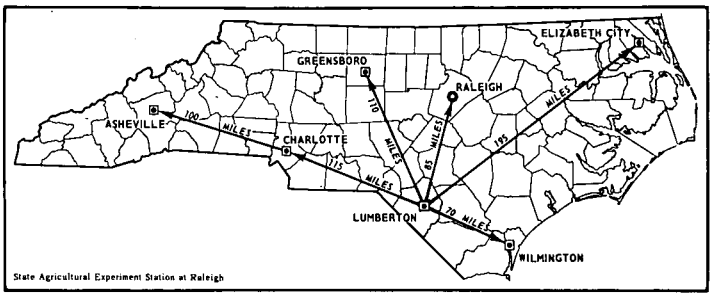


Figure 1.—**Location of Robeson County in North Carolina.**

How This Survey Was Made

Soil scientists made this survey to learn what kinds of soils are in Robeson County, where they are located, and how they can be used. The soil scientists went into the county knowing they likely would find many soils they had already seen and perhaps some they had not. They observed the steepness, length, and shape of slopes, the size and speed of streams, the kinds of native plants or crops, the kinds of rock, and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material that has not been changed much by leaching or by the action of plant roots.

The soil scientists made comparisons among the profiles they studied, and they compared these profiles with those in counties nearby and in places more distant. They classified and named the soils according to nationwide, uniform procedures. The *soil series* and the *soil phase* are the categories of soil classification most used in a local survey.

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, all the soils of one series have major horizons that are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Byars and Norfolk, for example, are the

[1] Others contributing substantially to the survey were C. E. BRANDON, WILLIE E. SPRUILL, HENRY S. HUNTT III, J. B. NEWMAN, NEIL N. RUBEL, GLENN E. KELLY, and DOUGLAS D. WEBER.

[2] Italic numbers in parentheses refer to Literature Cited, page 66.

names of two soil series. All the soils in the United States having the same series name are essentially alike in those characteristics that affect their behavior in the undisturbed landscape.

Soils of one series can differ in texture of the surface layer and in slope, stoniness, or some other characteristic that affects use of the soils by man. On the basis of such differences, a soil series is divided into phases. The name of a soil phase indicates a feature that affects management. For example, Norfolk loamy sand, 0 to 2 percent slopes, is one of several phases within the Norfolk series.

After a guide for classifying and naming the soils had been worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show woodlands, buildings, field borders, trees, and other details that help in drawing boundaries accurately. The soil map at the back of this publication was prepared from the aerial photographs.

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning the management of farms and fields, a mapping unit is nearly equivalent to a soil phase. It is not exactly equivalent, because it is not practical to show on such a map all the small, scattered bits of soil of some other kind that have been seen within an area that is dominantly of a recognized soil phase.

Some mapping units are made up of soils of different series, or of different phases within one series. One such kind of mapping unit shown on the soil map of Robeson County is an undifferentiated group.

An undifferentiated group is made up of two or more soils that could be delineated individually but are shown as one unit because, for the purpose of the soil survey, there is little value in separating them. The pattern and proportion of soils are not uniform. An area shown on the map may be made up of only one of the dominant soils, or of two or more. If there are two or more dominant series represented in the group, the name of the group ordinarily consists of the names of the dominant soils, joined by "and." Norfolk and Faceville soils, 6 to 10 percent slopes, is an example.

In most areas surveyed there are places where the soil material is so rocky, so shallow, so severely eroded, or so variable that it has not been classified by soil series. These places are shown on the soil map and are described in the survey, but they are classified only to the Great Group. Udorthents, loamy, is an example.

While a soil survey is in progress, soil scientists take soil samples needed for laboratory measurements and for engineering tests. Laboratory data from the same kind of soil in other places are also assembled. Data on yields of crops under defined practices are assembled from farm records and from field or plot experiments on the same kind of soil. Yields under defined management are estimated for all the soils.

Soil scientists observe how soils behave when used as a growing place for native and cultivated plants and as material, foundation, or covering for structures. They relate this behavior to properties of the soils. For example, they observe that filter fields for onsite disposal of sewage fail on a given kind of soil, and they relate this to the slow permeability of the soil or to its high water table. They see that streets, road pavements, and foundations for houses are cracked on a named kind of soil, and they relate this failure to the high shrink-swell potential of the soil material. Thus, they use observation and knowledge of soil properties, together with available research data, to predict limitations or suitability of soils for present and potential uses.

After data have been collected and tested for the key, or benchmark, soils in a survey area, the soil scientists set up trial groups of soils. They test these groups by further study and by consultation with farmers, agronomists, engineers, and others. They then adjust the groups according to the results of their studies and consultation. Thus, the groups that are finally evolved reflect up-to-date knowledge of the soils and their behavior under current methods of use and management.

General Soil Map

The general soil map at the back of this survey shows, in color, the soil associations in Robeson County. A soil association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils and at least one minor soil, and it is named for the major soils. The soils in one association may occur in another, but in a different pattern.

A map showing soil associations is useful to people who want a general idea of the soils in a county, who want to compare different parts of a county, or who want to know the location of large tracts that are suitable for a certain kind of land use. Such a map is a useful general guide in managing a watershed, a wooded tract, or a wildlife area or in planning engineering works, recreation facilities, and community developments. It is not a suitable map for planning the management of a farm or field or for selecting the exact location of a road, building, or other structure, because the soils in any one association ordinarily differ in slope, depth, stoniness, drainage, and other characteristics that affect their management.

The soil associations in Robeson County are discussed in the following pages.

1. Norfolk-Wagram-McColl association

Well-drained, nearly level to sloping soils that have a loamy subsoil and poorly drained, nearly level soils that have a clayey and loamy subsoil; on uplands

This association is on broad upland ridges and in many oval bays that appear as pockets on these ridges.

This association makes up 20 percent of the county. It is 33 percent Norfolk soils, 30 percent Wagram soils, and 7 percent McColl soils. Minor soils make up 30 percent of this association. They are Coxville, Rains, Goldsboro, Lynchburg, Pantego, and Lakeland soils.

Norfolk soils are well drained. The surface layer is grayish-brown loamy sand. The subsurface layer is light yellowish-brown loamy sand. The subsoil is yellowish-brown sandy loam in the upper part, yellowish-brown sandy clay loam in the middle part, and

mottled brownish-yellow, pale-brown, yellowish-red, and gray sandy clay loam in the lower part.

Wagram soils are well drained. The surface layer is dark grayish-brown loamy sand. The subsurface layer is light yellowish-brown loamy sand. The subsoil is yellowish-brown sandy loam and sandy clay loam in the upper part and yellowish-brown and pale-brown sandy loam in the lower part.

McColl soils are poorly drained. The surface layer is dark-gray loam. The subsoil is light-gray sandy clay in the upper part and strong-brown sandy clay loam in the lower part.

Most of the acreage is in crops and pasture, and the rest is forested.

Most of the major soils are well suited or fairly well suited to locally grown crops. The rest are well suited to a few locally grown crops if they are drained. The main crops are corn, cotton, tobacco, soybeans, and forage crops.

Low natural fertility, leaching of plant nutrients, droughtiness, soil blowing, a seasonal high water table, surface runoff, and slow permeability are some of the limitations in the use and management of these soils.

2. *Aycock-Trebloc-Exum association*

Well-drained to poorly drained, nearly level and gently sloping soils that have a loamy and clayey subsoil; on uplands

This association is on wide upland ridges, broad flats, and large oval or irregularly shaped bays.

This association makes up 5 percent of the county. It is 30 percent Aycock soils, 25 percent Trebloc soils, and 15 percent Exum soils. Minor soils make up 30 percent of this association. They are Nahunta, Faceville, Norfolk, Marlboro, and Coxville soils.

Aycock soils are well drained. The surface layer is pale-brown very fine sandy loam. The upper part of the subsoil is yellowish-brown clay loam and brownish-yellow loam, and the lower part is mottled strong-brown, yellow, red, and light-gray loam and sandy loam.

Trebloc soils are poorly drained. The surface layer is very dark gray loam. The subsurface layer is gray silt loam. The subsoil is gray loam, clay loam, and clay.

Exum soils are moderately well drained. The surface layer is grayish-brown very fine sandy loam. The subsurface layer is very pale brown very fine sandy loam. The subsoil is yellowish-brown clay loam.

Most of the acreage is in crops and pasture. The rest is forested.

Most of the major soils are well suited to locally grown crops. The rest are well suited to a few locally grown crops if they are drained. The main crops are tobacco, corn, soybeans, cotton, forage crops, and truck crops, such as snap beans, tomatoes, cucumbers, sweet potatoes, and onions.

A seasonal high water table, slow permeability, frequent ponding, and erosion are some of the limitations in the use and management of the soils.

3. *Rains-Lynchburg-Goldsboro association*

Poorly drained to moderately well drained, nearly level soils that have a loamy subsoil; on uplands

This association is on broad upland flats, large, irregularly shaped depressions, oval and irregularly shaped bays, and interstream areas.

This association makes up 18 percent of the county. It is about 29 percent Rains soils, 25 percent Lynchburg soils, and 15 percent Goldsboro soils. Minor soils make up 31 percent of the association. They are Norfolk, Wagram, Coxville, and Pantego soils.

Rains soils are poorly drained. The surface layer is black sandy loam. The subsurface layer is grayish-brown sandy loam. The subsoil is sandy clay loam that is gray and light brownish gray in the upper part and gray and light gray in the lower part.

Lynchburg soils are somewhat poorly drained. The surface layer is dark-gray sandy loam. The subsurface layer is pale-brown sandy loam. The subsoil is sandy clay loam that is pale brown in the upper part, light brownish gray in the middle part, and mottled light gray and pale brown in the lower part.

Goldsboro soils are moderately well drained. The surface layer is grayish-brown loamy sand. The subsurface layer is yellowish-brown loamy sand. The subsoil is yellowish-brown sandy clay loam in the upper part and gray sandy clay loam in the lower part.

Most of the acreage is in crops and pasture. The rest is forested.

Most of the major soils are well suited to a few or all of the locally grown crops. The rest are well suited to most locally grown crops if they are drained.

A seasonal high water table is the main limitation in the use and management of the soils.

4. *Wakulla-Pocalla associaton*

Somewhat excessively drained, nearly level and gently sloping soils that have a sandy and loamy subsoil; on uplands

This association is on broad interstream divides on uplands or stream terraces or on the outer rim of some large bays.

This association makes up 2 percent of the county. It is 60 percent Wakulla soils and 20 percent Pocalla soils. Minor soils make up 20 percent of the association. They are Lakeland, Wagram, Osier, Goldsboro, Rains, and Bibb soils.

Wakulla soils are somewhat excessively drained. The surface layer is dark grayish-brown sand. The subsurface layer is light yellowish-brown sand. The subsoil is strong-brown loamy sand.

Pocalla soils are somewhat excessively drained. The surface layer is dark grayish-brown loamy sand. The subsurface layer is brown sand. The upper part of the subsoil is yellowish-brown sandy loam. Below this is a layer of yellow loamy sand. The lower part of the subsoil is brownish-yellow to yellowish-brown sandy clay loam.

Most of the acreage is in crops and pasture. The rest is forested.

The major soils are fairly well suited to most locally grown crops. The main crops are corn, cotton, tobacco, and soybeans.

Low or very low natural fertility, low available water capacity, leaching of plant nutrients, droughtiness, and soil blowing are some of the limitations in the use and management of the soils.

5. *Johns-Lumbee association*

Moderately well drained to poorly drained, nearly level soils that have a loamy subsoil; on stream terraces

This association is on fairly broad stream terraces.

This association makes up 8 percent of the county. It is 31 percent Johns soils and 30 percent Lumbee soils. Minor soils make up 39 percent of the association. They are Kalmia, Portsmouth, Pactolus, Bibb, and Johnston soils.

Johns soils are moderately well drained and somewhat poorly drained. The surface layer is dark-gray sandy loam. The subsoil is yellowish-brown sandy clay loam in the upper part, grayish-brown sandy clay loam in the middle part, and gray sandy loam in the lower part.

Lumbee soils are poorly drained. The surface layer is dark-gray sandy loam. The subsoil is gray sandy loam and sandy clay loam.

Most of the acreage is in crops or pasture. The rest is forested.

The major soils are fairly well suited to locally grown crops if they are drained. The main crops are corn, cotton, tobacco, soybeans, forage crops, and truck crops.

A seasonal high water table and flooding (fig. 2) are some of the limitations in the use and management of the soils.

6. *Johnston-Bibb association*

Very poorly drained and poorly drained, nearly level soils that have loamy and sandy underlying material; on flood plains

This association is on broad first bottoms along major drainageways.

This association makes up about 12 percent of the county. It is 64 percent Johnston soils and 18 percent Bibb soils. Minor soils make up 18 percent of the association. They are Portsmouth, Lumbee, Plummer, Pactolus, and Rutlege soils.

Johnston soils are very poorly drained. The surface layer is black mucky loam. The underlying material is light brownish-gray, stratified sandy loam, loamy sand, and sand.

Figure 2.—Flooding in an area of Johns-Lumbee association.

Bibb soils are poorly drained. The surface layer is dark-gray sandy loam. The underlying material is stratified, dark-gray sandy loam, gray loamy sand, and gray sand.

Most of the acreage is in native hardwoods and in pine, cypress, and juniper. A small acreage is in crops or pasture.

If they are drained, the major soils are fairly well suited to a few locally grown crops. The main crops are corn, soybeans, and grasses.

A seasonal high water table, moderately rapid permeability, and flooding are some of the limitations in the use and management of the soils.

7. *Norfolk-Rains-Goldsboro association*

Well-drained to poorly drained, nearly level and gently sloping soils that have a loamy subsoil; on uplands

This association is on broad ridges, broad flats, and irregularly shaped or oval depressions on uplands.

This association makes up 35 percent of the county. It is 20 percent Norfolk soils, 18 percent Rains soils, and 14 percent Goldsboro soils. Minor soils make up 48 percent of this association. They are Wagram, Coxville, Lynchburg, Dunbar, Duplin, Marlboro, Lakeland, and Pocalla soils.

Norfolk soils are well drained. The surface layer is grayish-brown loamy sand. The subsurface layer is light yellowish-brown loamy sand. The subsoil is brownish-yellow sandy loam in the upper part, yellowish-brown sandy clay loam in the middle part, and mottled brownish-yellow, pale-brown, yellowish-red, and gray sandy clay loam in the lower part.

Rains soils are poorly drained. The surface layer is black sandy loam. The subsurface layer is grayish-brown sandy loam. The subsoil is sandy clay loam that is gray and light brownish gray in the upper part and gray and light gray in the lower part.

Goldsboro soils are moderately well drained. The surface layer is grayish-brown loamy sand. The subsurface layer is yellowish-brown loamy sand. The subsoil is yellowish-brown sandy clay loam in the upper part and gray sandy clay loam in the lower part.

Most of the acreage is in crops and pasture. The rest is forested.

Most of the major soils are well suited to locally grown crops. The rest are well suited to a few locally grown crops if they are drained. The main crops are corn, cotton, tobacco, soybeans, and forage crops.

A seasonal high water table and flooding are some of the limitations in the use and management of the soils.

Descriptions of the Soils

In this section the soils of Robeson County are described in detail and their use and management are discussed. Each soil series is described in detail, and then, briefly, the mapping units in that series. Unless it is specifically mentioned otherwise, it is to be assumed that what is stated about the soil series holds true for the mapping units in that series. Thus, to get full information about any one mapping unit, it is

necessary to read both the description of the mapping unit and the description of the soil series to which it belongs.

An important part of the description of each soil series is the soil profile, that is, the sequence of layers from the surface downward to rock or other underlying material. Each series contains two descriptions of this profile. The first is brief and in terms familiar to the layman. The second is much more detailed and is for those who need to make thorough and precise studies of soils. Color terms are for moist soil unless stated otherwise. The profile described in the soil series is representative for mapping units in that series. If a given mapping unit has a profile in some ways different from the one described in the series, these differences are stated in the description of the mapping unit, or they are apparent in the name of the mapping unit. The description of each mapping unit contains suggestions on how the soil can be managed.

As mentioned in the section "How This Survey Was Made," not all mapping units are members of a soil series. Udorthents, loamy, for example, does not belong to a soil series, nevertheless it is listed in alphabetic order along with the soil series.

Preceding the name of each mapping unit is a symbol in parentheses. This symbol identifies the mapping unit on the detailed soil map. Listed at the end of each description of a mapping unit is the capability unit and woodland group in which the mapping unit has been placed.

The acreage and proportionate extent of each mapping unit are shown in table 1. Many of the terms used in describing soils can be found in the Glossary, and more detailed information about the terminology and methods of soil mapping can be obtained from the Soil Survey Manual (*5*).

Robeson County adjoins Marlboro County, South Carolina, and Scotland County, North Carolina, both of which have a published soil survey. The soil boundaries are joined, and most of the soil names are the same. Exceptions are where miscellaneous land types join classified soils and, in a few places, where series concepts have changed as the system of classifying soils has been refined.

TABLE 1.—*Approximate acreage and proportionate extent of the soils*

Soil	Acres	Percent
Aycock very fine sandy loam, 0 to 2 percent slopes	10,928	1.80
Aycock very fine sandy loam, 2 to 6 percent slopes	1,457	.24
Bibb soils	22,464	3.70
Byars loam	3,157	.52
Coxville loam	31,934	5.26
Dunbar sandy loam	5,585	.92
Duplin sandy loam, 0 to 2 percent slopes	5,221	.86
Duplin sandy loam, 2 to 6 percent slopes	728	.12
Exum very fine sandy loam, 0 to 1 percent slopes	5,646	.93
Faceville fine sandy loam, 0 to 2 percent slopes	668	.11
Faceville fine sandy loam, 2 to 6 percent slopes	3,036	.50
Goldsboro loamy sand, 0 to 2 percent slopes	46,444	7.65
Johns sandy loam	15,359	2.53
Johnston soils	74,674	12.30
Kalmia loamy sand, 0 to 2 percent slopes	2,307	.38
Lakeland sand, 0 to 6 percent slopes	9,107	1.50
Leon sand	2,498	.41
Lumbee sandy loam	19,609	3.23
Lynchburg sandy loam	30,901	5.09
Marlboro sandy loam, 0 to 2 percent slopes	3,218	.53
Marlboro sandy loam, 2 to 6 percent slopes	1,153	.19
McColl loam	9,228	1.52
Meggett fine sandy loam	1,821	.30
Nahunta very fine sandy loam	7,407	1.22
Norfolk loamy sand, 0 to 2 percent slopes	76,374	12.58
Norfolk loamy sand, 2 to 6 percent slopes	7,832	1.29
Norfolk and Faceville soils, 6 to 10 percent slopes	668	.11
Pactolus loamy sand	4,128	.68
Pantego fine sandy loam	10,078	1.66
Plummer and Osier soils	5,828	.96
Pocalla loamy sand, 0 to 3 percent slopes	12,749	2.10
Ponzer muck, siliceous subsoil variant	1,578	.26
Portsmouth loam	6,678	1.10
Rains sandy loam	71,638	11.80
Rutlege loamy sand	3,278	.54
Toisnot loam	2,307	.38
Torhunta loam	2,975	.49
Trebloc loam	9,774	1.61
Udorthents, loamy	668	.11
Wagram loamy sand, 0 to 6 percent slopes	55,550	9.15
Wagram loamy sand, 6 to 10 percent slopes	3,218	.53
Wakulla sand, 0 to 6 percent slopes	13,964	2.30
Water	3,278	.54
Total	607,104	100.00

Aycock Series

The Aycock series consists of nearly level to gently sloping, well-drained soils on uplands.

In a representative profile the surface layer is pale-brown very fine sandy loam about 7 inches thick. The subsoil is 71 inches thick. The upper part is yellowish-brown clay loam and brownish-yellow loam that has mottles in shades of red and brown. The lower part is mottled strong-brown, yellow, red, and light-gray loam and sandy loam. The underlying material, to a depth of 100 inches, is light-gray sandy loam that has yellow mottles.

Aycock soils are low in natural fertility and organic-matter content. Permeability is moderate, the available water capacity is high, and the shrink-swell potential is moderate. Depth to the seasonal high water table is more than 5 feet.

Most of the acreage is in crops and pasture. The rest is in mixed hardwoods and pine forest.

Representative profile of Aycock very fine sandy loam, 0 to 2 percent slopes, in a cultivated field 2 miles southwest of Purvis, ¼ mile west of State Road 1184, and ¼ mile south of State Road 1134:

Ap—0 to 7 inches, pale-brown (10YR 6/3) very fine sandy loam; weak, medium, granular structure; very friable; few, fine, fibrous roots; a thin discontinuous layer of very pale brown (10YR 7/4) material is

in the lower part; slightly acid; abrupt, smooth boundary.

B21t—7 to 38 inches, yellowish-brown (10YR 5/6) clay loam; weak, medium, subangular blocky structure; friable, sticky and plastic; fine and medium fibrous roots; few patchy clay films on faces of peds and in pores; few, medium, hard, red (2.5YR 4/6) iron concretions; strongly acid; clear, smooth boundary.

B22t—38 to 48 inches, brownish-yellow (10YR 6/6) loam; common, medium, distinct, yellowish-red (5YR 4/8) and strong-brown (7.5YR 5/6) mottles and common, fine, distinct, pale-brown mottles; weak, medium, subangular blocky structure; friable, slightly sticky and slightly plastic; few, medium, fibrous roots; common small and medium pores; few discontinuous clay films on faces of peds and in pores; about 5 percent medium and large plinthite nodules that are strong brown (7.5YR 5/8) and red (2.5YR 5/8); strongly acid; gradual, wavy boundary.

B23t—48 to 70 inches, mottled strong-brown (7.5YR 5/8), yellow (10YR 7/8), red (2.5YR 5/8), and light-gray (10YR 7/1) loam; weak, thick, platy structure; friable, slightly sticky and slightly plastic; about 5 percent common, large, hard and brittle plinthite nodules that are strong brown (7.5YR 5/8) and red (2.5YR 5/8); strongly acid; gradual, wavy boundary.

B3—70 to 78 inches, mottled yellow (10YR 7/8), red (2.5YR 5/8), and light-gray (10YR 7/1) sandy loam; pockets of sandy clay loam; massive; strongly acid; gradual, wavy boundary.

C—78 to 100 inches, light-gray (10YR 7/1) sandy loam; pockets of sandy clay loam; many, coarse, distinct, yellow (10YR 7/8) mottles; massive; strongly acid.

The solum is 60 to 80 inches thick. The soils are strongly acid throughout unless they have been limed. The Ap or A1 horizon is dark grayish brown, grayish brown, pale brown, or brown. In some places there is an A2 horizon of pale-brown, very pale brown, or light yellowish-brown very fine sandy loam. The B2t horizon is brownish-yellow, yellowish-brown, and strong-brown loam or clay loam. The C horizon is light-gray or gray sandy loam and sandy clay loam.

Aycock soils have a slightly higher content of sand coarser than very fine sand and in some places contain slightly more plinthite in the lower part of the B horizon than defined in the range for the Aycock series, but this does not significantly alter their use or behavior.

AyA—Aycock very fine sandy loam, 0 to 2 percent slopes. This well-drained soil is on broad, smooth uplands on higher parts of the landscape. Most areas cover 5 to 200 acres. This soil has the profile described as representative of the series.

Included with this soil in mapping are a few small area of soils that have a surface layer of fine sandy loam and silt loam. Also included are small areas of Exum, Faceville, Marlboro, and Norfolk soils, small areas of a soil that is less than 60 inches deep to the underlying material, and small areas of soils that have slopes of more than 2 percent.

This soil is well suited to all locally grown crops. The main crops are corn, soybeans, cotton, tobacco, and truck crops, such as snap beans, tomatoes, cucumbers, sweet potatoes, and onions.

Erosion is the main limitation in the use and management of this soil. Winter cover crops, minimum tillage, and crop residue management help to control runoff and erosion and maintain the tilth and organic-matter content. Maintaining drainageways in sod, using terraces and diversions, and including close-growing crops in the crop rotation also help to conserve soil and water. Capability unit IIe–1; woodland group 2o1.

AyB—Aycock very fine sandy loam, 2 to 6 percent slopes. This well-drained soil is between nearly level soils and soils in drainageways or depressions. Most mapped areas cover 5 to 50 acres.

Included with this soil in mapping are a few small areas of soils that have a surface layer of fine sandy loam and silt loam. Also included are small areas of Faceville, Marlboro, and Norfolk soils and a few small areas of soils that have severely eroded spots.

This soil is well suited to all locally grown crops. The main crops are corn, soybeans, cotton, tobacco, and truck crops, such as snap beans, tomatoes, cucumbers, sweet potatoes, and onions.

Slope and erosion caused by surface runoff are the main limitations in the use and management of this soil. Winter cover crops, minimum tillage, and crop residue management help to control runoff and erosion and maintain the tilth and organic-matter content. Maintaining drainageways in sod, using terraces and diversions, and including close-growing crops in the crop rotation also help to conserve soil and water. Capability unit IIIe–1; woodland group 2o1.

Bibb Series

The Bibb series consists of nearly level, poorly drained soils on flood plains. These soils formed in recent alluvium.

In a representative profile the surface layer is dark-gray sandy loam about 12 inches thick. The underlying material, to a depth of 64 inches, is stratified dark-gray sandy loam, gray loamy sand, and gray sand.

Bibb soils are low in natural fertility and medium in organic-matter content. Permeability is moderately rapid, the available water capacity is medium, and the shrink-swell potential is low. The seasonal high water table is at or near the surface from November through July. These soils are flooded very frequently for brief periods from November through July.

Most of the acreage is forested. Only a small acreage is in crops.

Representative profile of Bibb sandy loam in an area of Bibb soils, in a wooded area one-half mile west of Lumber Bridge on State Road 1706, 200 feet north on State Road 1707, and 40 feet north of road:

O1—1 inch to 0, partly decomposed leaves and debris.

A1—0 to 12 inches, dark-gray (10YR 4/1) sandy loam; moderate, medium, granular structure; very friable; many medium and coarse roots; very strongly acid; gradual, smooth boundary.

C1g—12 to 26 inches, dark-gray (10YR 4/1) sandy loam; thin layers of gray (10YR 5/1) loamy sand; weak, medium, granular structure; very friable; common fine and medium roots; very strongly acid; gradual, smooth boundary.

C2g—26 to 50 inches, gray (10YR 5/1) loamy sand; single grained; loose; few fine and medium roots; very strongly acid; gradual, smooth boundary.

C3g—50 to 64 inches, gray (10YR 6/1) sand; single grained; loose; very strongly acid.

The soils are very strongly acid throughout unless they have been limed. The A horizon is dark gray, very dark gray, or dark grayish brown and is sandy loam, loamy sand, or loam. Where the A1 horizon is very dark gray, it is less than 8 inches thick. The C horizon, to a depth of 50 inches,

is dark-gray, gray, or light-gray stratified loamy sand, sandy loam, or loam. Below that depth it is sand.

BB—Bibb soils. These nearly level, poorly drained soils are on the flood plains of natural drainageways. The surface layer is sandy loam, loamy sand, or loam. Most mapped areas are narrow and long; in some places they extend for several miles along a stream.

The composition of this mapping unit is more variable and areas are generally larger than those of most other units in the county. Mapping has been controlled well enough, however, to make interpretations for the anticipated uses of the soils.

Included with these soils in mapping are a few areas of soils that have a black surface layer that is less than 12 inches thick. Also included are a few small areas of better drained soils on slightly elevated, narrow strips.

Wetness is a very severe limitation if the soils are not drained. If drained, the soils are suited to a few locally grown crops, mainly corn, soybeans, and grasses.

These soils have good tilth and can be worked within a wide range of moisture content. Tillage operations, however, are delayed in wet seasons. Minimum tillage and crop residue management help to maintain the tilth and organic-matter content.

A seasonal high water table, moderately rapid permeability, and flooding are the main limitations in the use and management of these soils. Drainage is needed for most uses. Capability unit IIIw–1 where the soils are occasionally flooded, Vw–1 where the soils are frequently flooded; woodland group 2w9.

Byars Series

The Byars series consists of nearly level, very poorly drained soils in depressions and bays on uplands.

In a representative profile the surface layer is black loam about 12 inches thick. The subsoil extends to a depth of 64 inches. It is dark-gray clay loam in the upper 3 inches and gray clay below. It is mottled with yellowish brown below a depth of 50 inches.

Byars soils are medium in natural fertility and organic-matter content. Permeability is slow, the available water capacity is high, and the shrink-swell potential is high. The seasonal high water table is at or near the surface from November through April. Many areas are ponded for brief periods from December to March.

Most of the acreage is in mixed hardwoods and pine forest. The rest is in crops and pasture.

Representative profile of Byars loam, in a wooded area five-eighths of a mile southwest of Rennert along Atlantic Coast Line Railroad and 50 feet west of railroad tracks:

A1—0 to 12 inches, black (10YR 2/1) loam; moderate, medium, granular structure; friable; many medium and coarse roots; very strongly acid; clear, smooth boundary.

B1g—12 to 15 inches, dark-gray (10YR 4/1) clay loam; weak, fine, subangular blocky structure; friable, sticky; few medium and fine roots; very strongly acid; clear, wavy boundary.

B21tg—15 to 36 inches, gray (10YR 5/1) clay; weak, medium, subangular blocky structure; firm, sticky and plastic; few medium and fine roots; shiny faces on peds; very strongly acid; gradual, wavy boundary.

B22tg—36 to 50 inches, gray (10YR 6/1) clay; weak, fine, angular blocky structure; firm, plastic and sticky; shiny faces on peds; very strongly acid; gradual, wavy boundary.

B3g—50 to 64 inches, gray (10YR 5/1) clay; few, fine distinct, yellowish-brown mottles; weak, fine, angular blocky structure; firm, plastic and sticky; very strongly acid.

The solum is 60 to 74 inches thick. The soils are very strongly acid throughout unless they have been limed. The A1 horizon is black or very dark gray. The B2t horizon is very dark gray, dark gray, gray, or light gray and is clay loam, silty clay loam, or clay.

By—Byars loam. This nearly level, very poorly drained soil is in low depressions or in bays. Most mapped areas cover 8 to 700 acres.

Included with this soil in mapping are some small areas that have a surface layer of mucky loam. Also included are small areas of Coxville, Pantego, and Trebloc soils and some small areas of soils that have less than 30 percent silt in the subsoil.

Wetness is a very severe limitation in winter and spring. The soil is suited to a few locally grown crops if it is drained. The main crops are soybeans, corn, fescue, ladino clover, and truck crops, such as snap beans, tomatoes, cucumbers, sweet potatoes, and onions.

Minimum tillage and crop residue management help to maintain the organic-matter content. Tillage operations, however, are delayed in wet seasons.

A seasonal high water table, high shrink-swell potential, slow permeability, and ponding are the main limitations in the use and management of this soil. Drainage is needed for most uses, but there are few suitable outlets. Capability unit IVw–2; woodland group 2w9.

Coxville Series

The Coxville series consists of nearly level, poorly drained soils on broad flats or in bays on uplands.

In a representative profile the surface layer is black loam about 8 inches thick. The subsoil is 56 inches thick. It is gray sandy clay loam that has pale-brown mottles in the upper 4 inches, and in the lower 52 inches it is gray clay loam or clay that has mottles in shades of brown and red. The underlying material, to a depth of 80 inches, is dark-gray clay that has white and yellowish-brown mottles.

Coxville soils are medium in natural fertility and organic-matter content. Permeability is moderately slow, the available water capacity is high, and the shrink-swell potential is moderate. The seasonal high water table is at or near the surface from November through April. These soils are ponded for brief periods from December through March.

Most of the acreage is forested. The rest is chiefly in crops and pasture.

Representative profile of Coxville loam, 1½ miles northeast of Lumberton High School, 800 feet west of State Road, 1945, and 75 feet north of farm road:

Ap—0 to 8 inches, black (10YR 2/1) loam; moderate, medium, granular structure; friable; common fine roots; strongly acid; abrupt, smooth boundary.

B1g—8 to 12 inches gray (10YR 5/1) sandy clay loam; few, medium, faint, pale-brown (10YR 6/3) mottles; weak, medium, subangular blocky structure; friable, slightly sticky and slightly plastic; common medium roots and pores; old root channels are filled with material from the Ap horizon, and some material from the Ap horizon is mixed with this horizon; strongly acid; clear, smooth boundary.

B21tg—12 to 20 inches, gray (10YR 5/1) clay loam; common, medium, distinct, yellowish-brown (10YR 5/6) mottles and few, fine, distinct, strong-brown mottles; weak, medium, subangular blocky structure; firm; common fine roots; root channels filled with material from the Ap horizon; common medium and large pores; few discontinuous clay films on faces of peds; strongly acid; clear, smooth boundary.

B22tg—20 to 64 inches, gray (10YR 5/1) clay; few pockets of sandy loam and sandy clay loam; common, coarse, prominent, red (10YR 5/8) mottles and common, medium, prominent, dark yellowish-brown (10YR 4/4) and strong-brown (7.5YR 5/6) mottles; weak, medium and coarse, subangular blocky structure; firm, sticky and plastic; few fine roots; common medium pores; medium discontinuous clay films on faces of peds; strongly acid; gradual, wavy boundary.

Cg—64 to 80 inches, dark-gray (10YR 4/1) clay, pockets of sandy clay loam; common, medium, distinct, white (10YR 8/1) mottles and few, medium, prominent, yellowish-brown (10YR 5/6) mottles; massive; firm; strongly acid.

The solum is 60 to 80 inches thick. The soils are strongly acid or very strongly acid throughout unless they have been limed. The Ap or A1 horizon is very dark gray or black. In some places there is an A2 horizon of gray to dark-gray loam. The B2t horizon is light-gray to dark-gray sandy clay, clay loam, or clay that has dark grayish-brown, yellowish-brown, strong-brown, and red mottles. The C horizon is dark-gray to light-gray clay to sandy clay loam.

Co—Coxville loam. This nearly level, poorly drained soil is on broad, low flats or in Carolina bays and is on the lowest part of the landscape. Most mapped areas cover 5 to 250 acres.

Included with this soil in mapping are a few small areas of soils that have a surface layer of fine sandy loam. Also included are small areas of Dunbar, McColl, and Rains soils, small areas of soils that have a subsoil of sandy clay that extends to a depth of less than 60 inches, and small areas of soils that have more than 30 percent silt in the subsoil.

This soil is mainly wooded, but it is suited to a few locally grown crops if it is drained. The main crops are corn, soybeans, and pasture grasses and legumes.

This soil has good tilth and can be worked within a wide range of moisture content. Tillage operations, however, are delayed in wet seasons. Minimum tillage and crop residue management help to maintain tilth and the organic-matter content.

A seasonal high water table, ponding, and moderately slow permeability are the main limitations in the use and management of this soil. Drainage is needed for most uses. Capability unit IIIw–2; woodland group 2w9.

Dunbar Series

The Dunbar series consists of nearly level, somewhat poorly drained soils on uplands.

In a representative profile the surface layer is dark-gray sandy loam about 8 inches thick. The subsoil is 54 inches thick. In the upper 6 inches, it is light olive-brown clay loam. In the middle 28 inches, it is grayish-brown fine sandy clay and gray sandy clay that has mottles in shades of brown and red. In the lower 20 inches, it is light-gray sandy clay that has mottles in shades of brown and red. The underlying material, to a depth of 92 inches, is light-gray sandy clay.

Dunbar soils are medium in natural fertility and organic-matter content. Permeability is moderately slow, the available water capacity is medium, and the shrink-swell potential is moderate. The seasonal high water table is about 1 to 1½ feet below the surface from November through May.

Most of the acreage is in crops and pasture. The rest is forested.

A representative profile of Dunbar sandy loam, in a cleared field 4 miles southeast of Red Springs on State Highway 211, one-fourth of a mile northeast of State Road 1507, and 40 feet south of road:

Ap—0 to 8 inches, dark-gray (10YR 4/1) sandy loam; weak, medium and fine, granular structure; very friable; many fine roots; strongly acid; clear, smooth boundary.

B21t—8 to 14 inches, light olive-brown (2.5Y 5/4) clay loam; weak, medium, subangular blocky structure; firm; common root channels containing material from A horizon; thin discontinuous clay films on faces of peds; very strongly acid; gradual, wavy boundary.

B22tg—14 to 20 inches, grayish-brown (2.5Y 5/2) sandy clay; common, coarse, faint, light olive-brown (2.5Y 5/4) mottles and few, medium, distinct, yellowish-brown (10YR 5/6) mottles; weak, medium, subangular blocky structure; firm, sticky and slightly plastic; thin discontinuous clay films on faces of peds; very strongly acid; gradual, wavy boundary.

B23tg—20 to 42 inches, gray (10YR 6/1) sandy clay; many, medium, prominent, yellowish-brown (10YR 5/8) mottles, few, medium, prominent, yellowish-red (5YR 5/8) mottles and common, medium, distinct, pale-brown (10YR 6/3) mottles; weak, medium, subangular blocky structure; firm, sticky and slightly plastic; thin discontinuous clay films on faces of peds; very strongly acid; gradual, wavy boundary.

B24tg—42 to 62 inches, light-gray (10YR 6/1) sandy clay; pockets of sandy clay loam; common, medium, prominent, yellowish-brown (10YR 5/8) mottles, common, medium, distinct, pale-brown (10YR 6/3) mottles and few, medium, prominent, yellowish-red (5YR 5/8) mottles; weak, medium, subangular blocky structure; firm; thin discontinuous clay films on faces of peds; very strongly acid; gradual, wavy boundary.

Cg—62 to 92 inches, light-gray (10YR 7/1) sandy clay; pockets of sandy clay loam; massive; firm; very strongly acid.

The solum is 60 to 75 inches thick. The soils are strongly acid or very strongly acid throughout unless they have been limed. The Ap or A1 horizon is grayish brown or dark gray. In some places there is an A2 horizon of pale-brown sandy loam or fine sandy loam. The B21t horizon is pale brown, light olive brown, brown, light yellowish brown, or brownish yellow and is clay loam or sandy clay. The B22t, B23t, and B3 horizons are light gray, gray, dark gray, or grayish brown and are sandy clay, clay loam, or clay. The C horizon is light-gray or gray loamy sand to clay.

Dn—Dunbar sandy loam. This nearly level, somewhat poorly drained soil is on broad flats, in bays, or in depressions on uplands. Most mapped areas cover 4 to 72 acres.

Included with this soil in mapping are small areas of

soils that have a surface layer of fine sandy loam or loam. Also included are small areas of Coxville, Duplin, Lynchburg, Rains, and Trebloc soils and some small areas of soils that have a subsoil of sandy clay that extends to a depth of less than 60 inches.

This soil is suited to most locally grown crops. The main crops are corn, soybeans, cotton, tobacco, small grain, and truck crops, such as snap beans, tomatoes, cucumbers, sweet potatoes, and onions. Drainage may be required for some crops, such as tobacco.

This soil has good tilth and can be worked within a fairly wide range of moisture content. Tillage operations, however, are delayed in wet seasons. Winter cover crops, minimum tillage, and crop residue management help to maintain tilth and the organic-matter content.

Moderately slow permeability and a seasonal high water table are the main limitations in the use and management of this soil. Capability unit IIw–2; woodland group 2w8.

Duplin Series

The Duplin series consists of nearly level to gently sloping, moderately well drained soils on uplands.

In a representative profile the surface layer is grayish-brown sandy loam about 8 inches thick. The subsoil is 76 inches thick. The upper part is yellowish-brown sandy clay that has mottles in shades of yellow, brown, red, and gray. The lower part is yellowish-brown sandy clay loam that has mottles in shades of gray and yellow. The underlying material, to a depth of 100 inches, is light-gray sandy clay loam that has mottles in shades of brown and red.

Duplin soils are medium in natural fertility and low in organic-matter content. Permeability is moderately slow, the available water capacity is medium, and the shrink-swell potential is moderate. The seasonal high water table is about 2 feet below the surface from December through April.

Most of the acreage is in crops and pasture. The rest is forested.

Representative profile of Duplin sandy loam, 0 to 2 percent slopes, in a field 3 miles east of Maxton on County Road 1303, ⅓ mile north on dirt road, ¼ mile east on field road, and 100 feet southeast:

Ap—0 to 8 inches, grayish-brown (10YR 5/2) sandy loam; weak, medium, granular structure; friable; many fine roots; many medium pores; neutral; abrupt, smooth boundary.

B21t—8 to 18 inches, yellowish-brown (10YR 5/4) sandy clay; common, medium, distinct, brownish-yellow (10YR 6/6) mottles; weak, medium, subangular blocky structure; hard, firm, sticky and plastic; common fine roots; common medium pores; thin discontinuous clay films on faces of peds; very strongly acid; gradual, wavy boundary.

B22t—18 to 27 inches, yellowish-brown (10YR 5/4) sandy clay; common, coarse, faint, pale-brown (10YR 6/3) mottles and few, medium, prominent, brownish-yellow (10YR 6/6) mottles; weak, medium, subangular blocky structure; firm, sticky and plastic; few fine roots; common medium pores; thin discontinuous clay films on faces of peds; very strongly acid; gradual, wavy boundary.

B23t—27 to 54 inches, yellowish-brown (10YR 5/4) sandy clay; common, coarse, prominent, light brownish-gray (10YR 6/2) mottles, common, medium, distinct, brownish-yellow (10YR 6/6) mottles, and few, fine, prominent, red mottles; weak, medium, subangular blocky structure; firm, sticky and plastic; few fine roots; thin continuous clay films on faces of peds; very strongly acid; gradual, wavy boundary.

B3—54 to 84 inches, yellowish-brown (10YR 5/4) sandy clay loam; many, coarse, distinct, light brownish-gray (10YR 6/2) mottles and common, medium, distinct, brownish-yellow (10YR 6/6) mottles; weak, medium, subangular blocky structure; friable, slightly sticky and slightly plastic; common medium pores; thin discontinuous clay films on faces of peds; common medium iron concretions; very strongly acid; gradual, wavy boundary.

Cg—84 to 100 inches, light-gray (10YR 7/1) sandy clay loam; pockets of sandy loam; many, medium, distinct, very pale brown (10YR 7/4) mottles and many, coarse, prominent, yellowish-red (5YR 5/6) mottles; massive; friable, slightly sticky; very strongly acid.

The solum is 60 to more than 80 inches thick. The soils are very strongly acid throughout unless they have been limed. The Ap or A1 horizon is grayish brown or dark grayish brown. In some places there is an A2 horizon of pale-brown to light brownish-gray sandy loam or fine sandy loam. In some places there is a B1 horizon of light olive-brown to yellowish-brown sandy clay loam. The B2t horizon is brown, strong brown, light yellowish brown, brownish yellow, or yellowish brown and is sandy clay, clay loam, or clay. Grayish mottles, indicating wetness, are at a depth of 18 to 30 inches. The B3 horizon is yellowish-brown, brownish-yellow, and strong-brown sandy clay loam and sandy clay. The C horizon is light gray or gray and ranges from sandy loam to clay.

DpA—Duplin sandy loam, 0 to 2 percent slopes. This moderately well drained soil is on smooth plains and is at a slightly lower elevation than well drained soils. Most areas cover 4 to 100 acres. This soil has the profile described as representative of the series.

Included with this soil in mapping are a few small areas of soils that have a surface layer of fine sandy loam and loam. Also included are small areas of Dunbar, Goldsboro, and Marlboro soils, small areas of soils that have a subsoil of sandy clay that extends to a depth of less than 60 inches, and small areas of soils that have slopes of more than 2 percent.

This soil is well suited to most locally grown crops. The main crops are tobacco, soybeans, cotton, corn, forage crops, and small grain. Drainage may be required for some crops, such as tobacco.

This soil has good tilth and can be worked over a fairly wide range of moisture content. Tillage operations, however, are delayed in wet seasons. Winter cover crops, minimum tillage, and crop residue management help to maintain the tilth and organic-matter content.

A seasonal high water table and moderately slow permeability are the main limitations to use and management of this soil. Capability unit IIw–1; woodland group 2w8.

DpB—Duplin sandy loam, 2 to 6 percent slopes. This moderately well drained soil is between nearly level soils and soils on drainageways. It is in areas of 5 to 40 acres.

Included with this soil in mapping are small areas of soils that have a surface layer of fine sandy loam and small areas of Marlboro and Norfolk soils.

This soil is well suited to most locally grown crops.

Tobacco, soybeans, cotton, forage crops, and corn are the main crops.

Winter cover crops, minimum tillage, and crop residue management help to control runoff and erosion and maintain the tilth and organic-matter content. Maintaining drainageways in sod, using terraces and diversions, and including close-growing crops in the crop rotation also help to conserve soil and water.

Slope, surface runoff, erosion, moderately slow permeability, and a seasonal high water table are the main limitations in the use and management of the soil. Capability unit IIe–2; woodland group 2w8.

Exum Series

The Exum series consists of nearly level, moderately well drained soils on broad uplands.

In a representative profile the surface layer is grayish-brown very fine sandy loam about 7 inches thick. The subsurface layer is very pale brown very fine sandy loam 2 inches thick. The subsoil is 61 inches thick. It is yellowish-brown clay loam that has mottles in shades of red, brown, and gray. The underlying material, to a depth of 80 inches, is mottled brownish-yellow and light-gray clay loam.

Exum soils are low in natural fertility and organic-matter content. Permeability is moderate, the available water capacity is high, and the shrink-swell potential is low. The seasonal high water table is 2½ feet below the surface from November through April.

Most of the acreage is in crops and pasture. The rest is forested.

Representative profile of Exum very fine sandy loam, 0 to 1 percent slopes, in a cultivated field one-half mile northeast of Raynham on U.S. Highway 301 and 200 yards north of U.S. Highway 301:

Ap—0 to 7 inches, grayish-brown (10YR 5/2) very fine sandy loam; weak, medium, granular structure; very friable; many fine roots; slightly acid; abrupt, wavy boundary.

A2—7 to 9 inches, very pale brown (10YR 7/4) very fine sandy loam; weak, medium, granular structure; very friable; many fine roots; slightly acid; abrupt, smooth boundary.

B21t—9 to 17 inches, yellowish-brown (10YR 5/6) clay loam; moderate, medium, subangular blocky structure; friable, sticky; many fine and medium roots; patchy clay films on faces of peds; few concretions (5 to 15 millimeters); strongly acid; clear, wavy boundary.

B22t—17 to 24 inches, yellowish-brown (10YR 5/4) clay loam; few, fine, prominent, red (2.5YR 4/8) mottles and few, medium, faint, strong-brown (7.5YR 5/8) mottles; weak, fine, subangular blocky structure; friable, sticky; few fine roots; few iron concretions; very strongly acid; clear, wavy boundary.

B23t—24 to 40 inches, yellowish-brown (10YR 5/4) clay loam; many, coarse, distinct, gray (10YR 6/1) mottles and common, medium, distinct, yellowish-red (5YR 4/8) and yellowish-brown (10YR 5/8) mottles; weak, fine, subangular blocky structure; slightly sticky; very strongly acid; clear, wavy boundary.

B24t—40 to 58 inches, yellowish-brown (10YR 5/8) clay loam; many, coarse, prominent, red (2.5YR 4/8) and light-gray (10YR 7/1) mottles; weak, fine, subangular blocky structure; slightly sticky; common concretions as much as 1 inch in diameter; about 4 percent plinthite; very strongly acid; clear, wavy boundary.

B3—58 to 70 inches, yellowish-brown (10YR 5/8) clay loam; many, coarse, prominent, red (2.5YR 4/8) and light-gray (10YR 7/1) mottles; weak, fine, subangular blocky structure; slightly sticky; very strongly acid; clear, wavy boundary.

Cg—70 to 80 inches, mottled brownish-yellow (10YR 6/8) and light-gray (10YR 7/1) clay loam; massive; slightly sticky; light-gray (10YR 7/1) material is slightly coarser in texture; very strongly acid.

The solum is commonly about 70 inches thick but ranges from 60 to 100 inches. The soils are strongly acid or very strongly acid throughout unless they have been limed. The Ap horizon is dark grayish brown, grayish brown, or light brownish gray. In some places there is a brown or very pale brown A2 horizon. The B2t horizon is yellowish-brown, pale-brown, or light yellowish-brown clay loam or loam. Gray mottles are 18 to 30 inches below the surface. In some places the lower part of the B horizon contains plinthite, but it contains less than 5 percent within a depth of 60 inches. The C horizon in some places is stratified loamy material.

ExA—Exum very fine sandy loam, 0 to 1 percent slopes. This moderately well drained soil is on broad flats. Most mapped areas cover from 5 to 175 acres.

Included with this soil in mapping are some small areas that have a surface layer of loam. Also included are small areas of Aycock, Duplin, Goldsboro, and Nahunta soils, few small areas of soils that are less than 60 inches deep, and some small areas of soils that have slopes of 1 to 2 percent.

This soil is well suited to most locally grown crops. The main crops are tobacco, cotton, soybeans, corn, forage crops, and truck crops, such as snap beans, tomatoes, cucumbers, sweet potatoes, and onions. Drainage may be required for some crops, such as tobacco.

This soil has good tilth and can be worked within a fairly wide range of moisture content. Tillage operations, however, are delayed in wet seasons. Winter cover crops, minimum tillage, and crop residue management help to maintain tilth and the organic-matter content.

A seasonal high water table is the main limitation in the use and management of this soil. Capability unit IIw–1; woodland group 2w8.

Faceville Series

The Faceville series consists of nearly level to gently sloping, well-drained soils on uplands.

In a representative profile the surface layer is brown fine sandy loam about 6 inches thick. The subsoil extends to a depth of 70 inches. It is red and yellowish-red clay that has mottles in shades of brown, red, yellow, and gray below a depth of 30 inches.

Faceville soils are low in natural fertility and organic-matter content. Permeability is moderate, the available water capacity is medium, and the shrink-swell potential is moderate. Depth to a seasonal high water table is more than 6 feet.

Most of the acreage is in crops. A few acres are forested.

Representative profile of Faceville fine sandy loam, 2 to 6 percent slopes, in a cleared field 1.8 miles south of Rowland and 50 feet east of U.S. Highway 301:

Ap—0 to 6 inches, brown (7.5YR 5/4) fine sandy loam; moderate, medium, granular structure; friable; few

fine roots; medium acid; abrupt, smooth boundary.
B21t—6 to 30 inches, red (2.5YR 4/6) clay; moderate, medium, subangular blocky structure; firm, sticky and plastic; strongly acid; clear, wavy boundary.
B22t—30 to 48 inches, yellowish-red (5YR 4/8) clay; few, medium, distinct, yellowish-brown (10YR 5/8) and red (2.5YR 4/8) mottles; moderate, medium, subangular blocky structure; firm, sticky and plastic; very strongly acid; clear, wavy boundary.
B23t—48 to 60 inches, yellowish-red (5YR 4/8) clay; common, medium, distinct, yellowish-brown (10YR 5/8) and red (2.5YR 4/8) mottles; moderate, medium, subangular blocky structure; firm, sticky and plastic; common clay films on faces of peds; very strongly acid; gradual, wavy boundary.
B24t—60 to 70 inches, red (2.5YR 4/6) clay; common, medium, distinct, brownish-yellow (10YR 6/6) and light-gray (10YR 7/1) mottles; weak, medium, subangular blocky structure; firm, sticky and plastic; very strongly acid.

The solum is 60 to 100 inches thick. The soils are strongly acid or very strongly acid throughout unless they have been limed. The Ap horizon is grayish brown, brown, dark brown, or yellowish brown. In some places there is an A2 horizon of brown and yellowish-brown fine sandy loam. The B2t horizon is yellowish-red or red clay, sandy clay, or clay loam.

FaA—Faceville fine sandy loam, 0 to 2 percent slopes. This well-drained soil is on the highest part of broad, smooth plains. Most mapped areas cover 5 to 80 acres.

Included with this soil in mapping are a few small areas of soils that have a surface layer of loamy sand or sandy loam. Also included are some small areas of Aycock, Marlboro, and Norfolk soils.

This soil is well suited to most locally grown crops. Truck crops, such as snap beans, tomatoes, cucumbers, sweet potatoes, and onions, corn, cotton, soybeans, and tobacco are the main crops. Row crops can be grown continuously.

The soil has no significant limitations for use and management. Capability unit I–1; woodland group 3o1.

FaB—Faceville fine sandy loam, 2 to 6 percent slopes. This well-drained soil is between nearly level soils on uplands and soils on drainageways or in bays. Most mapped areas cover 50 to 100 acres. This soil has the profile described as representative of the series.

Included with this soil in mapping are some small areas of Aycock and Marlboro soils. Also included are a few severely eroded spots that have a surface layer of sandy clay loam and a few small areas of a soil that has a subsoil of sandy clay loam.

This soil is well suited to most locally grown crops. The main crops are corn, cotton, soybeans, tobacco, and truck crops, such as snap beans, tomatoes, cucumbers, sweet potatoes, and onions.

Winter cover crops, minimum tillage, and crop residue management help to control runoff and erosion and maintain tilth and the organic-matter content. Maintaining drainageways in sod, using terraces and diversions, and including close-growing crops in the crop rotation also help to conserve soil and water. Slope, surface runoff, and erosion are the main limitations in the use and management of the soil. Capability unit IIe–1; woodland group 3o1.

Goldsboro Series

The Goldsboro series consists of nearly level, moderately well drained soils on uplands.

In a representative profile the surface layer is grayish-brown loamy sand about 7 inches thick. The subsurface layer is yellowish-brown loamy sand 3 inches thick. The subsoil is 54 inches thick. The upper part is yellowish-brown sandy clay loam that has mottles in shades of gray and red below a depth of 20 inches. The lower part is gray sandy clay loam that has mottles in shades of red and brown. The underlying material, to a depth of 70 inches, is gray sandy loam that has mottles in shades of brown.

Goldsboro soils are low in natural fertility and organic-matter content. Permeability is moderate, the available water capacity is medium, and the shrink-swell potential is low. The seasonal high water table is about 2½ feet below the surface from December through March.

Most of the acreage is in crops. The rest is forested.

Representative profile of Goldsboro loamy sand, 0 to 2 percent slopes, in a cultivated field north of Lumberton on State Road 1003, 1⅜ miles west of Barker Ten Mile Church, and 1,650 feet north of State Road 1935:

Ap—0 to 7 inches, grayish-brown (10YR 5/2) loamy sand; weak, medium, granular structure; very friable; few fine roots; medium acid; abrupt, smooth boundary.
A2—7 to 10 inches, light yellowish-brown (10YR 6/4) loamy sand; weak, medium, granular structure; very friable; some material from the Ap horizon; few fine roots; very strongly acid; abrupt, smooth boundary.
B21t—10 to 20 inches, yellowish-brown (10YR 5/4) sandy clay loam; weak, medium, subangular blocky structure; friable, sticky; few discontinuous clay films on faces of peds; few fine roots; very strongly acid; clear, wavy boundary.
B22t—20 to 46 inches, yellowish-brown (10YR 5/4) sandy clay loam; common, medium, distinct, light brownish-gray (10YR 6/2) and strong-brown (7.5YR 5/6) mottles and few, medium, prominent, yellowish-red (5YR 5/8) mottles; weak, medium, subangular blocky structure; friable, sticky; few fine roots; few discontinuous clay films on faces of peds; very strongly acid; clear, wavy boundary.
B3g—46 to 64 inches, gray (10YR 6/1) sandy clay loam; common, coarse, prominent, red (10YR 4/8) mottles and common, medium, distinct, yellowish-brown (10YR 5/4) mottles; weak, medium, subangular blocky structure; friable, sticky; few faint clay films on faces of peds; very strongly acid; gradual, wavy boundary.
Cg—64 to 70 inches, gray (10YR 6/1) sandy loam; lenses of sandy clay loam; common, medium, distinct, yellowish-brown (10YR 5/4) mottles; massive; friable, slightly sticky; very strongly acid.

The solum is 60 to 80 inches thick. The soils are very strongly acid throughout unless they have been limed. The A horizon is grayish brown, dark gray, or dark grayish brown. The A2 horizon is pale-brown to light yellowish-brown sandy loam. The B2t horizon is brown, light olive brown, light yellowish brown, brownish yellow, or yellowish brown. The B3 horizon is gray sandy clay loam to sandy loam. Gray mottles, indicating wetness, are at a depth of 18 to 30 inches. The C horizon is commonly light gray or gray and ranges from loamy sand to sandy clay loam.

GoA—Goldsboro loamy sand, 0 to 2 percent slopes. This moderately well drained soil is on broad, smooth interstream divides. Most mapped areas are generally broad and irregular in shape and cover 5 to 100 acres.

Included with this soil in mapping are some small

areas of soils that have a surface layer of sandy loam, fine sandy loam, and loamy fine sand. Also included are small areas of Duplin, Lynchburg, and Norfolk soils, small areas that have a combined surface layer and subsoil less than 60 inches thick, and small areas of soils that have slopes of more than 2 percent. A few wet spots, one-quarter acre to 3 acres in size, are shown by a special symbol on the detailed soil map.

This soil is well suited to all locally grown crops. The main crops are tobacco, cotton, corn (fig. 3), soybeans, strawberries, forage crops, and truck crops, such as snap beans, tomatoes, cucumbers, sweet potatoes, and onions. Drainage may be required for some crops, such as tobacco.

This soil has good tilth and can be worked within a fairly wide range of moisture content. Tillage operations, however, are delayed in wet seasons. Winter cover crops, minimum tillage, and crop residue management help to maintain tilth and the organic-matter content.

A seasonal high water table is the main limitation in the use and management of this soil. Capability unit IIw–1; woodland group 2w8.

Johns Series

The Johns series consists of nearly level, moderately well drained or somewhat poorly drained soils on stream terraces.

In a representative profile the surface layer is dark-gray sandy loam about 9 inches thick. The subsoil is 30 inches thick. The upper part is yellowish-brown sandy clay loam; the middle part is pale-brown and grayish-brown sandy clay loam that has mottles in shades of brown and gray; and the lower part is gray sandy loam that has mottles in shades of brown. The underlying material, to a depth of 60 inches, is gray and pale-yellow sand.

Johns soils are low in natural fertility and organic-matter content. Permeability is moderate, the available water capacity is medium, and the shrink-swell potential is low. The seasonal high water table is 1½ feet below the surface from November through April. These soils are subject to rare flooding for very brief periods from February through April.

Most of the acreage is in crops. The rest is forested.

Representative profile of Johns sandy loam, in a cultivated field 1½ miles southwest of Lumberton city limit on State Highway 41 and 25 feet west of road:

Ap—0 to 9 inches, dark-gray (10YR 4/1) sandy loam; weak, medium, granular structure; very friable; common medium and fine roots; strongly acid; abrupt boundary.

B21t—9 to 17 inches, yellowish-brown (10YR 5/4) sandy clay loam; weak, medium and coarse, subangular blocky structure; friable; small amount of material from the Ap horizon; few fine roots; very strongly acid; gradual, wavy boundary.

B22t—17 to 24 inches, pale-brown (10YR 6/3) sandy clay loam; common, medium, faint, yellowish-brown (10YR 5/6) and light brownish-gray (10YR 6/2) mottles; weak, medium, subangular blocky structure; friable; few fine roots; very strongly acid; gradual, wavy boundary.

B23tg—24 to 34 inches, grayish-brown (10YR 5/2) sandy clay loam; common, coarse, distinct, yellowish-brown (10YR 5/6) and pale-brown (10YR 6/3) mottles; weak, medium, subangular blocky structure; friable; very strongly acid; gradual, wavy boundary.

B3g—34 to 39 inches, gray (10YR 6/1) sandy loam; common, coarse, pale-brown (10YR 6/3) and yellowish-brown (10YR 5/6) mottles; weak, medium, subangular blocky structure; friable; very strongly acid; gradual, wavy boundary.

IICg—39 to 60 inches, gray (10YR 6/1) and pale-yellow (2.5Y 7/4) sand; single grained; loose; lenses of loamy sand to sandy loam next to upper boundary; very strongly acid.

The solum is 20 to 40 inches thick. The soils are strongly acid or very strongly acid throughout unless they have been limed. The Ap or A1 horizon is grayish brown, dark gray, or very dark gray. In places there is an A2 horizon that is light brownish gray or pale brown. The B21t and B22t horizons are pale brown, light yellowish brown, yellowish brown, grayish brown, or brownish yellow, and the B23t horizon is gray and has mottles of high chroma. The C horizon is loamy sand or sand.

Jo—Johns sandy loam. This nearly level, moderately well drained or somewhat poorly drained soil is on stream terraces, generally along the Lumber River and Big Swamp. Most mapped areas cover 5 to 250 acres.

Included with this soil in mapping are some small areas of soils that have a surface layer of fine sandy loam and loamy sand. Also included are small areas of Kalmia, Lumbee, and Pactolus soils, a few areas of soils that have a clayey subsoil and generally occur in narrow bands, and some small areas of soils that are dominantly gray within 17 inches of the surface.

This soil is fairly well suited to most locally grown crops. The main crops are corn, cotton, tobacco, soybeans, and forage crops. Drainage may be required for some crops, such as tobacco.

This soil has good tilth and can be worked within a fairly wide range of moisture content. Tillage operations, however, are delayed in wet seasons. Winter cover crops, minimum tillage, and crop residue management help to maintain tilth and the organic-matter content.

The seasonal high water table and flooding in areas near streams are the main limitations in the use and management of this soil. The sandy substratum is unstable in ditch banks. This is a hazard to installation

Figure 3.—Field of corn on Goldsboro loamy sand, 0 to 2 percent slopes.

and maintenance of drainage systems. Capability unit IIw–2; woodland group 2w2.

Johnston Series

The Johnston series consists of nearly level, very poorly drained soils on flood plains.

In a representative profile the surface layer is black mucky loam about 32 inches thick. The underlying material, to a depth of 60 inches, is light brownish-gray, stratified sandy loam, loamy sand, and sand.

Johnston soils are low in natural fertility and medium to high in organic-matter content. Permeability is moderate, the available water capacity is high, and the shrink-swell potential is low. The seasonal high water table is at the surface from November through July. These soils are flooded very frequently for long periods from November through July.

These soils are mainly forested.

Representative profile of Johnston mucky loam, in an area of Johnston soils, in a wooded area 1½ miles south of Lumber Bridge and 75 feet west of State Highway 20:

A1—0 to 32 inches, black (10YR 2/1) mucky loam; weak, medium, granular structure; friable; many coarse and medium roots; high in organic-matter content, estimated 10 to 15 percent woody fiber; very strongly acid; gradual, wavy boundary.

C1g—32 to 46 inches, light brownish-gray (10YR 6/2) stratified sandy loam and loamy sand; single grained; very friable or loose; few medium and fine roots; very strongly acid; gradual, wavy boundary.

C2g—46 to 60 inches, light brownish-gray (10YR 6/2) stratified sand and loamy sand; single grained; loose; very strongly acid.

The soils are very strongly acid or strongly acid throughout unless they have been limed. The A horizon is commonly black or very dark gray mucky loam, loam, and sandy loam. The C horizon is mostly light brownish gray, gray, grayish brown, dark gray, or very dark gray and is stratified sandy loam, loamy sand, or sand to a depth of more than 60 inches.

JT—Johnston soils. These nearly level, very poorly drained soils are on flood plains along major drainageways. The surface layer is mucky loam, loam, or sandy loam. Most areas are extremely large and are generally continuous for many miles; they range in width from a few feet at the head of streams to 2 miles or more along the larger streams.

The composition of this mapping unit is more variable and areas are generally larger than those of most other units in the county. Mapping has been controlled well enough, however, to make interpretations for the anticipated uses of soils.

Included with these soils in mapping are small areas of soils that have a surface layer of muck and a few small areas of soils that have a black surface layer less than 24 inches thick. Also included are small areas of Bibb, Lumbee, and Torhunta soils and a few small areas of a sandy soil that has better drainage and is on slightly elevated ridges.

These soils are used mainly for growing native hardwoods (fig. 4) and pine, cypress, and juniper.

Because of flooding and wetness, the soils are generally unsuited to crops. They are moderately well suited to a few locally grown crops if they are drained and protected from flooding, but there are few suitable drainage outlets. Forage crops, corn, and soybeans are the main crops. A seasonal high water table and flooding are the main limitations in the use and management of these soils. Capability unit IVw–3 drained, VIIw–1 undrained; woodland group 1w9.

Figure 4.—**Stand of native hardwoods on the poorly drained Johnston soils of the flood plains.**

Kalmia Series

The Kalmia series consists of nearly level, well-drained soils on stream terraces.

In a representative profile the surface layer is grayish-brown loamy sand about 7 inches thick. The subsurface layer is pale-brown loamy sand 3 inches thick. The subsoil is light yellowish-brown sandy loam and yellowish-brown sandy clay loam 26 inches thick. The underlying material, to a depth of about 68 inches, is very pale brown and yellow coarse sand.

Kalmia soils are low in natural fertility and organic-matter content. Permeability is moderate, the available water capacity is medium, and the shrink-swell potential is low. The seasonal high water table remains at a depth of more than 60 inches. A few lower areas are subject to rare flooding for very brief periods from February through April.

Most of the acreage is in crops and pasture.

Representative profile of Kalmia loamy sand, 0 to 2 percent slopes, in a cultivated field 0.2 mile north of U.S. Highway 74, 2.5 miles west of intersection with

Interstate Highway 95, and 50 feet west of a private drive:

Ap—0 to 7 inches, grayish-brown (10YR 5/2) loamy sand; weak, medium, granular structure; very friable; common fine roots; slightly acid; abrupt, smooth boundary.

A2—7 to 10 inches, pale-brown (10YR 6/3) loamy sand; weak, medium, granular structure; very friable; common fine roots; strongly acid; clear, smooth boundary.

B1—10 to 13 inches, light yellowish-brown (10YR 6/4) sandy loam; weak, medium, subangular blocky structure; friable; few fine roots; common medium pores; very strongly acid; clear, smooth boundary.

B21t—13 to 30 inches, yellowish-brown (10YR 5/6) sandy clay loam; weak, medium, subangular blocky structure; friable, slightly sticky; few fine roots; few prominent clay films on faces of peds; few fine mica flakes; few black organic stains; very strongly acid; gradual, wavy boundary.

B3—30 to 36 inches, light yellowish-brown (10YR 6/4) sandy loam; massive; very friable; pockets of sandy clay loam; few fine quartz pebbles; few fine mica flakes; few dark minerals; very strongly acid; clear, smooth boundary.

IIC1—36 to 48 inches, very pale brown (10YR 7/4) coarse sand and fine gravel; few, coarse, distinct, white (10YR 8/1) mottles; single grained; loose; few pockets of loamy sand; few dark minerals; strongly acid; gradual, wavy boundary.

IIC2—48 to 68 inches, yellow (10YR 7/6) coarse sand; single grained; loose; few, fine, dark minerals; strongly acid.

The solum is 28 to 40 inches thick. The soils are strongly acid or very strongly acid throughout unless they have been limed. The A horizon is dark grayish brown, dark gray, or grayish brown. The A2 horizon is light brownish gray, pale brown, light yellowish brown, or yellowish brown. The Bt horizon is light yellowish brown, brownish yellow, or yellowish brown. In some places strong-brown mottles are in the lower part of the B2t horizon. The B3 horizon is light yellowish brown or brownish yellow. The C horizon is very pale brown, yellow, or brownish-yellow loamy sand, coarse sand, or sand that has gray or white mottles.

KaA—Kalmia loamy sand, 0 to 2 percent slopes. This well-drained soil is on the highest part of stream terraces, mainly those along Lumber River and Big Swamp. Most mapped areas cover 5 to 75 acres.

Included with this soil in mapping are small areas of soils that have a surface layer of loamy fine sand and sandy loam and small areas of Johns soils. Also included are areas of a soil that has a sandy surface layer 20 to 40 inches thick, areas of a soil that has a yellowish-red subsoil, small areas of soils that have a subsoil of sandy loam, and small areas of soils that have slopes of 2 to 4 percent.

This soil is well suited to all locally grown crops. Forage crops, corn, cotton, tobacco, and soybeans are the main crops.

Growing winter cover crops and returning crop residue help to maintain tilth and the organic-matter content. This soil has no major limitations for use and management. Capability unit I–1; woodland group 2o7.

Lakeland Series

The Lakeland series consists of nearly level to gently sloping, excessively drained soils on uplands and stream terraces.

In a representative profile the surface layer is grayish-brown sand about 4 inches thick. The underlying material, to a depth of 90 inches, is brownish-yellow, yellowish-brown, yellow, and very pale brown sand.

Lakeland soils are very low in natural fertility and organic-matter content. Permeability is rapid, the available water capacity is very low, and the shrink-swell potential is low. The seasonal high water table is at a depth of more than 5 feet.

About half the acreage is in crops or pasture. The rest is chiefly forested.

Representative profile of Lakeland sand, 0 to 6 percent slopes, in a pine plantation 1 mile southeast of Lumberton, one-fourth mile north of gateway of Carolina Power and Light Plant on paved road, and 250 feet east of road:

A1—0 to 4 inches, grayish-brown (10YR 5/2) sand; single grained; loose; many fine roots; medium acid; clear, wavy boundary.

C1—4 to 29 inches, brownish-yellow (10YR 6/6) sand; single grained; loose; few fine roots; strongly acid; gradual, wavy boundary.

C2—29 to 38 inches, yellowish-brown (10YR 5/8) sand; single grained; loose; strongly acid; gradual, wavy boundary.

C3—38 to 44 inches, brownish-yellow (10YR 6/6) sand; single grained; loose; strongly acid; gradual, wavy boundary.

C4—44 to 56 inches, yellow (10YR 7/6) sand; single grained; loose; strongly acid; gradual, wavy boundary.

C5—56 to 71 inches, yellow (10YR 7/8) sand; single grained; loose; strongly acid; gradual, wavy boundary.

C6—71 to 80 inches, brownish-yellow (10YR 6/6) sand; single grained; loose; strongly acid; gradual, wavy boundary.

C7—80 to 90 inches, very pale brown (10YR 8/3) sand; single grained; loose; strongly acid.

These soils are coarse sand, sand, or fine sand to a depth of more than 80 inches. They are strongly acid or very strongly acid throughout unless they have been limed. The content of silt and clay is 5 to 10 percent between depths of 10 and 40 inches. The A1 or Ap horizon is grayish brown, dark grayish brown, or dark gray. The C horizon, to a depth of about 44 inches, is light yellowish-brown, yellow, brownish-yellow, yellowish-brown, reddish-yellow, or strong-brown sand or coarse sand. Below that depth, the C horizon is very pale brown, yellow, brownish-yellow, or yellowish-brown sand or coarse sand.

LaB—Lakeland sand, 0 to 6 percent slopes. This excessively drained soil is on broad upland ridges, stream terraces, and outer rims of large bays. It is on the highest parts of the landscape. Most mapped areas cover 10 to 200 acres.

Included with this soil in mapping are small areas of Pactolus, Wagram, and Wakulla soils, areas of a soil that has a subsoil of sandy clay loam to sandy loam within 72 inches of the surface, and some small areas of soils that are on stream terraces and have gray mottles within 40 inches of the surface.

Droughtiness is a severe limitation for cultivated crops. This soil is better suited to Coastal bermudagrass than to crops with a higher moisture requirement. It lacks sufficient moisture for most crops during the growing season. Soil blowing, leaching of plant nutrients, and very low natural fertility are also limita-

tions. Blowing sand often damages young plants. Capability unit IVs–1; woodland group 4s2.

Leon Series

The Leon series consists of nearly level, poorly drained soils on uplands and stream terraces.

In a representative profile the surface layer is black sand about 5 inches thick. The subsurface layer is light-gray and white sand 18 inches thick. The subsoil is 23 inches thick. It is dark reddish-brown and dark-brown sand that has mottles in shades of brown. The underlying material, to a depth of about 82 inches, is very pale brown, very dark grayish-brown, and light yellowish-brown sand that has yellow mottles.

Leon soils are very low in natural fertility and organic-matter content. Permeability is moderate, the available water capacity is very low, and the shrink-swell potential is low. The seasonal high water table is about 1½ feet below the surface from November through April.

Most of the acreage is forested. A small acreage has been cleared and is used primarily for blueberries and Coastal bermudagrass.

Representative profile of Leon sand, on a sand ridge between two large bays 2 miles south of Lumberton on Old Whiteville Road and three-fourths of a mile southwest of a private road:

A1—0 to 5 inches, black (10YR 2/1) sand; single grained; loose; few fine roots and organic debris; about 50 percent clean sand grains; extremely acid; clear, wavy boundary.

A21—5 to 10 inches, light-gray (10YR 7/1) sand; single grained; loose; few fine roots; very strongly acid; gradual, wavy boundary.

A22—10 to 23 inches, white (10YR 8/1) sand; single grained; loose; very strongly acid; abrupt, smooth boundary.

B21h—23 to 36 inches, dark reddish-brown (5YR 2/2) sand; few, hard, yellowish-brown (10YR 5/4) nodules that crush to loamy fine sand; moderate, medium, granular structure; friable, weakly cemented and slightly brittle; more than 95 percent of sand grains have organic coatings; very strongly acid; gradual, wavy boundary.

B22h—36 to 41 inches, dark-brown (7.5YR 3/2) sand; few, fine, distinct, strong-brown (7.5YR 5/6) specks and few, medium, distinct, dark reddish-brown (5YR 2/2) mottles; weak, medium, granular structure; very friable; very strongly acid; gradual, wavy boundary.

B23h—41 to 46 inches, dark reddish-brown (5YR 2/2) sand; single grained; very friable and loose; very strongly acid; gradual, wavy boundary.

C1—46 to 62 inches, very pale brown (10YR 7/3) sand; few, fine, distinct, brownish-yellowish mottles; single grained; loose; sand grains are coated; very strongly acid; gradual, wavy boundary.

C2—62 to 74 inches, very dark grayish-brown (10YR 3/2) sand; single grained; loose; sand grains are coated; very strongly acid; gradual, wavy boundary.

C3—74 to 82 inches, light yellowish-brown (10YR 6/4) sand; single grained; loose; very strongly acid.

The solum is 26 to 46 inches thick. The soils are extremely acid or very strongly acid throughout unless they have been limed. The A1 horizon is gray, very dark gray, or black. The A2 horizon is white, light gray, gray, or light brownish gray. The B2h horizon is dark reddish brown, very dark brown, or dark brown, and in some places it is streaked with strong brown. In some places this horizon is weakly cemented to strongly cemented. The C horizon is commonly very pale brown, very dark grayish brown, light yellowish brown, light brownish gray, and light gray.

Le—Leon sand. This nearly level, poorly drained soil is on interbay divides on uplands, on stream terraces, and around the outer rim of bays. Most mapped areas cover 5 to 200 acres.

Included with this soil in mapping are small areas of Pactolus and Plummer soils and areas of a soil that has a black surface layer more than 10 inches thick. Also included are small areas of soils that have a clayey layer at a depth of 50 to 60 inches.

This soil is suited to a few locally grown crops if it is drained. The main crops are Coastal bermudagrass and blueberries.

Wetness is a very severe limitation in winter and spring, although the soil is droughty in summer. Tillage operations are delayed in wet seasons. Drainage is needed for most uses, but there are few suitable outlets. Minimum tillage and crop residue management help to maintain the organic-matter content. A seasonal high water table, very low natural fertility, and leaching of plant nutrients are the main limitations in the use and management of this soil. Capability unit IVw–1; woodland group 4w2.

Lumbee Series

The Lumbee series consists of nearly level, poorly drained soils on stream terraces.

In a representative profile the surface layer is dark-gray sandy loam about 8 inches thick. The subsoil is 28 inches thick. It is gray sandy loam and sandy clay loam that has mottles in shades of brown and gray. The underlying material, to a depth of about 73 inches, is gray and dark-gray loamy sand.

Lumbee soils are low in natural fertility and medium in organic-matter content. Permeability is moderate, the available water capacity is medium, and the shrink-swell potential is low. The seasonal high water table is at the surface from November through April. About 60 percent of the acreage of Lumbee soils is subject to rare flooding for brief periods from February through April.

Most of the acreage is in crops and pasture. The rest is forested.

Representative profile of Lumbee sandy loam, in a cleared field 3 miles southwest of Lumberton on State Highway 41, ½ mile west on U.S. Highway 74, ½ mile north on farm road, and 100 feet west of road:

Ap—0 to 8 inches, dark-gray (10YR 4/1) sandy loam; weak, medium, granular structure; friable; many medium and coarse roots; medium acid; abrupt, wavy boundary.

B1g—8 to 13 inches, gray (10YR 6/1) sandy loam; weak, medium, subangular blocky structure; friable; few, medium and fine, fibrous roots; material from Ap horizon in channels; very strongly acid; clear, wavy boundary.

B21tg—13 to 23 inches, gray (10YR 5/1) sandy clay loam; common, medium, distinct, yellowish-brown (10YR 5/6) mottles; weak, medium, subangular blocky structure; firm; thin discontinuous clay films on faces of peds; very strongly acid; gradual, wavy boundary.

B22tg—23 to 30 inches, gray (10YR 5/1) sandy clay loam; common, medium, faint, dark-gray (10YR 4/1) mottles; weak, medium, subangular blocky struc-

ture; friable; patchy clay films on faces of peds; very strongly acid; gradual, wavy boundary.

B3g—30 to 36 inches, gray (10YR 5/1) sandy loam; weak, medium and fine, subangular blocky structure; friable; small pockets of sandy clay loam; very strongly acid; gradual, wavy boundary.

IIC1g—36 to 55 inches, gray (10YR 5/1) loamy sand; single grained; loose; very strongly acid; gradual, wavy boundary.

IIC2g—55 to 73 inches, dark-gray (10YR 4/1) loamy sand; single grained; loose; pockets of loamy sand; very strongly acid.

The solum is commonly 28 to 40 inches thick. The soils are strongly acid or very strongly acid throughout unless they have been limed. The A horizon is dark gray, very dark gray, or black. In some places there is an A2 horizon that is grayish-brown to gray. The B2t horizon is light brownish gray, grayish brown, or gray. The B3 horizon is gray to grayish brown. The C horizon is commonly white, gray, dark-gray, or grayish-brown loamy sand or sand that has pockets of sandy loam.

Lu—Lumbee sandy loam. This nearly level, poorly drained soil is on stream terraces. Most mapped areas cover 4 to 300 acres.

Included with this soil in mapping are a few small areas of soils that have a surface layer of loamy sand and fine sandy loam and small areas of Johns and Portsmouth soils. Also included are some small areas of soils that have a slightly more clayey subsoil, some small areas of soils that have a subsoil of sandy loam, and some small areas of soils that have clayey underlying material.

This soil is suited to a few locally grown crops if it is drained. The main crops are corn, soybeans, and small grain.

This soil has good tilth and can be worked within a wide range of moisture content. Tillage operations, however, are delayed in wet seasons. Minimum tillage and crop residue management help to maintain the organic-matter content. Winter cover crops may drown in the low-lying areas.

A seasonal high water table and flooding are the main limitations in the use and management of this soil. Drainage is needed for most uses, but the sandy underlying material in ditch banks is unstable, which makes the installation and maintenance of drainage systems difficult. Capability unit IIIw–3; woodland group 2w9.

Lynchburg Series

The Lynchburg series consists of nearly level, somewhat poorly drained soils on uplands.

In a representative profile the surface layer is dark-gray sandy loam about 3 inches thick. The subsurface layer is pale-brown sandy loam 4 inches thick. The subsoil is sandy clay loam 54 inches thick. The upper part is pale brown and has mottles in shades of brown and gray, the middle part is light brownish gray and has mottles in shades of brown, and the lower part is light gray and pale brown. The underlying material, to a depth of 68 inches, is light-gray and white sandy clay loam.

Lynchburg soils are low in natural fertility and organic-matter content. Permeability is moderate, the available water capacity is medium, and the shrink-swell potential is low. The seasonal high water table is 1½ feet below the surface from November through April.

Most of the acreage is in crops and pasture. The rest is forested.

Representative profile of Lynchburg sandy loam, in a wooded area 1¼ miles south of Maxton on U.S. Highway 74, ⅝ mile south of State Road 1153, ⅛ mile west and ¼ mile south on farm road, and 200 feet northwest:

A1—0 to 3 inches, dark-gray (10YR 4/1) sandy loam; weak, medium, granular structure; friable; abundant medium roots; strongly acid; abrupt, wavy boundary.

A2—3 to 7 inches, pale-brown (10YR 6/3) sandy loam; weak, medium, granular structure; friable; many medium roots; strongly acid; abrupt, wavy boundary.

B1—7 to 11 inches, pale-brown (10YR 6/3) sandy clay loam; weak, medium, subangular blocky structure; friable; few fine roots; strongly acid; clear, wavy boundary.

B21t—11 to 16 inches, pale-brown (10YR 6/3) sandy clay loam; common, medium, faint, yellowish-brown (10YR 5/6) and light brownish-gray (10YR 6/2) mottles; weak, medium, subangular blocky structure; friable; few medium roots; very strongly acid; gradual, wavy boundary.

B22tg—16 to 45 inches, light brownish-gray (10YR 6/2) sandy clay loam; many, coarse, distinct, yellowish-brown (10YR 5/8) and pale-brown (10YR 6/3) mottles; weak, medium, subangular blocky structure; friable; few medium and fine roots; patchy clay films on faces of peds; pockets of sandy loam (grayer color); some of the yellowish-brown material is brittle; very strongly acid; gradual, wavy boundary.

B3g—45 to 61 inches, light-gray (10YR 7/2) and pale-brown (10YR 6/3) sandy clay loam; pockets of sandy loam; weak, medium, subangular blocky structure; friable; thin patchy clay films on faces of peds; very strongly acid; gradual, wavy boundary.

Cg—61 to 68 inches, light-gray (10YR 7/1) and white (10YR 8/2) sandy clay loam; few, coarse, distinct, yellow (10YR 7/6) mottles; massive; friable; very strongly acid.

The solum is 60 to 80 inches thick. The soils are strongly acid or very strongly acid throughout unless they have been limed. The Ap or A1 horizon is dark-gray, very dark grayish-brown, or very dark gray sandy loam and loamy sand. The A2 horizon is light brownish-gray, pale-brown, and light yellowish-brown fine sandy loam or sandy loam. The B21t horizon is pale brown or light yellowish brown. The B22t horizon is gray, light brownish gray, or light gray. The B3 horizon is pale-brown, light brownish-gray, or light-gray sandy clay loam or sandy loam. The C horizon is commonly gray, light gray, pale brown, or white and is loamy sand, sandy clay loam, sandy loam, and sandy clay.

Ly—Lynchburg sandy loam. This nearly level, somewhat poorly drained soil is on broad, smooth plains. Most mapped areas cover 5 to 200 acres.

Included with this soil in mapping are a few small areas of soils that have a surface layer of fine sandy loam. Also included are small areas of Dunbar, Goldsboro, and Rains soils, a few small areas of soils that have a subsoil of sandy clay loam that extends to a depth of less than 60 inches, and a few small areas of soils that have a surface layer of loamy sand, 20 to 40 inches thick, over a subsoil of sandy clay loam.

This soil is well suited to most locally grown crops if drained. The main crops are corn (fig. 5), cotton,

Figure 5.—**Field of corn on Lynchburg sandy loam.**

tobacco, soybeans, strawberries, forage crops, and truck crops, such as snap beans, tomatoes, cucumbers, sweet potatoes, and onions. Drainage is required for crops such as tobacco.

This soil has good tilth and can be worked within a fairly wide range of moisture content. Tillage operations, however, are delayed in wet seasons. Winter cover crops, minimum tillage, and crop residue management help to maintain tilth and the organic-matter content.

A seasonal high water table is the main limitation in the use and management of this soil. Capability unit IIw–2; woodland group 2w8.

Marlboro Series

The Marlboro series consists of nearly level to gently sloping, well-drained soils on uplands.

In a representative profile the surface layer is dark grayish-brown sandy loam about 9 inches thick. The subsoil, to a depth of 63 inches, is yellowish-brown sandy clay and sandy clay loam that has mottles in shades of brown, red, and gray. Below this, to a depth of 7 inches, it is strong-brown sandy loam that has mottles in shades of gray and red.

Marlboro soils are low in natural fertility and organic-matter content. Permeability is moderate, the available water capacity is medium, and the shrink-swell potential is low. The seasonal high water table is below a depth of 5 feet.

Most of the acreage is in crops and pasture. The rest is forested.

Representative profile of Marlboro sandy loam, 0 to 2 percent slopes, in a cleared field 4 miles north of Interstate Highway 95 on State Highway 72, 2 miles north of State Road 1513, one-half mile west on State Road 1517, and 800 feet south of road:

Ap—0 to 9 inches, dark grayish-brown (10YR 4/2) sandy loam; moderate, medium, granular structure; very friable; common fine roots; slightly acid; abrupt, smooth boundary.

B21t—9 to 22 inches, yellowish-brown (10YR 5/4) sandy clay; weak, medium, subangular blocky structure; firm, slightly sticky; thin clay films on faces of peds; medium acid; gradual, wavy boundary.

B22t—22 to 46 inches, yellowish-brown (10YR 5/6) sandy clay; weak, medium, subangular blocky structure; firm, slightly sticky; thin discontinuous clay films on faces of peds; strongly acid; gradual, wavy boundary.

B23t—46 to 58 inches, yellowish-brown (10YR 5/6) sandy clay loam; few, medium, faint, strong-brown (7.5YR 5/6) mottles; weak, medium, subangular blocky structure; friable, slightly sticky; thin patchy clay films on faces of peds; strongly acid; gradual, wavy boundary.

B31—58 to 63 inches, yellowish-brown (10YR 5/4) sandy clay loam; common, medium, distinct, yellowish-red (5YR 5/6) and light brownish-gray (10YR 6|2) mottles; weak, medium, subangular blocky structure; friable; thin patchy clay films on faces of peds; very strongly acid; gradual, wavy boundary.

B32—63 to 75 inches, strong-brown (7.5YR 5/8) sandy loam; common, medium, prominent, gray (10YR 6/1) mottles and few, fine, distinct, yellowish-red mottles; moderate, medium, granular structure; friable; very strongly acid.

The solum is more than 72 inches thick. The soils are strongly acid or very strongly acid throughout unless they have been limed. The Ap or A1 horizon is grayish brown, dark grayish brown, or brown. In some places there is an A2 horizon of very pale brown to light yellowish-brown

loamy sand, loamy fine sand, or sandy loam. The B2t horizon is yellowish-brown or strong-brown sandy clay, sandy clay loam, or clay loam. The B3 horizon is sandy loam to clay. In some places the lower part of the B horizon contains plinthite nodules, but it is less than 5 percent plinthite within a depth of 60 inches.

MaA—Marlboro sandy loam, 0 to 2 percent slopes. This well-drained soil is on broad, smooth plains. Most mapped areas cover 5 to 100 acres. This soil has the profile described as representative of the series.

Included with this soil in mapping are a few small areas of soils that have a surface layer of loamy fine sand, loamy sand, and fine sandy loam. Also included are small areas of Aycock, Duplin, Faceville, and Norfolk soils, some small areas of soils that have a subsoil that extends to a depth of less than 60 inches, and some small areas of soils that have slopes of more than 2 percent.

This soil is well suited to corn, cotton, tobacco, soybeans, and forage crops.

The soil has no major limitations for use and management. Growing winter cover crops and returning crop residue help to maintain the organic matter content. Capability unit I–1; woodland group 3o1.

MaB—Marlboro sandy loam, 2 to 6 percent slopes. This well-drained soil is between nearly level soils on uplands and soils on drainageways. Most mapped areas cover 5 to 60 acres.

Included with this soil in mapping are a few small areas of soils that have a surface layer of fine sandy loam and loamy sand. Also included are small areas of Aycock, Duplin, Faceville, and Norfolk soils, some small areas of soils that have a subsoil that extends to a depth of less than 60 inches, small areas of soils that have severely eroded spots, and areas of soils that have slopes of less than 2 percent.

This soil is well suited to all locally grown crops. The main crops are corn, soybeans, cotton, tobacco, and truck crops, such as snap beans, tomatoes, cucumbers, sweet potatoes, and onions.

Slope, surface runoff, and erosion are the main limitations in the use and management of this soil. Winter cover crops, minimum tillage and crop residue management help to control runoff and erosion and maintain tilth and the organic-matter content. Maintaining drainageways in sod, using terraces and diversions, and including close-growing crops in the crop rotation help to conserve soil and water. Capability unit IIe–1; woodland group 3o1.

McColl Series

The McColl series consists of nearly level, poorly drained soils in oval depressions on uplands. The depressions lack natural outlets for drainage.

In a representative profile the surface layer is dark-gray loam about 4 inches thick. The subsoil is 47 inches thick. The upper part is light-gray sandy clay that has mottles in shades of gray and brown. The lower part is a fragipan of brittle, strong-brown sandy clay loam that has mottles in shades of gray and yellow. The underlying material, to a depth of 64 inches, is mottled yellow, red, and light-gray sandy loam.

McColl soils are low in natural fertility and organic-matter content. Permeability is slow, the available water capacity is low, and the shrink-swell potential is low. The seasonal high water table is at or near the surface from November through April. These soils are ponded for long periods from November through May.

Most of the acreage is in crops and pasture. Some is forested.

Representative profile of McColl loam, in a large wooded bay one-fourth mile north of Centre Church and 200 feet east of State Route 1312:

A1—0 to 4 inches, dark-gray (10YR 4/1) loam; moderate, fine, granular structure; friable; many medium and large roots; very strongly acid; abrupt, smooth boundary.

B21tg—4 to 9 inches, light-gray (10YR 7/1) sandy clay; common, medium, distinct, gray (10YR 5/1) mottles; moderate, fine, subangular blocky structure; firm, sticky and slightly plastic; common medium roots and common old root channels containing material from A horizon; common fine and medium pores; thin discontinuous clay films on faces of peds; very strongly acid; clear, wavy boundary.

B22tg—9 to 18 inches, light-gray (10YR 7/1) sandy clay; common, medium, distinct, strong-brown (7.5YR 5/8) mottles; weak, medium, subangular blocky structure; firm, slightly sticky and slightly plastic; common fine roots; common fine pores; thin discontinuous clay films on faces of peds; very strongly acid; gradual, wavy boundary.

B31x—18 to 36 inches, strong-brown (7.5YR 5/8) sandy clay loam; many, coarse, prominent, gray (10YR 6/1) tongues of clay loam that are oriented vertically and are 1 to 7 inches in diameter in the upper part and decrease to less than 1 inch in diameter in the lower part; common, medium, prominent, light-gray (10YR 7/1) mottles and few, fine, red mottles; moderate, medium, platy structure that parts to weak, fine, subangular blocky; slightly brittle, firm, slightly sticky; common fine roots in the gray tongues; common medium and fine pores; thin discontinuous clay films on faces of peds; very strongly acid; gradual, wavy boundary.

B32x—36 to 44 inches, strong-brown (7.5YR 5/8) sandy clay loam; many, medium, distinct, light-gray (10YR 7/1) streaks and mottles oriented vertically, common, medium, distinct, brownish-yellow (10YR 6/8) mottles and few, fine, distinct, red mottles; weak, fine, subangular blocky structure; firm, brittle; common medium and fine pores; thin discontinuous clay films on faces of peds; very strongly acid; gradual, wavy boundary.

B33x—44 to 51 inches, strong-brown (7.5YR 5|6) sandy clay loam; common, medium, distinct, light-gray (10YR 7/1) and brownish-yellow (10YR 6/8) mottles and few, fine, prominent, red mottles; weak, fine, subangular blocky structure; friable; few medium pores; patchy clay films on faces of peds; very strongly acid; gradual, wavy boundary.

C—51 to 64 inches, mottled yellow (10YR 7/6), red (2.5YR 4/8), and light-gray (10YR 7/1) sandy loam; pockets of sandy clay loam; weak, medium, granular structure; very friable; very strongly acid.

The solum is 40 to 60 inches thick. The soils are strongly acid or very strongly acid throughout unless they have been limed. The A horizon is very dark gray or dark gray. The B2t horizon is gray, light-gray, or light brownish-gray clay loam or sandy clay. The Bx horizon is strong brown or yellowish brown and has vertical tongues of gray material. It is sandy clay loam in the strong-brown matrix part and sandy clay loam, clay loam, or sandy clay in the large, vertically oriented tongues. The C horizon is mottled yellow, red, and light gray.

Mc—McColl loam. This nearly level, poorly drained soil is in oval bays on broad uplands. These bays lack

natural outlets for drainage. Most mapped areas cover 10 to 80 acres.

Included with this soil in mapping are a few small areas of soils that have a surface layer of fine sandy loam and clay loam. Also included are small areas of Coxville, Dunbar, Lynchburg, and Rains soils.

This soil is suited to a few locally grown crops if it is drained. The main crops are corn, soybeans, and forage crops.

This soil has good tilth and can be worked within a wide range of moisture content. Tillage operations, however, are delayed in wet seasons. Minimum tillage and crop residue management help to maintain tilth and the organic-matter content. Winter cover crops may drown in the low-lying areas.

A seasonal high water table and slow permeability are the main limitations in the use and management of this soil. Wetness is a very severe limitation, and drainage is needed for most uses. Capability unit IIIw–2 drained, IVw–2 undrained; woodland group 2w9.

Meggett Series

The Meggett series consists of nearly level, poorly drained soils on stream terraces.

In a representative profile the surface layer is dark-gray fine sandy loam about 10 inches thick. The subsoil is 31 inches thick. It is gray sandy clay and clay that has mottles in shades of brown. The underlying material, to a depth of 55 inches, is gray or light-gray and white loamy fine sand and sand that has lenses of sandy loam.

Meggett soils are medium in natural fertility and organic-matter content. Permeability is slow, the available water capacity is medium, and the shrink-swell potential is high. The seasonal high water table is at or near the surface from November through April. These soils are flooded frequently for brief periods from February through April.

Most of the acreage is forested. Some is in crops or pasture.

Representative profile of Meggett fine sandy loam, in a wooded area one-half mile north of State Highway 211 on Interstate Highway 95 service road at Lumberton and 240 feet east of service road:

A1—0 to 5 inches, dark-gray (10YR 4/1) fine sandy loam; weak, medium, granular structure; very friable; many large and medium roots; medium acid; abrupt, smooth boundary.

A3—5 to 10 inches, dark-gray (10YR 4/1) fine sandy loam; weak, medium, subangular blocky structure; very friable; common medium roots; medium acid; clear, smooth boundary.

B21tg—10 to 18 inches, gray (10YR 5/1) sandy clay; common, medium, distinct, yellowish-brown (10YR 5/6) mottles; weak, coarse, subangular blocky structure; firm, sticky and plastic; common medium roots; few, prominent, discontinuous clay films on faces of peds; neutral; gradual, wavy boundary.

B22tg—18 to 30 inches, gray (10YR 5/1) clay; few, fine, distinct, light olive-brown (2.5Y 5/4) mottles; weak, coarse, subangular blocky structure; very firm, very sticky and very plastic; common medium roots; neutral; gradual, wavy boundary.

B3g—30 to 41 inches, gray (10YR 5/1) sandy clay that grades to sandy clay loam; few, medium, distinct, light olive-brown (2.5Y 5/4) mottles; weak, medium, subangular blocky structure; friable; common medium roots; moderately alkaline; gradual, wavy boundary.

IIC1g—41 to 46 inches, gray (10YR 6/1) loamy fine sand; lenses of sandy loam and small spots of lighter colored sand; single grained; loose; moderately alkaline; gradual, wavy boundary.

IIC2g—46 to 55 inches, light-gray (10YR 7/1) and white (10YR 8/1) sand; single grained; loose; moderately alkaline.

The solum is 40 to 60 inches thick. Unless the soils have been limed, the A horizon is medium acid and the B horizon is neutral to moderately alkaline. The A1 horizon is dark gray, very dark gray, or black. In some places there is an A2 horizon that is light brownish gray, gray, light gray, or dark gray and is fine sandy loam, sandy loam, or loamy sand. The B2t horizon is light-gray, gray, or dark-gray sandy clay or clay. The IIC horizon is gray or light-gray sand to sandy clay. In many places it contains marl or shell fragments.

Me—Meggett fine sandy loam. This nearly level, poorly drained soil is on stream terraces and drainageways. Most mapped areas cover 10 to 150 acres.

Included with this soil in mapping are a few small areas of soils that have a surface layer of loamy fine sand, sandy loam, or loam. Also included are small areas of Bibb and Lumbee soils.

This soil is too wet for crops unless it is drained. It is suited to a few locally grown crops if it is drained. The main crops are corn, soybeans, and forage crops.

This soil has good tilth and can be worked within a wide range of moisture content. Tillage operations, however, are delayed in wet seasons. Minimum tillage and crop residue management help to maintain tilth and the organic-matter content.

A seasonal high water table, flooding, and slow permeability are the main limitations in the use and management of this soil. Drainage is needed for most uses. Capability unit IIIw–2 where the soil is not flooded, Vw–1 where the soil is flooded; woodland group 1w9.

Nahunta Series

The Nahunta series consists of nearly level, somewhat poorly drained soils on uplands.

In a representative profile the surface layer is dark-gray very fine sandy loam about 7 inches thick. The subsoil extends to a depth of 64 inches. It is light olive-brown loam that has mottles in shades of brown in the upper 3 inches, is light brownish-gray clay loam that has mottles in shades of red and yellow in the next 20 inches, and is light-gray clay loam that has mottles in shades of red and yellow in the lower 34 inches.

Nahunta soils are low in natural fertility and organic-matter content. Permeability is moderate, the available water capacity is high, and the shrink-swell potential is low. The seasonal high water table is 1½ feet below the surface from November through April.

Most of the acreage is in crops or pasture. The rest is forested.

Representative profile of Nahunta very fine sandy loam, three-fourths of a mile southeast of Raynham on State Road 2457 and 50 feet from west side of road:

Ap—0 to 7 inches, dark-gray (10YR 4/1) very fine sandy

loam; weak, medium, granular structure; friable; many medium and large roots; strongly acid; abrupt, smooth boundary.

B1—7 to 10 inches, light olive-brown (2.5Y 5/4) loam; common, medium, distinct, strong-brown (7.5YR 5/6) and yellowish-brown (10YR 5/6) mottles; weak, medium, subangular blocky structure; friable; many medium and large root pores filled with material from the Ap horizon; patchy clay films on faces of peds; few, hard, strong-brown nodules 5 to 15 millimeters in size; strongly acid; gradual, wavy boundary.

B21tg—10 to 30 inches, light brownish-gray (2.5Y 6/2) clay loam; many, medium and coarse, prominent, red (2.5YR 4/6), yellowish-red (5YR 5/8), and brownish-yellow (10YR 6/6) mottles; moderate, medium, subangular blocky structure; friable; prominent clay films on faces of peds and pore walls; few, hard, strong-brown concretions 5 to 15 millimeters in size; strongly acid; gradual, wavy boundary.

B22tg—30 to 50 inches, light-gray (10YR 6/1) clay loam; many, prominent, coarse, red (2.5YR 4/6) and brownish-yellow (10YR 6/6) mottles; weak, medium, subangular blocky structure; friable; prominent and patchy clay films on faces of peds and walls of root pores; strongly acid; gradual, wavy boundary.

B3g—50 to 64 inches, light-gray (10YR 7/1) clay loam; many, coarse, prominent, brownish-yellow (10YR 6/6) mottles; few, fine, yellow, gray, and red mottles; gray mottles contain much very fine sand; massive and weak, medium, subangular blocky structure; firm; very strongly acid.

The solum is 60 to 75 inches thick. The soils are strongly acid or very strongly acid throughout unless they have been limed. The Ap or A1 horizon is dark gray, dark grayish brown, or very dark gray. In some places there is an A2 horizon of very fine sandy loam. The B2t horizon is light brownish gray, light olive brown, pale brown, or light yellowish brown and has gray mottles within a depth of 20 inches. The B3 horizon is light brownish-gray, gray, or light-gray loam or clay loam. The Bt horizon contains 18 to 35 percent clay. In some places the lower part of the B horizon has few plinthite nodules, but it is less than 5 percent plinthite within a depth of 60 inches. In some places there is a C horizon of gray or light-gray loamy sand to clay.

Na—Nahunta very fine sandy loam. This nearly level, somewhat poorly drained soil is on broad smooth plains and is generally on the lowest part of the landscape. Most areas cover 5 to 140 acres.

Included with this soil in mapping are a few small areas of soils that have a surface layer of fine sandy loam. Also included are a few small areas of Exum, Dunbar, Lynchburg, and Trebloc soils and some small areas of soils that have a subsoil of clay loam that extends to a depth of less than 60 inches.

This soil is well suited to most locally grown crops. The main crops are corn, cotton, tobacco, soybeans, forage crops, and truck crops, such as snap beans, tomatoes, cucumbers, sweet potatoes, and onions. Drainage may be required for some crops, such as tobacco.

This soil has good tilth and can be worked within a fairly wide range of moisture content. Tillage operations, however, are delayed in wet seasons. Winter cover crops, minimum tillage, and crop residue management help to maintain tilth and the organic-matter content.

A seasonal high water table is the main limitation in the use and management of this soil. Capability unit IIw–2; woodland group 2w8.

Norfolk Series

The Norfolk series consists of nearly level to sloping, well-drained soils on uplands.

In a representative profile the surface layer is grayish-brown loamy sand about 9 inches thick. The subsurface layer is light yellowish-brown loamy sand 5 inches thick. The subsoil is 68 inches thick. It is yellowish-brown sandy loam in the upper 3 inches. In the next 53 inches, it is yellowish-brown sandy clay loam that has mottles in shades of red, brown, and gray. In the lower 12 inches, it is mottled brownish-yellow, pale-brown, yellowish-red, and gray sandy clay loam. The underlying material, to a depth of 100 inches, is mottled red, strong-brown, brownish-yellow, and gray, stratified loamy material.

Norfolk soils are low in natural fertility and organic-matter content. Permeability is moderate, the available water capacity is medium, and the shrink-swell potential is low. The seasonal high water table is more than 5 feet below the surface.

Most of the acreage is in crops or pasture. Some is forested.

Representative profile of Norfolk loamy sand, 0 to 2 percent slopes, 1¼ miles southeast of Parkton on State Road 1723, 1 mile south of State Road 1724, 300 feet south on field road, and 60 feet east of field road:

Ap—0 to 9 inches, grayish-brown (10YR 5/2) loamy sand; weak, medium, granular structure; very friable; common fine roots; medium acid; clear, smooth boundary.

A2—9 to 14 inches, light yellowish-brown (10YR 6/4) loamy sand; weak, medium, granular structure; very friable; common fine roots; strongly acid; clear, wavy boundary.

B1—14 to 17 inches, yellowish-brown (10YR 5/6) sandy loam; weak, fine, subangular blocky structure; friable; common fine roots; strongly acid; clear, wavy boundary.

B21t—17 to 38 inches, yellowish-brown (10YR 5/6) sandy clay loam; weak, medium, subangular blocky structure; friable; common fine roots; discontinuous clay films on faces of peds; many fine and medium pores; very strongly acid; gradual, wavy boundary.

B22t—38 to 58 inches, yellowish-brown (10YR 5/6) sandy clay loam; few fine, faint, yellowish-red and strong-brown mottles; weak, medium, subangular blocky structure; friable; few fine roots; thin discontinuous clay films on faces of peds; very strongly acid; gradual, wavy boundary.

B23t—58 to 70 inches, yellowish-brown (10YR 5/6) sandy clay loam; common, medium, distinct, pale-brown (10YR 6/3) and light brownish-gray (10YR 6/2) mottles; weak, fine, subangular blocky structure; friable; few, very firm, yellowish-red nodules; very strongly acid; gradual, wavy boundary.

B3—70 to 82 inches, mottled brownish-yellow (10YR 6/6), pale-brown (10YR 6/3), yellowish-red (5YR 4/6), and gray (10YR 5/1) sandy clay loam; weak, fine, angular blocky structure grading to platy; friable; weakly developed plinthite layer; gray increases with depth; very strongly acid; gradual, wavy boundary.

C—82 to 100 inches, mottled red (2.5YR 4/6), strong-brown (7.5YR 5/6), brownish-yellow (10YR 6/6), and gray (10YR 5/1), stratified loamy material; massive; friable; strongly acid.

The solum is 60 to 100 inches thick. The soils are strongly acid or very strongly acid throughout unless they have been limed. The A1 or Ap horizon is gray, grayish

brown, dark gray, light yellowish brown, or yellowish brown and is loamy sand and loamy fine sand. The A2 horizon is very pale brown, pale-brown, or light yellowish-brown loamy fine sand or loamy sand. The B2t horizon is brownish-yellow, yellowish-brown, or strong-brown sandy clay loam or sandy loam. In some places the lower part of the B horizon is sandy loam. In some places it contains plinthite nodules, but it is less than 5 percent plinthite within a depth of 60 inches. The C horizon is mottled red, yellowish brown, strong brown, brownish yellow, and gray and ranges from loamy sand to clay.

NoA—Norfolk loamy sand, 0 to 2 percent slopes. This well-drained soil is on broad, smooth plains and is commonly on the highest part of the landscape. Most areas cover 5 to more than 400 acres. This soil has the profile described as representative of the series.

Included with this soil in mapping are a few small areas of soils that have a surface layer of sandy loam, small areas of Goldsboro, Marlboro, and Wagram soils, and some wet areas, one-fourth of an acre to 3 acres in size, which are shown by a special symbol on the detailed soil map. Also included are small areas of a soil that consists of more than 5 percent, by volume, plinthite within a depth of 60 inches, small areas of soils that have a subsoil of yellowish-red to red sandy clay loam or sandy clay, and some small areas where the soils have slopes of more than 2 percent.

This soil is well suited to all locally grown crops. The main crops are corn, cotton, tobacco (fig. 6), soybeans, forage crops, and truck crops, such as snap beans, tomatoes, cucumbers, sweet potatoes, and onions.

The soil has no major limitations for use and management. Winter cover crops and crop residue management help to maintain the organic-matter content and conserve moisture. Capability unit I–1; woodland group 2o1.

NoB—Norfolk loamy sand, 2 to 6 percent slopes. This well-drained soil is on gentle side slopes between nearly level soils and soils on drainageways or bays. Most areas take in 5 to 40 acres.

Included with this soil in mapping are small areas of soils that have a surface layer of sandy loam, a few small areas of Marlboro and Wagram soils, and a soil that has a yellowish-red to red subsoil. Some wet areas, one-fourth of an acre to 3 acres in size, which are shown by a special symbol on the detailed soil map and a few severely eroded spots where the surface layer is sandy clay loam are also included.

This soil is well suited to all locally grown crops. The main crops are corn, soybeans, cotton, tobacco, and truck crops, such as snap beans, tomatoes, cucumbers, sweet potatoes, and onions.

Winter cover crops, minimum tillage, and crop residue management help to control runoff and erosion and maintain the tilth and organic-matter content. Maintaining drainageways in sod, using terraces and diversions, and including close-growing crops in the crop rotation also help to conserve soil and water. Slope, surface runoff, and erosion are the main limi-

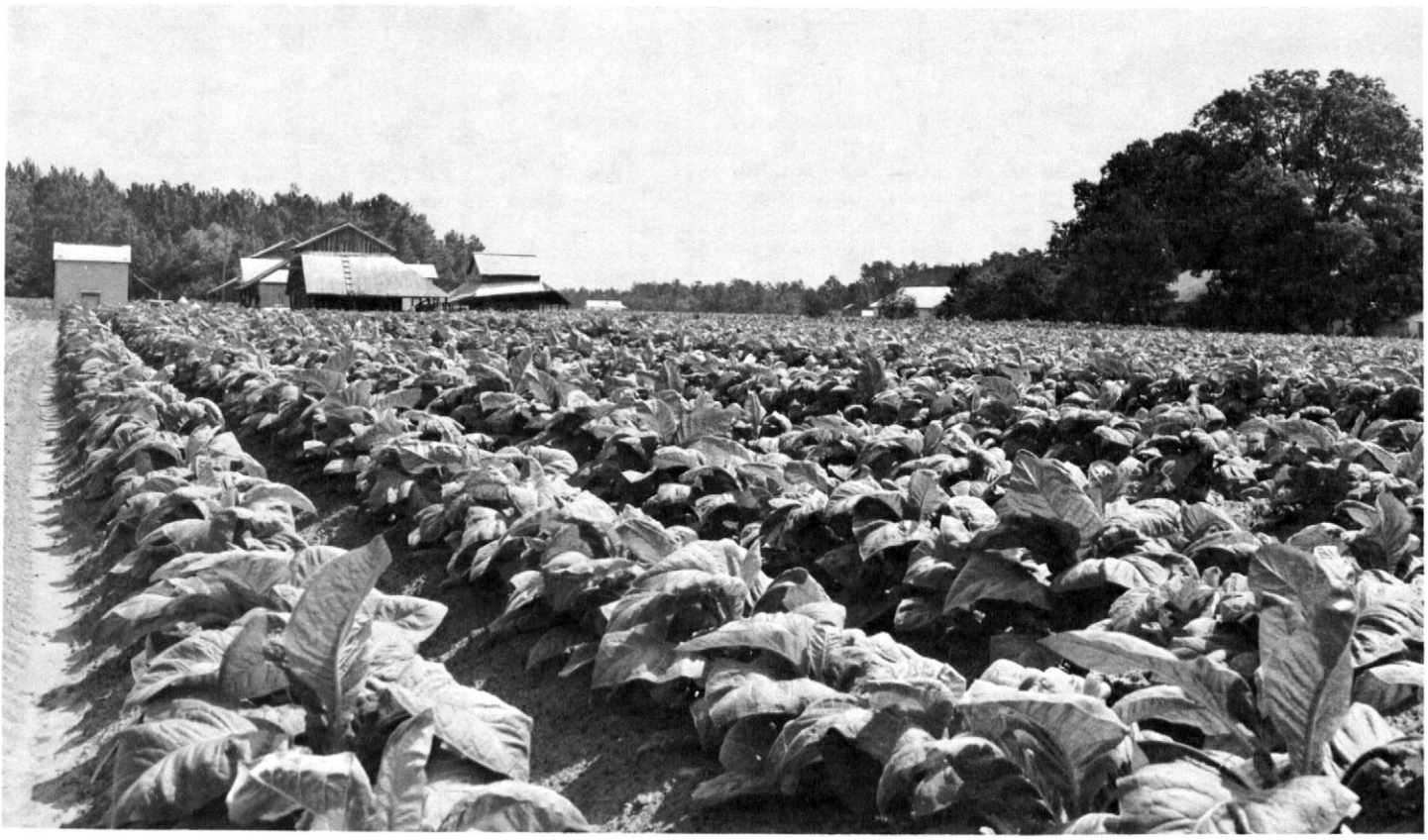


Figure 6.—**Field of tobacco on Norfolk loamy sand, 0 to 2 percent slopes.**

tations in the use and management of the soil. Capability unit IIe–1; woodland group 2o1.

NsC—Norfolk and Faceville soils, 6 to 10 percent slopes. These well-drained soils are on side slopes between nearly level or gently sloping soils and soils on the flood plains of major drainageways. Most areas are long and narrow and range from 5 to 25 acres. Any mapped area can consist of either or both of the soils. Slightly more than half the total acreage is Norfolk soil.

The Norfolk soil in this mapping unit has a profile similar to the one described as representative of the Norfolk series. The Faceville soil has a profile similar to the one described as representative of the Faceville series, but the subsoil contains slightly more sand.

Included with these soils in mapping are some small areas of soils that have a surface layer of loamy sand. A few small severely eroded spots and a few small areas where slopes are steeper are also included.

These soils are suited to most locally grown crops. The main crops are corn, cotton, tobacco, soybeans, and forage crops.

Winter cover crops, minimum tillage, and crop residue management help to control runoff and erosion. Maintaining drainageways in sod, using terraces and diversions, and including close-growing crops in the crop rotation also help to conserve soil and water.

Slope, surface runoff, and erosion are the main limitations to use and management of the soils. Capability unit IVe–1; woodland group 3o1.

Osier Series

The Osier series consists of nearly level, poorly drained soils on uplands and stream terraces.

In a representative profile the surface layer is black sand about 7 inches thick. The underlying material, to a depth of 75 inches, is dark grayish-brown, light-gray, and light brownish-gray sand.

Osier soils are very low in natural fertility and medium in organic-matter content. Permeability is rapid, the available water capacity is very low, and the shrink-swell potential is low. The seasonal high water table is about 1½ feet below the surface from November through April. These soils are subject to frequent flooding for brief periods from December through March.

In Robeson County, Osier soils are mapped only in an undifferentiated group with Plummer soils.

Representative profile of Osier sand, in an area of Plummer and Osier soils, in a pine seed orchard one-fourth mile west of the picnic pavillion at Riegel Nursery on State Highway 211, north of Lumberton:

Ap—0 to 7 inches, black (10YR 2/1) sand; weak, medium, granular structure; very friable; few fine and medium roots; very strongly acid; clear, smooth boundary.

C1—7 to 10 inches dark grayish-brown (10YR 4/2) sand; weak, medium, granular structure; loose; few fine and medium roots; very strongly acid; gradual, wavy boundary.

C2—10 to 39 inches, light-gray (10YR 7/2) sand; single grained; loose; very strongly acid; gradual, wavy boundary.

C3—39 to 52 inches, light-gray (10YR 7/1) sand; single grained; loose; very strongly acid; gradual, wavy boundary.

C4—52 to 67 inches, light brownish-gray (10YR 6/2) sand; single grained; loose; very strongly acid; gradual, wavy boundary.

C5—67 to 75 inches, dark grayish-brown (10YR 4/2) sand; single grained; loose; very strongly acid.

The Osier soils are strongly acid or very strongly acid throughout unless they have been limed. The A1 or Ap horizon is black or very dark gray loamy sand or sand. The C horizon is commonly dark-gray, dark grayish-brown, gray, grayish-brown, light brownish-gray, or light-gray sand, but in some places there is a thin C1 horizon of gray or light grayish brown loamy sand.

Pactolus Series

The Pactolus series consists of nearly level, moderately well drained soils on uplands and stream terraces.

In a representative profile the surface layer is very dark grayish-brown loamy sand about 6 inches thick. The underlying material is brownish-yellow, light yellowish-brown, yellow, and white loamy sand and sand that extends to a depth of 72 inches.

Pactolus soils are very low in natural fertility and organic-matter content. Permeability is rapid, the available water capacity is low, and the shrink-swell potential is low. The seasonal high water table is about 2½ feet below the surface from January through March.

Most of the acreage is forested; much is in managed stands. Some is in crops and pasture.

Representative profile of Pactolus loamy sand, in a sparse stand of pine 150 feet east of Old Whiteville Road and three-fourths of a mile north of Big Swamp run:

A1—0 to 6 inches, very dark grayish-brown (10YR 3/2) loamy sand; weak, medium, granular structure; very friable; many medium roots; strongly acid; clear, wavy boundary.

C1—6 to 27 inches, brownish-yellow (10YR 6/6) loamy sand; common, medium, distinct, very pale brown (10YR 7/3) mottles; weak, medium, granular structure; very friable; very strongly acid; gradual, wavy boundary.

C2—27 to 36 inches, light yellowish-brown (10YR 6/4) loamy sand; few, medium, distinct, strong-brown (7.5YR 5/8) mottles and common, medium, distinct, very pale brown (10YR 7/3) mottles; weak, medium, granular structure; very friable; very strongly acid; gradual, wavy boundary.

C3—36 to 48 inches, yellow (10YR 7/6) sand; many, coarse, distinct, light-gray (10YR 7/2) mottles and few, medium, faint, brownish-yellow (10YR 6/6) mottles; single grained; loose; very strongly acid; gradual, wavy boundary.

C4—48 to 72 inches, white (10YR 8/2) sand and coarse sand; about 40 percent of matrix is yellowish-brown (10YR 5/6) coated sand; single grained; loose; few fine mica flakes; very strongly acid.

The Pactolus soils have sandy horizons to a depth of more than 80 inches. The soils are strongly acid or very strongly acid throughout unless they have been limed. The A horizon is very dark gray, very dark grayish brown, dark gray, dark grayish brown, or grayish brown. The C1 and C2 horizons are brown, yellowish-brown, light yellowish-brown, brownish-yellow, pale-brown, or very pale brown loamy sand. The C3 and C4 horizons are pale-brown, light-gray, yellow, or white sand or loamy sand to a depth of more than 80 inches. Gray mottles, indicating wetness, are at a depth of 18 to 40 inches.

Pa—Pactolus loamy sand. This nearly level, mod-

erately well drained soil is in depressions and drainageways on broad, smooth ridges and stream terraces. Most mapped areas cover 8 to 60 acres.

Included with this soil in mapping are small areas of soils that contain less than 10 percent silt and clay in the upper 40 inches and small areas of Johns and Wakulla soils. Also included are some small areas of soils that lack gray mottles above a depth of 40 inches, some small areas of soils that have humus or brown-stained horizons at a depth of 3 to 4 feet, and some areas of soils that have slopes of 2 to 6 percent.

This soil is suited to most locally grown crops, especially those that require less water. The main crops are corn, cotton, tobacco, and soybeans.

Soil blowing is a concern in managing this soil. Blowing sand can damage young plants. Minimum tillage, crop residue management, and including close-growing grasses and legumes in the crop rotation help to control soil blowing and conserve moisture.

A seasonal high water table and leaching of plant nutrients are the main limitations in the use and management of this soil. Capability unit IIIs–1; woodland group 3w2.

Pantego Series

The Pantego series consists of nearly level, very poorly drained soils on uplands.

In a representative profile the surface layer is black fine sandy loam about 14 inches thick. The subsoil extends to a depth of 80 inches. It is gray and light-gray sandy clay loam that has pale-brown mottles.

Pantego soils are low in natural fertility and medium in organic-matter content. Permeability is moderate, the available water capacity is medium, and the shrink-swell potential is low. The seasonal high water table is at the surface from November through April. These soils are ponded for very brief periods from November through February.

Most of the acreage is forested. The rest is drained and is in crops and pasture.

Representative profile of Pantego fine sandy loam in a cleared field 4 miles west of Wakulla on State Highway 71, 4 miles north of State Road 1313, and 75 feet west of road:

Ap—0 to 14 inches, black (10YR 2/1) fine sandy loam; moderate, fine, granular structure; very friable; common fine and medium roots; medium acid; clear, smooth boundary.

B1g—14 to 22 inches, gray (10YR 6/1) sandy clay loam; weak, fine, subangular blocky structure; friable; few fine roots; few patchy clay films on faces of peds; strongly acid; gradual, wavy boundary.

B2tg—22 to 64 inches, gray (10YR 6/1) sandy clay loam; few, medium, faint, pale-brown (10YR 6/3) mottles; weak, medium, subangular blocky structure; friable; few patchy clay films on faces of peds; strongly acid; gradual, wavy boundary.

B3g—64 to 80 inches, light-gray (10YR 7/1) sandy clay loam; pockets of sandy loam; massive; few, faint, patchy clay films on faces of peds; strongly acid.

The solum is 60 to 80 inches thick. The soils are strongly acid or very strongly acid throughout unless they have been limed. The Ap or A1 horizon is black or very dark gray. The B2t horizon is dark-gray, gray, or light-gray sandy clay loam or sandy loam. In some places there is a C horizon of gray, light-gray, or white sand to sandy clay loam.

Pg—Pantego fine sandy loam. This nearly level, very poorly drained soil is on the lowest part of irregularly shaped or oval bays. Most mapped areas cover 5 to 250 acres.

Included with this soil in mapping are a few small areas of soils that have a surface layer of loam and sandy loam. Also included are small areas of Byars, Coxville, Plummer, Portsmouth, Rains, and Torhunta soils.

This soil is suited to a few locally grown crops if it is drained. The main crops are corn, soybeans, pasture grasses, and legumes.

This soil has good tilth and can be worked within a wide range of moisture content. Tillage operations, however, are delayed in wet seasons. Minimum tillage and crop residue management help to maintain the organic-matter content. Winter cover crops may drown in the low-lying areas.

A seasonal high water table and ponding are the main limitations in the use and management of this soil. Drainage is needed for most uses. Capability unit IIIw–3; woodland group 1w9.

Plummer Series

The Plummer series consists of nearly level, poorly drained soils on uplands and, to a lesser extent, on stream terraces.

In a representative profile the surface layer is black and grayish-brown loamy sand about 13 inches thick. The subsurface layer, to a depth of 56 inches, is light brownish-gray and white sand. The subsoil, to a depth of 65 inches, is light-gray sandy loam.

Plummer soils are very low in natural fertility and medium in organic-matter content. Permeability is moderately rapid, the available water capacity is low, and the shrink-swell potential is low. The seasonal high water table is within 1½ feet of the surface from November through April. These soils are subject to frequent flooding for brief periods from December through March.

Most of the acreage is forested. A few areas are in crops and pasture.

In this county, Plummer soils are mapped only in an undifferentiated group with Osier soils.

Representative profile of Plummer loamy sand, in an area of Plummer and Osier soils, 1 mile south of Smyrna Church on Wiregrass Road, ¾ mile west on State Road 2241, ½ mile south on private road, and 320 yards south of house on power line right-of-way:

A11—0 to 7 inches, black (10YR 2/1) loamy sand; moderate, fine, granular structure; very friable; many fine roots; very strongly acid; clear, wavy boundary.

A12—7 to 13 inches, grayish-brown (10YR 5/2) loamy sand; weak, fine, granular structure; very friable; many fine roots; very strongly acid; gradual, wavy boundary.

A21—13 to 29 inches, light brownish-gray (10YR 6/2) sand; single grained; loose; strongly acid; diffuse boundary.

A22—29 to 56 inches, white (10YR 8/1) sand; single grained; loose; strongly acid; gradual, wavy boundary.

B2t—56 to 65 inches, light-gray (10YR 7/3) sandy loam; weak, medium, granular structure; friable; strongly acid.

The solum is more than 65 inches thick. The soils are strongly acid or very strongly acid throughout unless they have been limed. The A1 horizon is black to dark gray or grayish brown. The A2 horizon is gray, light-gray, or white loamy sand, sand, or fine sand. The B2t horizon is gray or light-gray sandy loam or sandy clay loam.

Pm—Plummer and Osier soils. These nearly level, poorly drained soils are in depressions and along drainageways on uplands and stream terraces. These soils are similar in use and management, and for the purpose of this survey it was not practical to map them separately. Slightly more than half the total acreage is Plummer soil.

The profile of the Plummer soil in this mapping unit is similar to the one described as representative of the Plummer series, but the subsoil is sandy loam. The profile of the Osier soil is similar to the one described as representative of the Osier series.

Included with these soils in mapping are small areas of Bibb and Rains soils and other wet soils.

Most of the acreage is forested; some is in crops and pasture. The soils are suited to a few locally grown crops if they are drained. The main crops are corn, soybeans, and pasture grasses.

Minimum tillage and crop residue management help to maintain the organic-matter content. Tillage operations, however, are delayed in wet seasons.

A seasonal high water table and flooding are the main limitations in the use and management of these soils. Wetness is a very severe limitation in winter and spring. Drainage is needed for most uses, but there are few suitable drainage outlets.

The characteristics of these soils are variable, and a detailed examination is needed for accurate interpretations. Capability unit IVw–1; Plummer soil in woodland group 2w3, Osier soil in woodland group 3w3.

Pocalla Series

The Pocalla series consists of nearly level to gently sloping, somewhat excessively drained soils on uplands.

In a representative profile the surface layer is dark grayish-brown loamy sand about 7 inches thick. The subsurface layer is pale-brown sand 15 inches thick. The upper part of the subsoil is yellowish-brown sandy loam 12 inches thick. Below this is a layer of yellow loamy sand 13 inches thick. The lower part of the subsoil extends to a depth of 72 inches. It is brownish-yellow, light yellowish-brown, and yellowish-brown sandy clay loam that has mottles in shades of red, brown, and gray.

Pocalla soils are low in natural fertility and organic-matter content. Permeability is moderate, the available water capacity is low, and the shrink-swell potential is low. The seasonal high water table is below a depth of 5 feet.

Most of the acreage is in crops and pasture. The rest is forested.

Representative profile of Pocalla loamy sand, 0 to 3 percent slopes, in a cultivated field 400 feet southwest of Gaddysville Cross Road and 30 feet south of State Road 2485:

Ap—0 to 7 inches, dark grayish-brown (10YR 4/2) loamy sand; weak, fine, granular structure; loose; common medium roots; medium acid; abrupt, smooth boundary.

A2—7 to 22 inches, pale-brown (10YR 6/3) sand; single grained; loose; strongly acid; clear, wavy boundary.

B2t—22 to 34 inches, yellowish-brown (10YR 5/6) sandy loam; weak, medium, granular structure; very friable; few fine roots; common medium pores; strongly acid; gradual, wavy boundary.

A'2—34 to 47 inches, yellow (10YR 7/6) loamy sand; weak, medium, granular structure to single grained; loose; strongly acid; gradual boundary.

B'21t—47 to 57 inches, brownish-yellow (10YR 6/6) sandy clay loam; common, medium, distinct, yellowish-red (5YR 5/8) mottles; weak, medium, subangular blocky structure; friable; strongly acid; gradual, wavy boundary.

B'22t—57 to 64 inches, light yellowish-brown (10YR 6/4) sandy clay loam; common, medium, distinct, red (10YR 4/8) and very pale brown (10YR 7/3) mottles; weak, medium, subangular blocky structure; friable; few, rough, irregular iron nodules; strongly acid; gradual, wavy boundary.

B'23t—64 to 72 inches, yellowish-brown (10YR 5/8) sandy clay loam; many, coarse, prominent, red (10R 4/8) and light-gray (10YR 7/2) mottles and many, coarse, distinct, strong-brown (7.5YR 5/8) mottles; weak, medium, subangular blocky structure; friable; about 3 percent hard iron fragments; strongly acid.

The solum is 72 to more than 90 inches thick. The soils are strongly acid or very strongly acid throughout unless they have been limed. The A1 or Ap horizon is dark grayish brown or grayish brown. The A2 horizon is pale-brown, brown, or light yellowish-brown sand or loamy sand. The B2t horizon is yellowish-brown or strong-brown sandy loam or sandy clay loam. The A'2 horizon is yellow, pale-yellow, light yellowish-brown, pale-brown, or light-gray sand or loamy sand. The B't horizon is light yellowish-brown, brownish-yellow, yellowish-brown, reddish-yellow, or strong-brown sandy clay loam or sandy loam. In some places plinthite nodules are in the B'22t and B'23t horizons, but no horizon within 60 inches of the soil surface has as much as 5 percent plinthite. The C horizon is sand to sandy clay loam.

PoB—Pocalla loamy sand, 0 to 3 percent slopes. This somewhat excessively drained soil is on broad, smooth plains. The mapped areas are broad and irregular in shape. Most mapped areas cover 10 to 350 acres.

Included with this soil in mapping are a few small areas of soils that have a surface layer of sand, small areas of Wagram and Wakulla soils, and some small areas of soils that lack the lower part of the subsoil. Also included are many wet spots, one-fourth of an acre to 3 acres in size, which are shown by a special symbol on the detailed soil map and small areas of soils that have a surface layer less than 20 inches thick.

This soil is well suited to most locally grown crops. The main crops are corn, cotton, tobacco, soybeans, and forage crops.

Leaching of plant nutrients, low natural fertility, low available water capacity, and soil blowing are the main limitations in the use and management of this soil. Blowing sand often damages young plants. Winter cover crops, minimum tillage, and crop residue management help to maintain the organic-matter content and conserve moisture. Capability unit IIs–1; woodland group 3s2.

Ponzer Variant

The Ponzer variant consists of level, very poorly drained soils in large bays on uplands.

In a representative profile the surface layer is very dark brown muck about 18 inches thick. Below this is a thin layer of yellow silt loam 3 inches thick. The next layer is black mucky loam that extends to a depth of about 31 inches. The underlying material extends to a depth of 60 inches. It is light brownish-gray and light-gray clay loam in the upper part, dark grayish-brown and grayish-brown sandy loam in the middle part, and very pale brown and white sand in the lower part.

Ponzer soils are low in natural fertility and high in organic-matter content. Permeability is moderate, the available water capacity is very high, and subsidence is high if the soils are drained. The seasonal high water table is at or near the surface from November through July. The soils are subject to ponding for long periods from November through June.

A small acreage is in crops, and the rest is forested. About half of the acreage has been drained.

Representative profile of Ponzer muck, siliceous subsoil variant, 1¼ miles south of Rennert east of the Main Canal in the northeast section of the desert, 40 feet from the culvert:

Oa1—0 to 18 inches, sapric material (muck), very dark brown (10YR 2/2) broken face and rubbed; 25 percent fiber; moderate, coarse, granular structure; friable; common small pieces of charcoal, logs, and ash; very strongly acid; gradual, wavy boundary.

IIC—18 to 21 inches, yellow (10YR 7/6) silt loam; massive; friable; very strongly acid; clear, wavy boundary.

A1b—21 to 31 inches, black (10YR 2/1) mucky loam; weak, medium, granular structure; very friable; high in organic-matter content; very strongly acid; clear, wavy boundary.

C1g—31 to 42 inches, light brownish-gray (10YR 6/2) and light-gray (10YR 7/2) clay loam; massive; firm; very strongly acid; gradual, wavy boundary.

C2g—42 to 47 inches, dark grayish-brown (10YR 4/2) and grayish-brown (10YR 5/2) sandy loam; massive; friable; 2- to 3-inch strata of white (10YR 8/1) clay at base of horizon; very strongly acid; gradual, wavy boundary.

C3g—47 to 60 inches, very pale brown (10YR 7/4) and white (10YR 8/1) sand and coarse sand; single grained; loose; very strongly acid.

The soils are very strongly acid or extremely acid throughout unless they have been limed. They have very dark brown or black organic surface horizons containing from 35 to 75 percent organic matter and less than 30 percent unrubbed fiber. The underlying mineral horizons are black, very dark gray, gray, grayish brown, or light brownish gray and are sandy loam, silt loam, silty clay loam, or clay loam. They overlie light-gray or very pale brown, sandy horizons that extend to a depth of more than 60 inches.

Pr—Ponzer muck, siliceous subsoil variant. This level, very poorly drained, organic soil is in large bays. Most mapped areas are irregularly oval in shape and cover 100 to 200 acres.

Included with this soil in mapping are some small areas of soils that have a surface layer of muck less than 16 inches thick. Also included are small areas of soils that lack a loamy subhorizon within a depth of 60 inches and small areas of Byars soil.

This soil is mainly forested. Because of flooding and wetness, it is generally unsuited to crops. It is moderately well suited to a few locally grown crops if it is drained and protected. The main crops are corn, soybeans, and forage crops.

A seasonal high water table, flooding, and the necessity of regulating the moisture level in the soil are the main limitations to use and management. Capability unit IVw–3 drained, VIIw–1 undrained; woodland group 4w3.

Portsmouth Series

The Portsmouth series consists of nearly level, very poorly drained soils on stream terraces. These soils formed in old Coastal Plain alluvium.

In a representative profile the surface layer is black loam about 12 inches thick. The subsoil is 26 inches thick. It is very dark gray sandy loam in the upper part, very dark grayish-brown sandy clay loam in the middle part, and dark-gray and very dark gray sandy loam in the lower part. The underlying material, to a depth of 62 inches, is dark-gray sandy loam and dark grayish-brown loamy sand.

Portsmouth soils are low in natural fertility and medium in organic-matter content. Permeability is moderate, the available water capacity is high, and the shrink-swell potential is low. The seasonal high water table is at or near the surface from November through May. The soils are flooded frequently for very brief periods from February through May.

Most of the acreage is forested. Some is in crops or pasture.

Representative profile of Portsmouth loam, in a cultivated field 2 miles south of Lumberton on State Highway 41, ½ mile west of U.S. Highway 74, ⅜ mile north of private road, and 30 feet west of road:

Ap—0 to 12 inches, black (10YR 2/1) loam; moderate, medium to coarse, granular structure; friable; many coarse and medium roots; strongly acid; abrupt, wavy boundary.

B1g—12 to 16 inches, very dark gray (10YR 3/1) sandy loam; weak, medium to coarse, subangular blocky structure; friable; common medium and fine roots; very strongly acid; gradual boundary.

B2tg—16 to 28 inches, very dark grayish-brown (10YR 3/2) sandy clay loam; weak, medium to coarse, subangular blocky structure; friable; few pockets of sandy loam; very strongly acid; gradual, wavy boundary.

B3g—28 to 38 inches, dark-gray (10YR 4/1) and very dark gray (10YR 3/1) sandy loam; weak, medium, subangular blocky structure; friable; pockets of sandy clay loam; very strongly acid; gradual, wavy boundary.

IIC1g—38 to 56 inches, dark-gray (10YR 4/1) sandy loam; massive; friable; pockets of loamy sand (as much as one-third of soil mass); very strongly acid; gradual, wavy boundary.

IIC2g—56 to 62 inches, dark grayish-brown (10YR 4/2) loamy sand; single grained; loose; very strongly acid.

The solum is 28 to 38 inches thick. The soils are strongly acid or very strongly acid throughout. The Ap or A1 horizon is black or very dark gray. The B2tg horizon is very dark gray, very dark grayish brown, dark gray, or gray and is sandy clay loam, sandy loam, or clay loam. The C horizon is light-gray, gray, dark-gray, dark grayish-brown, or pale-brown sand to sandy loam.

Pt—Portsmouth loam. This nearly level, very poorly drained soil is on low stream terraces and is on the lowest part of the landscape. Most mapped areas cover 10 to 350 acres.

Included with this soil in mapping are a few small areas of soils that have a surface layer of fine sandy loam, sandy loam, or loamy sand. Also included are small areas of Lumbee, Bibb, and Johnston soils, a few small areas of soils that have a subsoil of sandy clay loam that extends to a depth of 50 to 60 inches, and some small areas of soils that have a black surface layer more than 20 inches thick.

This soil is suited to a few locally grown crops if it is drained. The main crops are corn, soybeans, fescue, and truck crops, such as snap beans, tomatoes, cucumbers, sweet potatoes, and onions.

This soil has good tilth and can be worked within a wide range of moisture content. Tillage operations, however, are delayed in wet seasons. Minimum tillage and crop residue management help to maintain tilth and the organic-matter content. Winter cover crops may drown in low-lying areas.

A seasonal high water table and flooding are the main limitations in the use and management of this soil. Drainage is needed for most uses, but the sandy underlying material causes ditch banks to be unstable. Thus, installing and maintaining drainage systems is difficult. Capability unit IIIw–3; woodland group 1w9.

Rains Series

The Rains series consists of nearly level, poorly drained soils on uplands.

In a representative profile the surface layer is black sandy loam about 3 inches thick. The subsurface layer is grayish-brown sandy loam 4 inches thick. The subsoil is sandy clay loam about 55 inches thick. In the upper part it is gray and light brownish gray and has mottles in shades of brown and yellow. In the lower part it is gray and light gray and has mottles in shades of brown and gray. The underlying material, to a depth of 72 inches, is light-gray sandy loam that has mottles in shades of gray.

Rains soils are low in natural fertility and organic-matter content. Permeability is moderate, the available water capacity is medium, and the shrink-swell potential is low. The seasonal high water table is at or near the surface from November through April. These soils are ponded for very brief periods from November through February.

About half the acreage is in crops or pasture. The rest is forested (fig. 7).

Representative profile of Rains sandy loam, in a wooded area 2 miles southeast of Pembroke on State Highway 711, ¾ mile southwest on State Road 1003, and 300 feet north of road:

A1—0 to 3 inches, black (10YR 2/1) sandy loam; moderate, medium, granular structure; friable; common medium and coarse roots; extremely acid; clear, smooth boundary.

A2—3 to 7 inches, grayish-brown (10YR 7/2) sandy loam; moderate, medium, granular structure; common medium and coarse roots; very strongly acid; clear, wavy boundary.

B21tg—7 to 15 inches, gray (10YR 5/1) sandy clay loam; common, medium, distinct, yellowish-brown (10YR 5/6) mottles; weak, fine, subangular blocky structure; friable; few fine roots; faint clay films on faces of peds; very strongly acid; gradual, wavy boundary.

B22tg—15 to 22 inches, light brownish-gray (10YR 6/2) sandy clay loam; common, medium, distinct, yellowish-brown (10YR 5/4) mottles and few, fine, distinct, brownish-yellow mottles; weak, fine, subangular blocky structure; friable; common fine roots; faint clay films on faces of peds; very strongly acid; gradual, wavy boundary.

B23tg—22 to 40 inches, gray (10YR 5/1) sandy clay loam; common, medium, distinct, yellowish-brown (10YR 5/8) mottles; weak, fine, subangular blocky structure; friable; faint clay films on faces of peds; very strongly acid; gradual, wavy boundary.

B24tg—40 to 53 inches, light-gray (10YR 7/1) sandy clay loam; common, medium, faint, gray (10YR 6/1) mottles and few, fine, distinct, yellowish-brown mottles; weak, fine, subangular blocky structure; friable; faint clay films on faces of peds; very strongly acid; gradual, wavy boundary.

B3g—53 to 62 inches, light-gray (10YR 7/1) sandy clay loam; few, fine, faint, gray mottles and common, fine, distinct, yellowish-brown mottles; common pockets of white (10YR 8/1) sandy loam; weak, fine, subangular blocky structure; friable; faint discontinuous clay films on faces of peds; very strongly acid; gradual, wavy boundary.

Cg—62 to 72 inches, light-gray (2.5Y 7/2) sandy loam; common pockets of sandy clay loam; common, medium, distinct, very dark gray (N 3/0) mottles; weak, medium, granular structure; friable; very strongly acid.

The solum is 60 to 73 inches thick. The soils are strongly acid or very strongly acid throughout unless they have been limed. The A1 horizon is black or very dark gray. In some places there is an A2 horizon of gray or grayish-brown fine sandy loam or sandy loam. The B2t horizon is gray, grayish-brown, light brownish-gray, or light-gray sandy clay loam or sandy loam. The C horizon is commonly sandy loam but ranges from loamy sand to sandy clay loam.

Figure 7.—**Stand of pine on Rains sandy loam.**

Ra—Rains sandy loam. This nearly level, poorly drained soil is on broad, low plains and is on the lowest part of the landscape. Most mapped areas cover 5 to 300 acres.

Included with this soil in mapping are a few small areas of soils that have a surface layer of fine sandy loam, loam, or loamy sand. Also included are small areas of Coxville, Lynchburg, Pantego, and Toisnot

soils and a few small areas of soils that are 40 to 60 inches deep to sandier layers.

Wetness is a severe limitation for crops. If the soil is drained, it is suited to a few locally grown crops. The main crops are strawberries, corn, soybeans, fescue, and ladino clover.

This soil has good tilth and can be worked within a wide range of moisture content. Tillage operations, however, are delayed in wet seasons. Minimum tillage and crop residue management help to maintain tilth and the organic-matter content. Winter cover crops may drown in the low-lying areas.

A seasonal high water table and ponding (fig. 8) are the main limitations in the use and management of this soil. Drainage is needed for most uses. Capability unit IIIw–3 drained, Vw–1 undrained; woodland group 2w3.

Rutlege Series

The Rutlege series consists of nearly level, very poorly drained soils on stream terraces and uplands.

In a representative profile the surface layer is black loamy sand and very dark grayish-brown sand about 20 inches thick. The underlying material, to a depth of 72 inches, is gray and light-gray sand.

Rutlege soils are very low in natural fertility and medium in organic-matter content. Permeability is rapid, the available water capacity is very low, and the shrink-swell potential is low. The seasonal high water table is at or near the surface from November through April. These soils are ponded for very brief periods from November through March.

Most of the acreage is forested. Only a small acreage is in crops.

Representative profile of Rutlege loamy sand, in a wooded area 4.2 miles southwest of Bladenboro on State Highway 242, 0.5 mile south on unpaved State road, and 1.2 miles north of road on woods road, east of the run of Big Swamp:

A11—0 to 11 inches, black (10YR 2/1) loamy sand; moderate, fine, granular structure; very friable; many fine roots; very strongly acid; gradual, wavy boundary.

A12—11 to 20 inches, very dark grayish-brown (10YR 3/2) sand; single grained; loose; few fine roots; very strongly acid; gradual, wavy boundary.

C1g—20 to 28 inches, gray (10YR 5/1) sand; single grained; loose; very strongly acid; gradual, wavy boundary.

C2g—28 to 72 inches, light-gray (10YR 7/1) sand; single grained; loose; very strongly acid.

The Rutlege soils have horizons of loamy sand and sand to a depth of more than 80 inches. The soils are strongly acid or very strongly acid throughout unless they have been limed. The A horizon is very dark gray, very dark grayish brown, very dark brown, or black. The C horizon is dark-gray, gray, light-gray, or white sand or loamy sand.

Ru—Rutlege loamy sand. This nearly level, very poorly drained soil is on stream terraces and in large oval bays. Most mapped areas cover 5 to 150 acres.

Included with this soil in mapping are a few small areas of soils that have a surface layer of sand, fine sand, loamy fine sand, and loam. Also included are

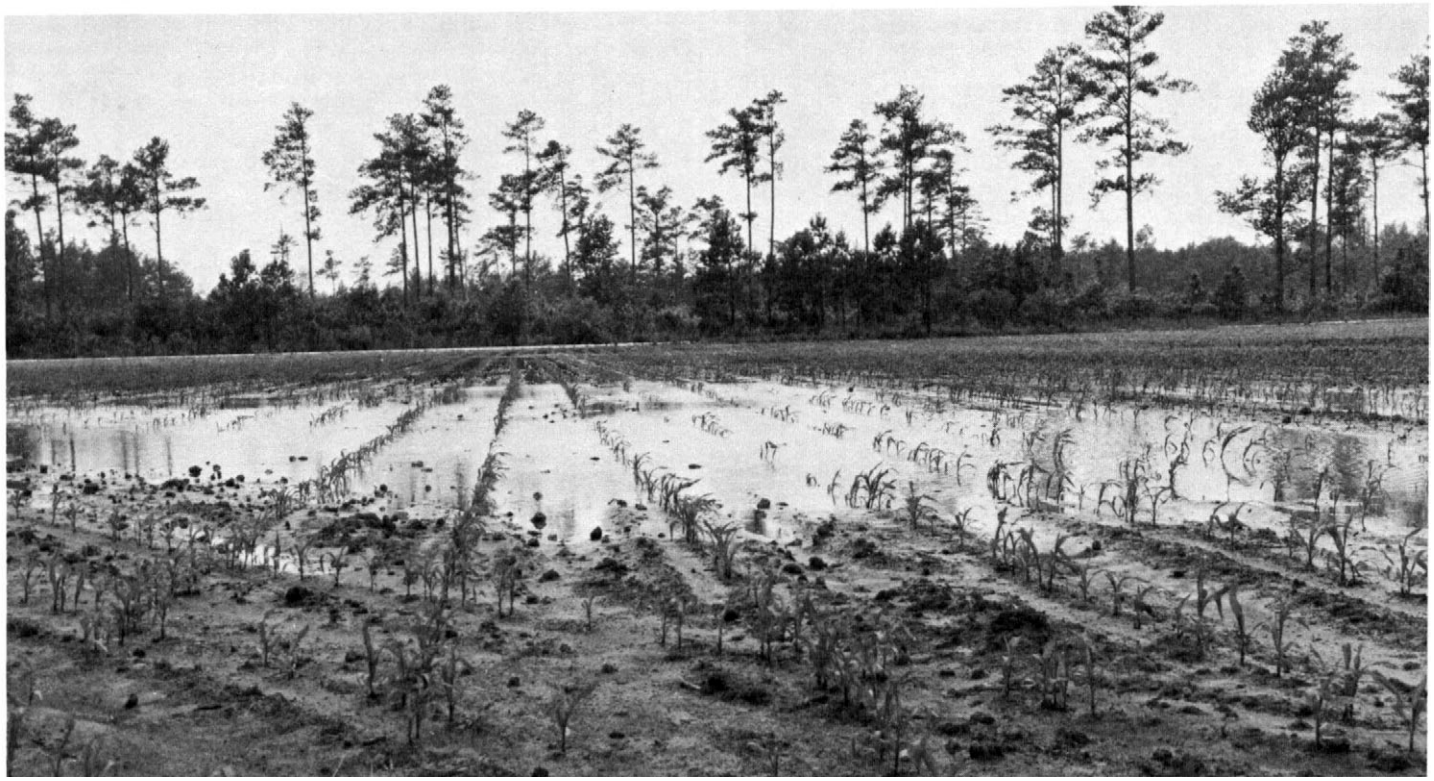


Figure 8.—**Field of young corn in a ponded area of Rains sandy loam.**

small areas of Johnston, Bibb, Plummer, and Torhunta soils.

This soil is mainly forested. It can be used for corn, soybeans, forage crops, and truck crops, such as snap beans, tomatoes, cucumbers, sweet potatoes, onions, and blueberries, if it is drained.

A seasonal high water table, ponding, very low natural fertility, and leaching of plant nutrients are the main limitations in the use and management of this soil. The organic-matter content can be maintained by returning crop residue to the soil. Drainage is needed for most crops and pasture plants, but it is difficult to install and maintain drainageways because of the sand and poor outlets. Capability unit Vw–1; woodland group 2w3.

Toisnot Series

The Toisnot series consists of nearly level, poorly drained soils on the outer fringes of stream terraces and on uplands.

In a representative profile the surface layer is very dark gray loam about 6 inches thick. The subsurface layer is gray loamy sand 7 inches thick. The next layer, to a depth of 28 inches, is dark-gray sandy loam. Below this, to a depth of 45 inches, is a fragipan of light-gray sandy loam that is compact, dense, and brittle. The subsoil, to a depth of 61 inches, is gray sandy clay loam that has mottles in shades of gray. The underlying material, to a depth of 90 inches, is gray sandy clay and light-gray clay that has mottles in shades of gray and yellow.

Toisnot soils are low in natural fertility and organic-matter content. The fragipan impedes the downward movement of water and growth of roots. Permeability is slow, the available water capacity is low to medium, and the shrink-swell potential is low. The seasonal high water table is at or near the surface from December through April. These soils are subject to ponding for brief periods from January through June.

Most of the acreage is forested. The rest is in crops and pasture.

Representative profile of Toisnot loam, 2 miles south of St. Pauls, 1⅛ miles south of Great Marsh Church, and 100 feet east of State Road 1759:

O1—1 inch to 0, partly decayed leaves, moss, and twigs.

A1—0 to 6 inches, very dark gray (10YR 3/1) loam; weak, medium, granular structure; very friable; many medium and large roots; very strongly acid; clear, wavy boundary.

A2g—6 to 13 inches, gray (10YR 6/1) loamy sand; massive; friable (slightly brittle); few medium and fine roots; about 5 percent material from the A1 horizon; few small bodies of clean sand; very strongly acid; clear, wavy boundary.

B&A—13 to 28 inches, dark-gray (10YR 4/1) sandy loam; about 15 percent gray (10YR 6/1) loamy sand that is brittle; massive but parts to weak, medium, subangular blocky structure; friable; few fine roots; few small bodies of clean sand; few irregular tongues 3 to 8 inches in diameter and 2 to 5 feet apart; very strongly acid; clear, irregular boundary.

A'2x—28 to 45 inches, light-gray (10YR 7/1) sandy loam; common, medium, distinct, grayish-brown (10YR 5/2) and light brownish-gray (10YR 6/2) mottles; massive; very hard (difficult to cut with spade); dry or very slightly moist when adjacent horizons are saturated; very strongly acid; gradual, irregular boundary.

B'2tg—45 to 61 inches, gray (10YR 6/1) sandy clay loam; many, coarse, faint, light-gray (10YR 7/1) bodies of sandy loam; weak, medium, subangular blocky structure; friable; few fine roots; sandy loam is brittle and decreases with depth; few small bodies of clean sand; very strongly acid; gradual, wavy boundary.

IIC1g—61 to 80 inches, gray (10YR 5/1, 6/1) sandy clay; common, medium, faint, light brownish-gray (10YR 6/2) and light-gray (10YR 7/2) mottles and common small pockets of dark gray (10YR 4/1); massive; firm; few fine roots; very strongly acid; gradual, wavy boundary.

IIC2g—80 to 90 inches, light-gray (10YR 7/1) clay; few, fine, distinct, yellow mottles; massive; very firm, plastic; few fine roots; very strongly acid.

The solum is 40 to more than 80 inches thick. The soils are strongly acid or very strongly acid throughout unless they have been limed. The Ap or A1 horizon is black, very dark gray, very dark grayish brown, dark gray, or dark grayish brown. The A2 horizon is dark gray, gray, grayish brown, light brownish gray, or light gray and is sand, loamy sand, or sandy loam. In some places there is a B2g horizon of dark-gray, gray, or grayish-brown sandy loam or fine sandy loam.

Depth to the fragipan (A'2x horizon) ranges from 20 to 42 inches. The fragipan is light gray, gray, light brownish gray, white, or pale brown and is sandy loam, loamy sand, or loam. The whiter areas have less clay than the grayer and browner areas. The fragipan ranges from dense, extremely hard, very firm, and brittle to slightly hard, firm, and brittle.

The B'2t horizon is dark-gray, gray, light-gray, or light grayish-brown sandy clay loam to sandy clay. The C horizon is gray or light-gray sandy clay loam or sandy clay. Commonly, it is weakly stratified or is interspersed with coarser materials.

Ta—Toisnot loam. This nearly level, poorly drained soil is in shallow depressions, around the heads of drainageways on the plains, and on the outer fringes of stream terraces. Most mapped areas cover 4 to 150 acres.

Included with this soil in mapping are a few small areas of soils that have a surface layer of loamy sand and sandy loam. Also included are small areas of Bibb, Plummer, and Rains soils.

This soil is suited to a few locally grown crops if it is drained. The main crops are corn, soybeans, and forage crops.

Minimum tillage and crop residue management help to maintain the organic-matter content. Tillage operations, however, are delayed in wet seasons.

A seasonal high water table, slow permeability, and ponding are the main limitations in the use and management of this soil. Wetness is a very severe limitation in winter and spring. Drainage is needed for most uses, but there are few suitable outlets. Capability unit IVw–2; woodland group 3w9.

Torhunta Series

The Torhunta series consists of nearly level, very poorly drained soils in bays on uplands and stream terraces.

In a representative profile the surface layer is black loam and very dark gray sandy loam about 14 inches thick. The subsoil is gray sandy loam 26 inches thick.

The underlying material is grayish-brown loamy sand that has mottles in shades of gray and yellow.

Torhunta soils are low in natural fertility and high in organic-matter content. Permeability is moderately rapid, the available water capacity is medium, and the shrink-swell potential is low. The seasonal high water table is at or near the surface from November through April. These soils are flooded frequently because of ponding or overflow for long periods from January through April.

Most of the acreage is forested. Some is in crops and pasture.

Representative profile of Torhunta loam, in a cultivated field 300 feet southwest of Sandhill Church and 200 feet south of State Road 2207.

Ap—0 to 9 inches, black (10YR 2/1) loam; weak, medium, granular structure; very friable; many medium and fine roots; slightly acid; clear, wavy boundary.

A12—9 to 14 inches, very dark gray (10YR 3/1) sandy loam; weak, medium, granular structure; very friable; common medium and fine roots; strongly acid; clear, wavy boundary.

Bg—14 to 40 inches, gray (10YR 5/1) sandy loam; few, medium, distinct, light yellowish-brown (10YR 6/4) mottles; weak, medium, subangular blocky structure; very friable, slightly sticky; few fine roots; few pockets of loamy sand; strongly acid; gradual, wavy boundary.

Cg—40 to 64 inches, grayish-brown (10YR 5/2) loamy sand; common, medium, distinct, gray (10YR 6/1) mottles and few, medium, distinct, brownish-yellow (10YR 6/6) mottles; single grained; loose; strongly acid.

The solum is 24 to 50 inches thick. The soils are strongly acid or very strongly acid throughout. The Ap or A1 horizon is black or very dark gray. The B horizon is dark-gray or gray sandy loam or fine sandy loam. The C horizon is gray, dark-gray, grayish-brown, or dark grayish-brown sand or loamy sand.

To—Torhunta loam. This nearly level, very poorly drained soil is in large oval bays on the plains and on stream terraces. Most mapped areas cover 5 to 250 acres.

Included with this soil in mapping are a few small areas of soils that have a surface layer of loamy sand and fine sandy loam. Also included are small areas of Pantego, Plummer, Portsmouth, and Rutlege soils and small areas that have a black or very dark gray surface layer more than 24 inches thick.

This soil is unsuited to crops because of wetness unless it is drained. If it is drained, the soil is suited to a few locally grown crops. The main crops are corn, soybeans, grasses, small grain, and blueberries.

This soil has good tilth and can be worked within a wide range of moisture content. Tillage operations, however, are delayed in wet seasons. Minimum tillage and crop residue management help to maintain tilth and the organic-matter content. Winter cover crops may drown in low-lying areas.

Flooding, low natural fertility, and a seasonal high water table are the main limitations in the use and management of this soil. The sandy substratum causes ditch banks to be unstable. This is a limitation to the installation and maintenance of drainage systems. Capability unit IIIw–3 drained, VIw–1 undrained; woodland group 2w9.

Trebloc Series

The Trebloc series consists of nearly level, poorly drained soils on uplands.

In a representative profile the surface layer is very dark gray loam about 5 inches thick. The subsurface layer is gray silt loam 4 inches thick. The subsoil is 51 inches thick. It is gray loam in the upper part, gray clay loam in the middle part, and gray clay in the lower part. The underlying material, to a depth of more than 80 inches, is gray and light-gray clay.

Trebloc soils are low in natural fertility and organic-matter content. Permeability is moderately slow and slow, the available water capacity is high, and the shrink-swell potential is moderate. The seasonal high water table is at or near the surface from November through April. These soils are ponded for brief periods from January through April.

Most of the acreage is forested. Some is in crops.

Representative profile of Trebloc loam, in a wooded area 2½ miles southeast of Rowland on State Highway 130, ⅝ mile west on State Road 2465, 75 feet south of road, and 75 feet east of main canal:

O2—1 inch to 0, very dark grayish-brown (10YR 3/2) partly decomposed leaves and other plant residue.

A1—0 to 5 inches, very dark gray (10YR 3/1) loam; moderate, medium, granular structure; friable; many large roots; strongly acid; abrupt, wavy boundary.

A2g—5 to 9 inches, gray (10YR 6/1) silt loam; weak, medium, subangular blocky and weak, fine, granular structure; friable, slightly sticky and slightly plastic; common medium and large roots; many medium and large pores; some material from the A1 horizon; strongly acid; abrupt, wavy boundary.

B21tg—9 to 19 inches, gray (10YR 6/1) loam; few, fine, faint, pale-brown mottles and few, fine, prominent, strong-brown mottles; weak, medium, subangular blocky structure; friable, sticky and plastic; common medium and large roots; few discontinuous clay films on faces of peds; very strongly acid; gradual, wavy boundary.

B22tg—19 to 48 inches, gray (10YR 5/1) clay loam; common, medium, prominent, red (2.5YR 4/8) and strong-brown (7.5YR 5/6) mottles; weak, fine and medium, angular blocky structure; firm, sticky and plastic; few fine and medium roots; common small and medium pores; few, thin, discontinuous clay films on faces of peds; very strongly acid; gradual, wavy boundary.

B3g—48 to 60 inches, gray (10YR 5/1) clay; few pockets of light-gray (10YR 7/1) loam; common, coarse, prominent, strong-brown (7.5YR 5/8) mottles; massive; firm, sticky and plastic; few fine and medium roots; few small pores; strongly acid; gradual, wavy boundary.

Cg—60 to 84 inches, gray (10YR 6/1) and light-gray (10YR 7/1) clay; few pockets of loam; common, medium, distinct, yellowish-brown (10YR 5/6) and strong-brown (7.5YR 5/6) mottles; massive; firm, sticky and plastic; few fine roots; strongly acid.

The solum is 60 to 80 inches thick. The soils are strongly acid or very strongly acid throughout unless they have been limed. The A1 horizon is very dark grayish brown or very dark brown. In some places there is an A2 horizon

that is gray or dark gray. The B2tg horizon is gray or light-gray silt loam, silty clay loam, and clay loam. The C horizon is clayey or loamy sediment.

Tr—Trebloc loam. This nearly level, poorly drained soil is on broad plains and is on the lowest part of the landscape. Most mapped areas cover 10 to 350 acres.

Included with this soil in mapping are small areas of soils that have a surface layer of silt loam or very fine sandy loam. Also included are small areas of soils that have more sand in the subsoil and small areas of Coxville and Nahunta soils.

This soil is suited to a few locally grown crops if it is drained. The main crops are corn, soybeans, forage crops, and truck crops, such as snap beans, tomatoes, cucumbers, sweet potatoes, and onions.

This soil has good tilth and can be worked within a wide range of moisture content. Tillage operations, however, are delayed in wet seasons. Minimum tillage and crop residue management help to maintain tilth and the organic-matter content. Winter cover crops may drown in low-lying areas.

The seasonal high water table, slow and moderately slow permeability, and ponding are the main limitations in the use and management of this soil. Wetness is a very severe limitation, and drainage is needed for most uses. Capability unit IIIw–2 drained, IVw–2 undrained; woodland group 2w9.

Udorthents, Loamy

Ud—Udorthents, loamy, are soils, in small areas, that have been altered by man to the extent that the original relief and soil profile cannot be recognized. Dominantly, these soils are loamy to a depth of 40 inches. Some small areas of sandy soils are included in mapping.

Because of the variable characteristics of these soils, a detailed examination is needed for accurate interpretations. Not assigned to a capability unit or woodland group.

Wagram Series

The Wagram series consists of nearly level to sloping, well-drained soils on uplands.

In a representative profile the surface layer is dark grayish-brown loamy sand about 8 inches thick. The subsurface layer is light yellowish-brown loamy sand 20 inches thick. The subsoil is 50 inches thick. In the upper 5 inches, it is yellowish-brown sandy loam. In the next 39 inches, it is yellowish-brown sandy clay loam that has mottles in shades of red, brown, and gray. In the lower 6 inches, it is yellowish-brown and pale-brown sandy loam that has yellowish-red mottles. The underlying material, to a depth of 100 inches, is brownish-yellow and yellowish-red loamy sand.

Wagram soils are low in natural fertility and organic-matter content. Permeability is moderately rapid, the available water capacity is low, and the shrink-swell potential is low. The seasonal high water table is below a depth of 5 feet.

Most of the acreage is in crops and pasture. Some is forested.

Representative profile of Wagram loamy sand, 0 to 6 percent slopes, in a cultivated field 1½ miles east of the St. Pauls railroad station, 900 feet south on State Highway 20, and 50 feet east of farm road:

Ap—0 to 8 inches, dark grayish-brown (10YR 4/2) loamy sand; weak, medium, granular structure; loose; common fine roots; strongly acid; abrupt, wavy boundary.

A2—8 to 28 inches, light yellowish-brown (10YR 6/4) loamy sand; few, medium, faint, brownish-yellow (10YR 6/6) mottles; weak, medium, granular structure; loose; few fine roots; strongly acid; clear, wavy boundary.

B1—28 to 33 inches, yellowish-brown (10YR 5/6) sandy loam; weak, medium, subangular blocky structure; very friable; few fine roots; few medium pores; strongly acid; clear, wavy boundary.

B21t—33 to 48 inches, yellowish-brown (10YR 5/6) sandy clay loam; few, medium, distinct, yellowish-red (5YR 4/8) mottles; weak, medium, subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; few, thin, discontinuous clay films on faces of peds; few, medium, brittle, yellowish-red (5YR 4/8) concretions; few coarse grains of sand and very fine pebbles; strongly acid; clear, wavy boundary.

B22t—48 to 72 inches, yellowish-brown (10YR 5/6) sandy clay loam; many, medium and coarse, distinct, strong-brown (7.5YR 5/6) and yellowish-red (5YR 4/8) mottles, many, coarse, distinct, pale-brown (10YR 6/3) mottles and common, medium, distinct, light-gray (10YR 7/2) mottles; moderate, thick, platy primary structure that parts to weak, medium and coarse, subangular blocky; friable, slightly sticky and slightly plastic; few, thin, discontinuous clay films on faces of peds; 4 to 5 percent, by volume, is common, medium, brittle and hard, strong-brown and yellowish-red iron nodules; strongly acid; gradual, wavy boundary.

B3—72 to 78 inches, yellowish-brown (10YR 5/6) and pale-brown (10YR 6/3) sandy loam; common, medium, distinct, yellowish-red (5YR 5/8) mottles; massive; friable; strongly acid; gradual, wavy boundary.

C—78 to 100 inches, brownish-yellow (10YR 6/6) and yellowish-red (5YR 5/8) loamy sand; massive; very friable; strongly acid.

The solum is 60 to 80 inches thick. The soils are strongly acid or very strongly acid throughout unless they have been limed. The A1 or Ap horizon is gray, grayish brown, light grayish brown, or dark grayish brown. The A2 horizon is very pale brown, pale-brown, or light yellowish-brown loamy sand or sand. The Bt horizon is yellowish brown or strong brown. The lower part of the B2t horizon contains gray mottles. In some places the B horizon contains plinthite nodules below a depth of 40 inches, but it is less than 5 percent plinthite within a depth of 60 inches. The C horizon is sandy to clayey sediment.

WaB—Wagram loamy sand, 0 to 6 percent slopes. This well-drained soil is on plains next to drainageways and on broad, smooth ridges or between nearly level soils and soils on drainageways or bays. Most mapped areas cover 5 to more than 300 acres. This soil has the profile described as representative of the series.

Included with this soil in mapping are some small areas of soils that have a surface layer of sand, fine sand, or loamy fine sand and small areas of Norfolk and Wakulla soils. Also included are some small areas of soils that have a sandy surface layer more than 40 inches thick, small areas of soils that have more than 5 percent plinthite in the lower part of the subsoil and within a depth of 60 inches, and some wet spots, one-fourth of an acre to 3 acres in size, which are shown by a special symbol on the detailed soil map.

This soil is fairly well suited to most locally grown crops. The main crops are corn, cotton, tobacco, soybeans, and forage crops (fig. 9).

Low natural fertility, leaching of plant nutrients, droughtiness, and soil blowing are the main limitations in the use and management of this soil. Blowing sand may damage young plants. Winter cover crops, minimum tillage, and crop residue management help to maintain the organic-matter content and conserve moisture. Capability unit IIs–1; woodland group 3s2.

WaC—Wagram loamy sand, 6 to 10 percent slopes. This well-drained soil is between nearly level to gently sloping soils on ridges and soils on drainageways. The mapped areas are long and narrow, and most cover 5 to 50 acres.

Included with this soil in mapping are a few small areas of soils that have a surface layer of sand and loamy fine sand. Also included are small areas of Norfolk and Wakulla soils and small areas of soils that have a sandy surface layer more than 40 inches thick.

This soil is suited to most locally grown crops, but it is better suited to crops that require less water. The main crops are corn, cotton, tobacco, soybeans, and forage crops.

Slope, low natural fertility, soil blowing, surface runoff, and leaching of plant nutrients are the main limitations in the use and management of this soil. Blowing sand often damages young plants. Minimum tillage, crop residue management, and including close-growing grasses and legumes in the crop rotation help to control soil blowing and conserve moisture. Capability unit IIIs–1; woodland group 3s2.

Wakulla Series

The Wakulla series consists of nearly level to gently sloping, somewhat execessively drained soils on uplands.

In a representative profile (fig. 10) the surface layer is dark grayish-brown sand about 7 inches thick. The subsurface layer is light yellowish-brown sand 17 inches thick. The subsoil is strong-brown loamy sand 18 inches thick. The underlying material, to a depth of 83 inches, is yellowish-brown and yellow sand.

Wakulla soils are very low in natural fertility and organic-matter content. Permeability is rapid, the available water capacity is very low, and the shrink-swell potential is low. The seasonal high water table is below a depth of 5 feet.

Most of the acreage is in crops and pasture. The rest is forested.

Representative profile of Wakulla sand, 0 to 6 percent slopes, in a cultivated field 2¼ miles west of St. Pauls, 1½ miles west of Interstate Highway 95 on State Road 1006, and ⅜ mile north of Big Marsh Swamp:

Ap—0 to 7 inches, dark grayish-brown (10YR 4/2) sand; single grained; loose; few medium and fine roots; medium acid; abrupt, wavy boundary.

A2—7 to 24 inches, light yellowish-brown (10YR 6/4) sand; single grained; loose; few fine roots; strongly acid; clear, wavy boundary.

B2t—24 to 42 inches, strong-brown (7.5YR 5/8) loamy sand; weak, fine, granular structure; very friable; few fine roots; grains of sand bridged with clay; strongly acid; gradual, wavy boundary.

C1—42 to 56 inches, yellowish-brown (10YR 5/8) sand;

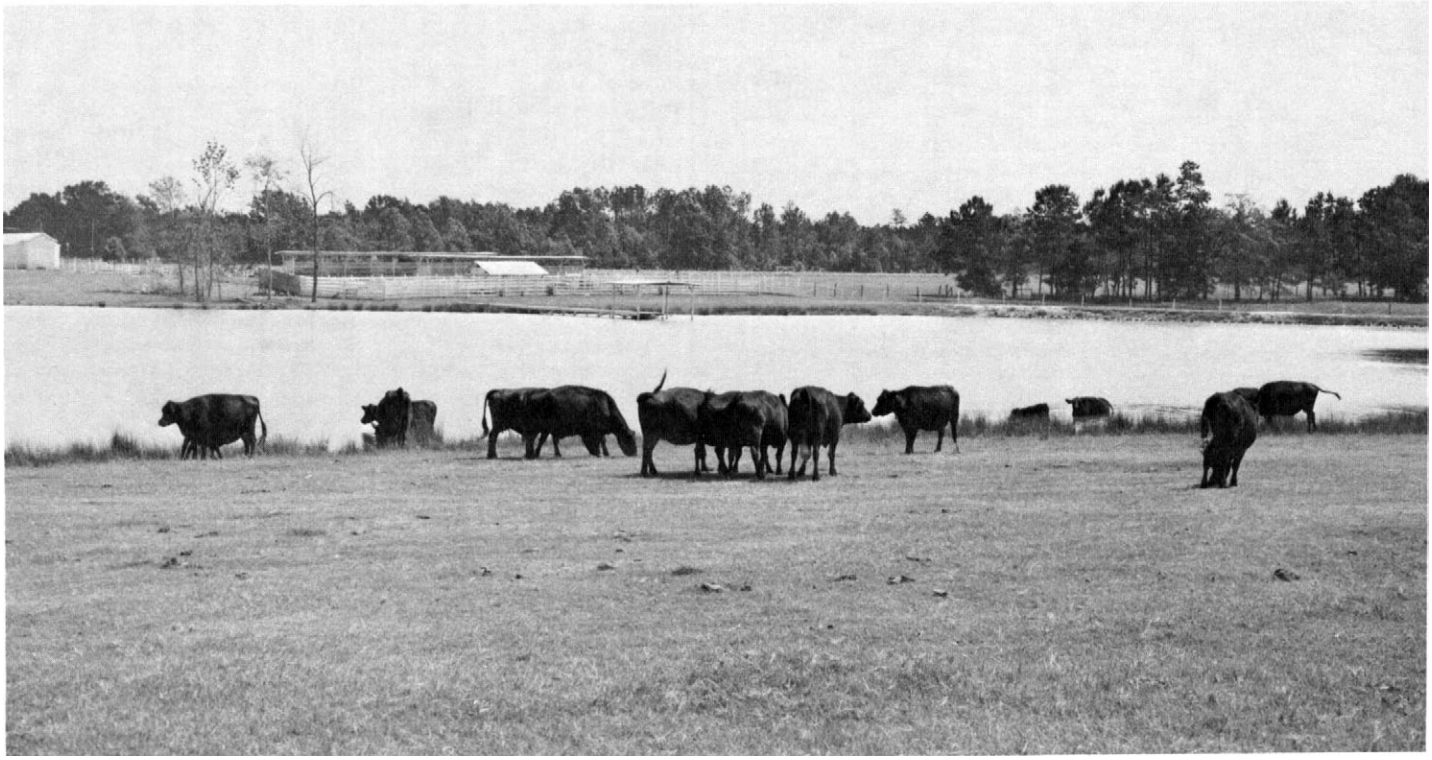


Figure 9.—**Pasture of Coastal bermudagrass on Wagram loamy sand, 0 to 6 percent slopes.**

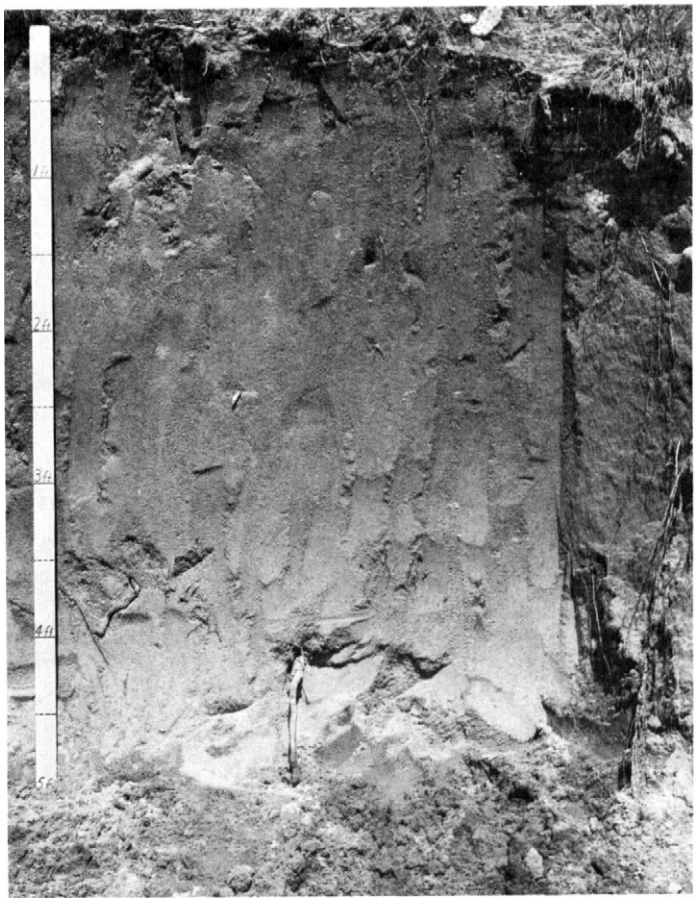


Figure 10.—**Profile of Wakulla sand, 0 to 6 percent slopes.**

single grained; loose; very strongly acid; gradual, wavy boundary.

C2—56 to 83 inches, yellow (10YR 7/6) sand; single grained; loose; very strongly acid.

The solum is 28 to 60 inches thick. The soils are strongly acid or very strongly acid throughout unless they have been limed. The Ap or A1 horizon is dark grayish brown or grayish brown. The A2 horizon is pale-brown, pale-yellow, light yellowish-brown, or yellowish-brown sand or loamy sand. The B2t horizon is yellowish brown, strong brown or yellowish red and contains 10 to 20 percent silt and clay. The C horizon is light-gray, very pale brown, yellow, yellowish-brown, or reddish-yellow sand or coarse sand.

WkB—Wakulla sand, 0 to 6 percent slopes. This somewhat excessively drained soil is on broad ridges generally near drainageways and is on the highest part of the landscape. Most mapped areas cover 5 to more than 400 acres.

Included with this soil in mapping are a few small areas of soils that have a surface layer of loamy sand and small areas of soils that have a subsoil of sandy loam or sandy clay loam 40 to 72 inches below the surface and sandy or loamy underlying layers. Also included are small areas of Pocalla and Lakeland soils and small areas of soils that have slopes of more than 6 percent.

This soil is suited to most locally grown crops, but it is best suited to crops that require less water. The main crops are corn, tobacco, and soybeans.

Very low natural fertility, very low available water capacity, leaching of plant nutrients, droughtiness, and soil blowing are the main limitations in the use and management of this soil. Blowing sand often damages young plants. Minimum tillage, crop residue management, and including close-growing grasses and legumes in the crop rotation help to control soil blowing and conserve moisture. Capability unit IIIs–1; woodland group 3s2.

Use and Management of the Soils

In the first part of this section, general guidelines for managing soils for crops and pasture are given. The capability classification used by the Soil Conservation Service is explained, and the capability units in Robeson County are described. Estimated yields of crops under defined management are listed. Then, use of the soils for woodland, wildlife, recreation facilities, and engineering works is discussed.

Use and Management for Crops and Pasture

Land use is fairly consistent throughout the county. Such soil differences as erodibility, wetness, and droughtiness are the major concerns in management. These concerns determine land use patterns on most farms. The differences in the soils are the basis of the capability classification system.

Most soils that are used for cultivated crops need management to help control erosion, provide drainage, conserve moisture, and maintain tilth and fertility. Practices used on such soils as Norfolk, Goldsboro, Kalmia, and Wagram soils are growing a winter cover crop, stripcropping, building terraces and diversions, keeping tillage to the minimum, and including grasses or legumes with tilled crops in a long-term conservation cropping system. Other practices include using grassed waterways and field borders and applying lime and fertilizer according to the need indicated by soil tests.

Wet soils, such as Coxville and Torhunta soils, need drainage to produce optimum yields of crops. Wet soils are slower to warm in the spring than better drained soils. Tillage is delayed, and farm machinery often bogs down. Drainage can be improved by constructing ditches, smoothing the land, and installing tile.

Capability grouping

Some readers, particularly those who farm on a large scale, may find it practical to use and manage alike some of the different kinds of soil on their farm. These readers can make good use of the capability classification system, a grouping that shows, in a general way, the suitability of soils for most kinds of farming.

The grouping is based on limitations of soils when used for field crops, the risk of damage when they are farmed, and the way the soils respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major

reclamation projects; and does not apply to rice, cranberries, horticultural crops, or other crops that require special management.

Those familiar with the capability classification can infer from it much about the behavior of soils when used for other purposes, but this classification is not a substitute for interpretations designed to show suitability and limitations for forest trees or for engineering.

In the capability system, all kinds of soil are grouped at three levels: the class, the subclass, and the unit. These are discussed in the following paragraphs.

Capability classes are the broadest groups and are designated by Roman numerals I through VIII. In class I are the soils that have few limitations, the widest range of use, and the least risk of damage when they are used. The soils in the other classes have progressively greater natural limitations. In class VIII are soils and landforms so rough, so shallow, or otherwise so limited that they do not produce worthwhile yields of crops, forage, or wood products.

Capability subclasses are soil groups within one class; they are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main 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 drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is too cold or too dry.

In class I there are no subclasses, because the soils of this class have few limitations. Class V can contain, at the most, only the subclasses indicated by *w*, *s*, and *c*, because the soils in class V are subject to little or no erosion, though they have other limitations that restrict their use largely to pasture, woodland, wildlife habitat, or recreation.

Capability units are soil groups within the subclasses. The soils in one capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping for making many statements about management of soils. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe–1 or IIIw–3. Thus, in one symbol, the Roman numeral designates the capability class, or degree of limitation; the small letter indicates the subclass, or kind of limitation, as defined in the foregoing paragraph; and the Arabic numeral specifically identifies the capability unit within each subclass.

Following is a brief description of the capability classes and the subclasses and units in Robeson County. The capability unit of each mapping unit in the county is listed in the "Guide to Mapping Units." More detailed information about managing the soils is given in the section "Descriptions of the Soils."

Class I. Soils that have few limitations that restrict their use.

(No subclasses.)

Unit I–1. Well-drained, nearly level soils that have a surface layer of fine sandy loam, sandy loam, or loamy sand and a subsoil of sandy loam, sandy clay loam, sandy clay, or clay.

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

Subclass IIe. Soils that have a moderate hazard of erosion unless they are protected.

Unit IIe–1. Well-drained, nearly level and gently sloping soils that have a surface layer of very fine sandy loam, fine sandy loam, sandy loam, or loamy sand and a subsoil of loam, sandy loam, sandy clay loam, clay loam, sandy clay, or clay.

Unit IIe–2. Moderately well drained, gently sloping soils that have a surface layer of sandy loam and a subsoil of sandy clay or sandy clay loam.

Subclass IIw. Soils moderately limited because of excess water.

Unit IIw–1. Moderately well drained, nearly level soils that have a surface layer of very fine sandy loam, sandy loam, or loamy sand and a subsoil of sandy clay, sandy clay loam, or clay loam.

Unit IIw–2. Moderately well drained or somewhat poorly drained soils that have a surface layer of sandy loam or very fine sandy loam and a subsoil of fine sandy clay, sandy clay, sandy clay loam, clay loam, loam, or coarse sandy loam.

Subclass IIs. Soils moderately limited because of low available water capacity.

Unit IIs–1. Somewhat excessively drained and well drained, nearly level and gently sloping soils that have a surface layer of loamy sand and a subsoil of sandy loam or sandy clay loam.

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

Subclass IIIe. Soils that have a severe hazard of erosion if they are cultivated and not protected.

Unit IIIe–1. Well-drained, gently sloping soils that have a surface layer of very fine sandy loam and a subsoil of clay loam, sandy loam, or loam.

Subclass IIIw. Soils that have a severe limitation because of excess water.

Unit IIIw–1. Poorly drained, nearly level soils that have a surface layer of sandy loam and underlying material of sandy loam, loamy sand, or sand.

Unite IIIw–2. Poorly drained, nearly level soils that have a surface layer of loam or fine sandy loam and a subsoil of clay, sandy clay, sandy clay loam, clay loam, or loam.

Unit IIIw–3. Poorly drained and very poorly drained, nearly level soils that have a surface layer of loam, sandy loam, or fine sandy loam and a subsoil of sandy loam or sandy clay loam.

Subclass IIIs. Soils that have severe limitations because of low available water capacity.
Unit IIIs–1. Moderately well drained, well drained, and somewhat excessively drained, nearly level to sloping soils that have a surface layer of loamy sand or sand, a subsoil of sandy loam, sandy clay loam, or loamy sand, and underlying material of loamy sand or sand.

Class IV. Soils that have very severe limitations that reduce the choice of plants, require very careful management, or both.
Subclass IVe. Soils subject to very severe erosion if they are cultivated and not protected.
Unit IVe–1. Well-drained, sloping soils that have a surface layer of loamy sand and a subsoil of sandy loam or sandy clay loam.
Subclass IVw. Soils that have very severe limitations because of excess water.
Unit IVw–1. Poorly drained, nearly level soils that have a surface layer of sand or loamy sand and a subsoil of sand or sandy loam.
Unit IVw–2. Poorly drained and very poorly drained, nearly level soils that have a surface layer of loam and a subsoil of clay, sandy clay, sandy clay loam, clay loam, sandy loam, or loam.
Unit IVw–3. Very poorly drained, level and nearly level soils that have a surface layer of mucky loam and organic matter and underlying material of stratified sandy loam, loamy sand, sand, or mucky loam.
Subclass IVs. Soils that have very severe limitations because of low available water capacity.
Unit IVs–1. Excessively drained, nearly level, and gently sloping soils that have a surface layer and underlying material of sand.

Class V. Soils that are subject to little or no erosion but have other limitations, impractical to remove, that limit their use largely to pasture, woodland, or wildlife habitat.
Subclass Vw. Soils that are too wet for cultivation; drainage is generally not feasible.
Unit Vw–1. Poorly drained and very poorly drained, nearly level soils that have a surface layer of sand, loamy sand, sandy loam, or fine sandy loam, either a subsoil of sandy loam, sandy clay loam, sandy clay, or clay or underlying material of sand, sandy loam, or loamy sand.

Class VI. Soils that have severe limitations that make them generally unsuitable for cultivation and that restrict their use largely to pasture, woodland, or wildlife habitat.
Subclass VIw. Soils severely limited by excess water.
Unit VIw–1. Very poorly drained, nearly level soils that have a surface layer of loam and a subsoil of sandy loam.

Class VII. Soils that have very severe limitations that make them unsuitable for cultivation and that restrict their use largely to pasture, woodland, or wildlife habitat.
Subclass VIIw. Soils that have very severe limitations because of excess water.
Unit VIIw–1. Very poorly drained, level or nearly level soils that have a surface layer of organic matter and a subsoil of mucky loam.

Class VIII. Soils and landforms that have limitations that preclude their use for commercial plants and restrict their use to recreation, wildlife habitat, or water supply or to esthetic purposes. (None in Robeson County.)

Predicted yields

Table 2 lists predicted yields of the principal crops grown in the county. The predictions are based on estimates made by farmers, soil scientists, and others who have knowledge of yields in the county and on information taken from research data. The predicted yields are average yields per acre that can be expected by good commercial farmers at the level of management which tends to produce the highest economic returns.

TABLE 2.—*Estimated average acre yields of crops under a high level of management*

[Dashes mean that the crop is not commonly grown on the soil or that there is no data on which to base an estimate]

Soil	Corn	Cotton (lint)	Tobacco (flue cured)	Soybeans	Wheat	Oats	Coastal bermudagrass (hay)	Pasture	
								Fescue and ladino clover	Coastal bermudagrass
	Bu	*Lb*	*Lb*	*Bu*	*Bu*	*Bu*	*Tons*	*AUM* [1]	*AUM* [1]
Aycock very fine sandy loam, 0 to 2 percent slopes	100	700	2,900	40	55	85	5.0	7.5	12.0
Aycock very fine sandy loam, 2 to 6 percent slopes	90	650	2,700	35	50	80	5.0	7.0	12.0
Bibb soils	90	----	----	35	----	----	----	12.0	----
Byars loam	90	----	----	40	----	----	----	12.0	----
Coxville loam	85	----	----	40	45	70	----	12.0	----
Dunbar sandy loam	95	700	2,600	45	55	75	5.8	12.0	14.0
Duplin sandy loam, 0 to 2 percent slopes	110	750	2,800	50	60	80	5.8	----	14.0

TABLE 2.—*Estimated average acre yields of crops under a high level of management*—Continued

Soil	Corn	Cotton (lint)	Tobacco (flue cured)	Soybeans	Wheat	Oats	Coastal bermudagrass (hay)	Pasture	
								Fescue and ladino clover	Coastal bermudagrass
	Bu	*Lb*	*Lb*	*Bu*	*Bu*	*Bu*	*Tons*	*AUM* [1]	*AUM* [1]
Duplin sandy loam, 2 to 6 percent slopes	100	750	2,800	45	60	75	5.6	-------	14.0
Exum very fine sandy loam, 0 to 1 percent slopes	110	750	2,800	50	60	75	5.8	-------	14.0
Faceville fine sandy loam, 0 to 2 percent slopes	100	750	2,900	40	55	75	5.5	-------	12.0
Faceville fine sandy loam, 2 to 6 percent slopes	90	700	2,700	35	50	75	5.5	-------	12.0
Goldsboro loamy sand, 0 to 2 percent slopes	125	700	3,000	45	60	80	6.0	6.5	11.5
Johns sandy loam	100	650	2,700	40	55	75	5.5	6.5	10.5
Johnston soils	80	-------	-------	40	-------	-------	-------	6.0	-------
Kalmia loamy sand, 0 to 2 percent slopes	110	750	2,900	45	60	80	5.5	-------	10.5
Lakeland sand, 0 to 6 percent slopes	-------	-------	1,500	-------	-------	-------	3.0	-------	6.0
Leon sand	-------	-------	-------	-------	-------	-------	3.0	-------	7.0
Lumbee sandy loam	110	-------	-------	45	-------	70	-------	8.6	-------
Lynchburg sandy loam	100	675	2,700	45	55	75	5.5	12.0	11.0
Marlboro sandy loam, 0 to 2 percent slopes	100	900	2,650	45	65	85	6.5	8.0	11.0
Marlboro sandy loam, 2 to 6 percent slopes	90	800	2,500	40	60	75	6.0	8.0	11.0
McColl loam	85	-------	-------	40	-------	70	-------	7.0	-------
Meggett fine sandy loam	-------	-------	-------	-------	-------	-------	-------	11.0	-------
Nahunta very fine sandy loam	110	675	2,800	45	55	75	5.0	7.5	9.5
Norfolk loamy sand, 0 to 2 percent slopes	110	700	3,000	40	60	80	6.0	8.0	10.5
Norfolk loamy sand, 2 to 6 percent slopes	100	650	2,900	35	55	70	5.9	7.5	10.0
Norfolk and Faceville soils, 6 to 10 percent slopes	90	600	2,500	30	50	65	5.5	7.0	9.5
Pactolus loamy sand	60	400	1,700	25	-------	-------	3.5	-------	7.0
Pantego fine sandy loam	110	-------	-------	50	-------	75	-------	9.0	-------
Plummer and Osier soils	60	-------	-------	25	-------	-------	-------	-------	-------
Pocalla loamy sand, 0 to 3 percent slopes	75	600	2,200	30	40	60	5.0	-------	8.5
Ponzer muck, siliceous subsoil variant	-------	-------	-------	-------	-------	-------	-------	-------	-------
Portsmouth loam	100	-------	-------	45	-------	70	-------	8.5	-------
Rains sandy loam	90	-------	-------	40	-------	70	-------	8.0	-------
Rutlege loamy sand	60	-------	-------	25	-------	-------	-------	5.0	-------
Toisnot loam	-------	-------	-------	-------	-------	-------	-------	-------	-------
Torhunta loam	90	-------	-------	35	-------	65	-------	8.0	-------
Trebloc loam	100	-------	-------	45	-------	75	-------	8.0	-------
Udorthents, loamy	-------	-------	-------	-------	-------	-------	-------	-------	-------
Wagram loamy sand, 0 to 6 percent slopes	80	650	2,400	30	40	60	5.0	-------	8.5
Wagram loamy sand, 6 to 10 percent slopes	70	550	2,100	20	30	50	4.5	-------	7.5
Wakulla sand, 0 to 6 percent slopes	45	-------	1,700	20	-------	-------	3.5	-------	6.0

[1] AUM is animal-unit-month, a term used to express the carrying capacity of pasture. It is the number of months during the grazing season that 1 acre will provide grazing for 1 animal unit (one cow, horse, or mule, five hogs, or seven sheep) without damage to the pasture.

Crops other than those shown in table 2 are grown in the county, but their predicted yields are not included because their acreage is small or reliable data on yields are not available.

The predicted yields given in table 2 can be expected if the following management practices are used:

1. Rainfall is effectively used and conserved.
2. Surface or subsurface drainage systems, or both, are installed.
3. Crop residue is managed to maintain soil tilth.
4. Tillage is kept to the minimum and is timely.
5. Insect, disease, and weed control measures are used consistently.
6. Fertilizer is applied according to soil tests and crop needs.
7. Suitable crop varieties are used at recommended seeding rates.

If supplemental irrigation is needed, the following additional practices are used:

8. Suitable quality of irrigation water is used.

9. Applications of water are timed to meet the need of the soil and the crop.
10. Irrigation systems are properly designed and efficiently used.

Use of the Soils for Woodland [3]

All of Robeson county originally was covered by forests. A wide variety of needleleaf and broadleaf trees grew in these forests. Loblolly pine, longleaf pine, some shortleaf pine, white oak, black oak, post oak, southern red oak, hickory, yellow-poplar, sweetgum, blackgum, persimmon, dogwood, and sourwood grew on the well-drained soils, such as Faceville and Norfolk soils, on the interstream uplands. Scattered loblolly pine, longleaf pine, and pond pine grew with sweetgum, blackgum, white oak, water oak, willow oak, yellow-poplar, and red maple on the wetter soils, such as Rains and Dunbar soils, on uplands. Pond pine, pond cypress, swamp tupelo, red maple, sweetbay, and red bay competed with abundant heathlike, evergreen shrubs on the very wet soils, such as Pantego soils, in the Carolina bays and on the flat areas and depressions on uplands.

The principal kinds of trees that grew on the deep sands and loamy sands, such as Lakeland and Wakulla soils, mainly in the western section of Robeson County, were longleaf pine and an understory of blackjack oak, bluejack oak, and turkey oak.

Yellow-poplar, sweetgum, sycamore, water oak, white oak, willow oak, swamp chestnut oak, cottonwood, American elm, ash, and river birch grew on the wet soils, such as Lumbee and Portsmouth soils, along the Lumber River and other major streams. Baldcypress, swamp tupelo, water tupelo, Carolina (water) ash, overcup oak, and red maple were the principal trees on the very wet soils, such as Johnston and Bibb soils, on the flood plain and in the swamps.

In 1966, commercial forests occupied 318,100 acres (*6*), or about 52.7 percent of the county. These forests are one of the county's most important natural resources. About 99.7 percent of the land in commercial forests is privately owned, mostly by farmers. Most of this land is in tracts of less than 100 acres.

The soils in Robeson County have been classified in woodland suitability groups. A woodland suitability group consists of soils that have comparable productivity and comparable problems, produce similar wood crops, and require similar management or conservation practices.

In table 3 each woodland suitability group in Robeson County is briefly described and is shown for each mapping unit in the county in the "Guide to Mapping Units."

In the table, a group symbol consisting of three elements is used to designate each woodland suitability group. The first element in the symbol is an Arabic numeral that denotes the relative potential productivity of the soils in the group. It expresses site quality based on the site index of one or more commercially important forest trees. The numeral 1 indicates very high potential productivity, 2 indicates high, 3 indicates moderately high, 4 indicates moderate, and 5 indicates low.

The second element in the symbol is a lowercase letter that denotes the soil property that is the primary cause of hazards, limitations, or restrictions of the soils for woodland use or management. The letter *w* indicates excessive wetness. Soils with this designation are those in which excessive water, either seasonal or yearlong, causes significant limitations for woodland use. Such soils have restricted drainage, a seasonal high water table, or overflow hazard which adversely affects either the development or the management of the stand. The letter *s* indicates that management limitations are due primarily to the quantity of sandy material in the soil profile. Such soils have little or no textural B horizon, have a low available water capacity, and generally are low in available plant nutrients. Also, the high sand content can impose restrictions on the use of equipment. The letter *o* indicates that there are no significant soil-related problems. Some soils may have more than one limiting property. In such cases, the letter was assigned in the order that characteristics are listed above.

The third element in the symbol is an Arabic numeral that denotes the degree of hazards or limitations and the general suitability of the soils for certain kinds of trees. The numeral 1 means that the soils have no significant management problems and that they are best suited to needleleaf trees. The numeral 2 means that the soils have slight to moderate limitations and are best suited to needleleaf trees. The numeral 3 means that the soils have moderate to severe limitations and are best suited to needleleaf trees. The numeral 7 means that the soils have no significant management problems and are suited to either needleleaf or broadleaf trees. The numeral 8 means that the soils have slight to moderate limitations and are suited to needleleaf or broadleaf trees. The numeral 9 means that the soils have moderate to severe management problems and are suited to needleleaf or broadleaf trees.

The woodland suitability groups in Robeson County have been rated in table 3 on the basis of their suitability for producing tree crops. The ratings are based on measurements by foresters and soil scientists, pertinent research, and the experience of foresters and forest managers. The table gives information about potential productivity, major management concerns, and preferred tree species for planting and management.

Potential productivity is expressed as site class for a given tree species. Site class is the numerical designation of the relative productivity of the soils for the species shown in the table. It is based on site index, which is the average of the total heights, measured in feet, of the dominant and codominant trees in an even-aged stand at age 50, except for cottonwood, which was determined at age 30, and sycamore, which was determined at age 35. Site index is rounded to the nearest 10-foot interval to determine site class. For some trees, especially broadleaf species, site index is based on the comparative site class of other trees on the same soil. By using published research data, site

[3] By JOHN E. WIGGINS, JR., forester, Soil Conservation Service.

TABLE 3.—*Woodland management*

Woodland suitability group and map symbols	Potential productivity		Management problems			Preferred trees for planting and management	
	Trees	Site class [1]	Erosion hazard	Equipment restrictions	Seedling mortality	Broadleaf	Needleleaf
Group 1w9: Very poorly drained and poorly drained, nearly level soils that have a loamy and sandy subsoil; on uplands, stream terraces, and flood plains; subject to frequent or very frequent flooding or ponding; very high potential productivity; suited to broadleaf and needleleaf trees.[2] JT, Me, Pg, Pt	Loblolly pine Slash pine Sweetgum Yellow-poplar Water oak Willow oak Cottonwood	100 100 100 100 90–100 100 100	Slight	Severe [3]	Severe [3]	Sweetgum, yellow-poplar, green ash, Shumard oak, cherrybark oak, willow oak, water oak, sycamore, swamp tupelo, water tupelo.	Loblolly pine, slash pine, pond pine, longleaf pine, baldcypress.
Group 2o1: Well-drained, nearly level and gently sloping soils that have a loamy subsoil; on uplands; high potential productivity; best suited to needleleaf trees. AyA, AyB, NoA, NoB	Loblolly pine Slash pine Longleaf pine Southern red oak	90 90 70 80	Slight	Slight	Slight	None recommended.	Loblolly pine, slash pine, longleaf pine.
Group 2o7: Well-drained, nearly level soil that has a loamy subsoil; on stream terraces; subject to rare flooding; high potential productivity; suited to needleleaf and broadleaf trees. KaA	Loblolly pine Slash pine Sweetgum Yellow-poplar	90 90 80–90 100	Slight	Slight	Slight	Yellow-poplar, black walnut, cherrybark oak, Shumard oak, white ash.	Loblolly pine, slash pine, longleaf pine.
Group 2w2: Moderately well drained or somewhat poorly drained, nearly level soil that has a loamy subsoil; on stream terraces; subject to rare flooding; high potential productivity; best suited to needleleaf trees. Jo	Loblolly pine Slash pine Longleaf pine	90 90 70	Slight	Moderate	Moderate	None recommended.	Loblolly pine, slash pine.
Group 2w3: Poorly drained and very poorly drained, nearly level soils that have a loamy and sandy subsoil; on uplands and stream terraces; subject to frequent flooding and ponding; high potential productivity; best suited to needleleaf trees. Pm, Ra, Ru	Loblolly pine Slash pine Pond pine Sweetgum	90 90 70 90	Slight	Severe [3]	Severe [3]	None recommended.	Loblolly pine, slash pine.
Group 2w8: Moderately well drained and somewhat poorly drained, nearly level and gently sloping soils that have a loamy and clayey subsoil; on uplands; high potential productivity; suited to needleleaf and broadleaf trees. Dn, DpA, DpB, ExA, GoA, Ly, Na	Loblolly pine Slash pine Longleaf pine Sweetgum Yellow-poplar Water oak	90 90 70 90 100 90	Slight	Moderate	Slight to Moderate.	Sweetgum, yellow-poplar, green ash, water oak, willow oak, white oak, swamp oak, chestnut oak, cherrybark oak, Shumard oak, sycamore.	Loblolly pine, slash pine, longleaf pine.

See footnotes at end of table.

TABLE 3.—*Woodland management*—Continued

Woodland suitability group and map symbols	Potential productivity		Management problems			Preferred trees for planting and management	
	Trees	Site class [1]	Erosion hazard	Equipment restrictions	Seedling mortality	Broadleaf	Needleleaf
Group 2w9: Poorly drained and very poorly drained, nearly level soils that have a loamy, sandy, or clayey subsoil; on uplands, flood plains, and stream terraces; subject to ponding and frequent or very frequent flooding; high potential productivity; suited to broadleaf and needleleaf trees [2]. BB, By, Co, Lu, Mc, To	Loblolly pine Slash pine Longleaf pine Sweetgum	90 90 70 90	Slight	Severe [3]	Severe [3]	Sweetgum, yellow-poplar, cottonwood, willow oak, water oak, Shumard oak, swamp oak, chestnut oak, cherrybark oak, green ash, sycamore, water tupelo, swamp tupelo.	Loblolly pine, slash pine, longleaf pine, baldcypress.
Group 3o1: Well-drained, nearly level and gently sloping soils that have a clayey and loamy subsoil; on uplands; moderately high potential productivity; best suited to needleleaf trees. FaA, FaB, MaA, MaB	Loblolly pine Slash pine Longleaf pine	80 80 60–70	Slight	Slight	Slight	None recommended.	Loblolly pine, slash pine, longleaf pine.
Group 3s2: Somewhat excessively drained and well-drained, nearly level to sloping soils that have a sandy and loamy subsoil; on uplands; moderately high potential productivity; best suited to needleleaf trees. PoB, WaB, WaC, WkB	Loblolly pine Slash pine Longleaf pine	80 80 60–70	Slight	Moderate	Moderate	None recommended.	Slash pine, loblolly pine, longleaf pine.
Group 3w2: Moderately well drained, nearly level soil that has a sandy subsoil; on uplands and stream terraces; moderately high potential productivity; best suited to needleleaf trees. Pa	Loblolly pine Slash pine Longleaf pine	80 80 70	Slight	Moderate	Moderate	None recommended.	Loblolly pine, slash pine, longleaf pine.
Group 3w9: Poorly drained, nearly level soil that has a loamy subsoil and a hard fragipan above the subsoil; on stream terraces and uplands; subject to ponding; moderately high potential productivity; suited to broadleaf and needleleaf trees [3]. Ta	Loblolly pine Slash pine Longleaf pine Sweetgum Water oak	80 80 70 80 80	Slight	Severe [3]	Severe [3]	Sweetgum, yellow-poplar, green ash, Shumard oak, water oak, swamp tupelo.	Loblolly pine, slash pine, pond pine.
Group 4s2: Excessively drained, nearly level or gently sloping soil that has sandy layers more than 80 inches thick; on uplands and stream terraces; moderate potential productivity; best suited to needleleaf trees. LaB	Slash pine Longleaf pine Loblolly pine	70 60 70	Slight	Moderate	Moderate	None recommended.	Slash pine, loblolly pine.

See footnotes at end of table.

TABLE 3.—*Woodland management*—Continued

Woodland suitability group and map symbols	Potential productivity		Management problems			Preferred trees for planting and management	
	Trees	Site class[1]	Erosion hazard	Equipment restrictions	Seedling mortality	Broadleaf	Needleleaf
Group 4w2: Poorly drained, nearly level soil that has a sandy subsoil; on uplands and stream terraces; moderate potential productivity; best suited to needleleaf trees. Le	Slash pine Loblolly pine Longleaf pine	70 70 60	Slight	Moderate	Moderate	None recommended.	Slash pine, longleaf pine, loblolly pine.
Group 4w3: Very poorly drained, level soil that has loamy underlying material; on uplands; subject to ponding; moderate potential productivity; best suited to needleleaf trees.[2] Pr	Pond pine	50–60	Slight	Severe	Severe	Yellow-poplar, swamp tupelo, sweetgum.	Slash pine, loblolly pine, pond pine, baldcypress, Atlantic white-cedar.

[1] Site class is the numerical designation of the relative potential productivity of the soils for the trees shown in the table. It is based on site index which is the average of the total heights, measured in feet, of the dominant and codominant trees in an even aged stand at age 30 for cottonwood, at age 35 for sycamore, and at age 50 for all other species or types. Site index was rounded to the nearest 10-foot interval to determine site class. For some trees, especially broadleaf trees, site class is based on the comparative site class of other trees on the same soil.

[2] Potential productivity can be attained only where the soils have adequate surface drainage. Tree planting is generally not feasible where the soils are ponded.

[3] The limitation is moderate in areas that have adequate surface drainage.

class can be converted to expected yields (*3*, *4*).

Management problems to be considered are erosion hazard, equipment restrictions, and seedling mortality. Windthrow is not generally considered a hazard on soils in Robeson County except when winds are abnormally high, as during a hurricane.

Potential erosion is rated to indicate the hazard of erosion as a result of woodland management. Generally, the rating is slight where slopes are 0 to 6 percent, moderate where 6 to 10 percent, and severe where steeper than 10 percent. These general guidelines are modified where erodibility is a result of soil characteristics.

Equipment restrictions are rated according to physical characteristics of the soils and topographic features that restrict or prohibit the use of equipment in building access roads, harvesting forest products, controlling undesirable vegetation, controlling fire, or other forest management. Excessive wetness and the coarse sandy surface texture of some soils are the chief factors that restrict equipment use in Robeson County.

Each woodland group is rated as slight, moderate, or severe. The rating is *slight* if conventional equipment can be used during any time of the year, except during short periods of heavy rainfall. The soils are moderately well drained to excessively drained, are not subject to overflow or ponding, and have slopes of less than 15 percent. The rating is *moderate* if conventional equipment can be used from March to December, but the soils are occasionally flooded. The water level is generally below the surface and is seldom above the surface for extended periods, and slopes are less than 25 percent. The rating is *severe* if conventional equipment can be used only in the driest months or between floods or if slopes are steeper than 25 percent.

Seedling mortality refers to the expected degree of loss of naturally occurring or planted tree seedlings as a result of unfavorable soil characteristics or topographic features. In evaluating mortality, it is assumed that competition from other plants is not a limiting factor and that environmental factors are normal. For planted seedlings, it is assumed that healthy seedlings of the proper grade have been properly planted. An adequate seed source is assumed for both planted and natural reseeding.

Each mapping unit is rated as slight, moderate, or severe. The rating is *slight* if average mortality does not exceed 25 percent, *moderate* if average mortality is 25 to 50 percent, and *severe* if average mortality exceeds 50 percent.

Preferred trees for planting and management are the principal commercial tree species which are favored in existing stands and the tree species that are suitable for planting. Preferred trees were selected on the basis of their growth rates and the quality, value, and general marketability of the products obtained from each species.

Wildlife[4]

Wildlife species are associated with given types of plant communities which, in turn, are directly related to particular kinds of soil. Proper manipulation of soil, water, and plants to produce suitable habitat is the most effective way to maintain and improve wildlife populations.

The soils of Robeson County produce a wide variety of plants which provide food, cover, and protection for

[4] By JOHN P. EDWARDS, biologist, Soil Conservation Service.

many species of wildlife. Upland game animals such as squirrel, rabbits, quail, deer, mourning dove, fox, and songbirds, are abundant in the county. Furbearers, such as raccoon, muskrat, mink, and opposum, are also abundant. Several species of waterfowl, such as mallards, black ducks, and wood ducks, live along the Lumber River and its tributaries.

In table 4 the suitability of soils mapped in the county is shown for seven elements of wildlife habitat and three kinds of wildlife. In determining suitability of a soil for wildlife, the seven habitat elements are considered first. Then, combinations of habitat elements are used in determining suitability of the soils for the three kinds of wildlife. Such soil properties as thickness of the surface layer and subsoil, flood hazard, drainage, available water capacity, and slope are considered. Suitability is expressed in table 4 as *good*, *fair*, *poor*, or *very poor*. These terms are defined as follows:

Good suitability means that habitats are easily im-

TABLE 4.—*Suitability of the soils for elements*

[See text for explanation

Soil series and map symbols	Elements of wildlife habitat [1]			
	Grain and seeds crops	Domestic grasses and legumes	Wild herbaceous plants	Hardwood trees
Aycock: AyA, AyB	Good	Good	Good	Good
Bibb: BB [2]	Very poor	Poor	Poor	Poor
Byars: By	Very poor	Poor	Poor	Poor
Coxville: Co	Poor	Fair	Fair	Fair
Dunbar: Dn	Fair	Good	Good	Good
Duplin:				
DpA	Good	Good	Good	Good
DpB	Good	Good	Good	Good
Exum: ExA	Good	Good	Good	Good
Faceville: FaA, FaB	Good	Good	Good	Good
Goldsboro: GoA	Good	Good	Good	Good
Johns: Jo	Fair	Good	Good	Good
Johnston: JT [2]	Very poor	Poor	Poor	Poor
Kalmia: KaA	Fair	Good	Good	Good
Lakeland: LaB	Very poor	Poor	Poor	Very poor
Leon: Le	Poor	Poor	Fair	Poor
Lumbee: Lu	Poor	Fair	Fair	Fair
Lynchburg: Ly	Poor	Fair	Fair	Good
Marlboro: MaA, MaB	Good	Good	Good	Good
McColl: Mc	Poor	Fair	Fair	Fair
Meggett: Me	Poor	Fair	Fair	Fair
Nahunta: Na	Fair	Good	Good	Good
Norfolk:				
NoA, NoB	Good	Good	Good	Good
NsC	Fair	Good	Good	Good
For the Faceville part of NsC, see the Faceville series.				
Osier	Poor	Poor	Fair	Poor
Mapped only with Plummer soils.				
Pactolus: Pa	Good	Good	Good	Good
Pantego: Pg	Very poor	Poor	Poor	Poor
Plummer: Pm	Poor	Poor	Fair	Poor
For the Osier part of Pm, see the Osier series.				
Pocalla: PoB	Poor	Poor	Fair	Fair
Ponzer: Pr	Very poor	Poor	Poor	Poor
Portsmouth: Pt	Very poor	Poor	Poor	Poor
Rains: Ra	Poor	Fair	Fair	Fair
Rutlege: Ru [2]	Very poor	Poor	Poor	Poor
Toisnot: Ta	Poor	Fair	Fair	Fair
Torhunta: To [2]	Very poor	Poor	Poor	Poor
Trebloc: Tr	Poor	Fair	Fair	Fair
Udorthents, loamy: Ud. Too variable to be rated.				
Wagram:				
WaB	Good	Good	Good	Good
WaC	Fair		Good	Good
Wakulla: WkB	Poor		Fair	Poor

[1] All soils are rated for natural conditions.

proved, maintained, or created; there are few or no soil limitations in habitat management; and satisfactory results can be expected. *Fair* means that habitats can be improved, maintained, or created, but moderate soil limitations affect habitat management or development. A moderate intensity of management and fairly frequent attention may be required to insure satisfactory results. *Poor* means that habitats can be improved, maintained, or created, but the limitations are severe. Habitat management may be difficult and expensive and require intensive effort, and results are questionable. *Very poor* means that it is impractical to improve, maintain, or create habitats. Unsatisfactory results are probable.

The suitabilities given in table 4 can be used as guidelines, but onsite investigation is needed for planning the management of a specific site. The column headings are discussed briefly in the following paragraphs.

of wildlife habitat and kinds of wildlife

of ratings]

Elements of wildlife habitat [1]—Continued			Openland wildlife	Woodland wildlife	Wetland wildlife
Coniferous plants	Wetland plants	Shallow water areas			
Good	Poor	Very poor	Good	Good	Very poor.
Poor	Good	Good	Poor	Poor	Good.
Poor	Good	Good	Poor	Poor	Good.
Fair	Good	Fair	Fair	Fair	Fair.
Good	Fair	Fair	Good	Good	Fair.
Good	Poor	Poor	Good	Good	Poor.
Good	Poor	Very poor	Good	Good	Very poor.
Good	Poor	Poor	Good	Good	Poor.
Good	Poor	Very poor	Good	Good	Very poor.
Good	Poor	Poor	Good	Good	Poor.
Good	Poor	Very poor	Good	Good	Very poor.
Poor	Good	Good	Poor	Poor	Good.
Good	Poor	Very poor	Good	Good	Very poor.
Very poor	Very poor	Very poor	Poor	Very poor	Very poor.
Poor	Poor	Very poor	Poor	Poor	Very poor.
Fair	Good	Fair	Fair	Fair	Fair.
Good	Fair	Fair	Fair	Good	Fair.
Good	Poor	Very poor	Good	Good	Very poor.
Fair	Good	Good	Fair	Fair	Good.
Fair	Good	Fair	Fair	Fair	Fair.
Good	Fair	Fair	Good	Good	Fair.
Good	Poor	Very poor	Good	Good	Very poor.
Good	Very poor	Very poor	Good	Good	Very poor.
Poor	Poor	Very poor	Poor	Poor	Very poor.
Good	Poor	Very poor	Good	Good	Very poor.
Poor	Good	Fair	Poor	Poor	Fair.
Poor	Poor	Very poor	Poor	Poor	Very poor.
Fair	Very poor	Very poor	Poor	Fair	Very poor.
Poor	Good	Good	Poor	Poor	Good.
Poor	Good	Fair	Poor	Poor	Fair.
Fair	Good	Fair	Fair	Fair	Fair.
Poor	Good	Good	Poor	Poor	Good.
Fair	Good	Good	Fair	Fair	Good.
Poor	Good	Good	Poor	Poor	Good.
Fair	Good	Good	Fair	Fair	Good.
Good	Poor	Very poor	Good	Good	Very poor.
Good	Very poor	Very poor	Good	Good	Very poor.
Poor	Very poor	Very poor	Poor	Poor	Very poor.

[1] Ratings have been adjusted upward for wetland plants and shallow water developments because of the high water table.

Grain and seed crops are domestic grains or other seed-producing annuals planted to produce wildlife food. Examples are corn, sorghum, wheat, oats, barley, millet, buckwheat, cowpeas, soybeans, and sunflowers.

Domestic grasses and legumes are domestic perennial grasses and herbaceous legumes that are planted for both food and cover. Examples are fescue, lovegrass, switchgrass, clover, trefoil, and crown vetch.

Wild herbaceous plants are native or naturally established herbaceous grasses and forbs, including weeds, that provide food and cover. Examples are goldenrod, beggarweed, partridgepea, pokeweed, and fescue.

Hardwood trees are nonconiferous trees and associated woody understory plants that provide food and cover for wildlife. Examples are oaks, hickory, autumnolive, dogwoods, and poplar.

Coniferous plants are cone-bearing trees and shrubs that furnish wildlife cover or supply food in the form of seed or fruitlike cones. Examples are pine and cedar.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist to wet sites but exclude submerged or floating aquatics. These plants produce food and cover principally for wetland forms of wildlife. Examples are smartweed, wild millet, rushes, sedges, reeds, wild rice, cutgrass, cordgrass, and cattail.

Shallow-water areas generally are less than 5 feet deep. They may be natural wet areas or those created by dams or levees or by water control devices in marshes or streams. Examples are muskrat marshes, beaver ponds, waterfowl feeding areas, and wildlife ponds.

Openland wildlife are birds and mammals that live in cultivated fields, pastures, lawns, and idle areas overgrown with grasses, herbs, shrubs, and vines. Mourning dove, quail, red fox, cottontail rabbit, and many kinds of songbirds are typical examples of openland wildlife.

Woodland wildlife are birds and mammals that live in areas of hardwoods, coniferous trees, and shrubs. Examples are deer, squirrel, woodpeckers, and gray fox.

Wetland wildlife are birds and mammals that are found primarily in swamps, marshes, or ponds. Examples are muskrat, mink, raccoon, redwing blackbird, and various kinds of ducks.

Use of the Soils for Recreation Development

The amount of land used for recreation is rapidly increasing in Robeson County. Among the larger recreation areas are the Lumbee Recreational Center at Pembroke, Pine Crest County Club at Lumberton, Fairmont Golf Course, Lumber Bridge Golf Course, the Carolina Power and Light Plant lake, and Buies Pond at Philadelphia. Hunting and fishing are extensive in most of the county.

Most of the soils of Robeson County have a potential for one or more kinds of recreation development. Soils on flood plains are well suited to some kinds of recreation because they generally occur as long, winding areas along streams and adjacent to scenic uplands. An onsite assessment of the height, duration, and frequency of flooding should be made in these areas before recreation facilities are developed.

Knowledge of soils is necessary in planning, developing, and maintaining areas used for recreation. In table 5, the soils of Robeson County are rated according to limitations that affect their suitability for camp areas, picnic areas, playgrounds, and paths and trails. The ratings are determined by the kind and degree of restrictive soil features, such as the hazard of flooding, texture, and wetness. Suitability of soils for growing and maintaining vegetation is not a part of these ratings. It is, however, an important item to consider in evaluating a site. Esthetic value, water supply, sewage disposal, and the size and shape of soil areas are not considered in the ratings. Ratings

TABLE 5.—*Recreation development*

["Percs slowly" and some of the other terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe"]

Soil series	Camp areas	Picnic areas	Playgrounds	Paths and trails
Aycock:				
AyA	Slight	Slight	Slight	Slight.
AyB	Slight	Slight	Moderate: slope	Slight.
Bibb: BB	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.
Byars: By	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.
Coxville: Co	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.
Dunbar: Dn	Moderate: wetness; percs slowly.	Moderate: wetness	Moderate: wetness; percs slowly.	Moderate: wetness.
Duplin:				
DpA	Moderate: percs slowly.	Slight	Moderate: wetness; percs slowly.	Slight.
DpB	Moderate: percs slowly.	Slight	Moderate: wetness; percs slowly.	Slight.
Exum: ExA	Slight	Slight	Slight	Slight.

TABLE 5.—*Recreation development*—Continued

Soil series	Camp areas	Picnic areas	Playgrounds	Paths and trails
Faceville:				
FaA	Slight	Slight	Slight	Slight.
FaB	Slight	Slight	Moderate: slope	Slight.
Goldsboro: GoA	Slight	Slight	Slight	Slight.
Johns: Jo	Moderate: wetness	Moderate: wetness	Moderate: wetness	Moderate: wetness; too sandy.
Johnston: JT	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.
Kalmia: KaA	Slight	Moderate: too sandy	Moderate: too sandy	Moderate: too sandy.
Lakeland: LaB	Severe: too sandy	Severe: too sandy	Severe: too sandy	Severe: too sandy.
Leon: Le	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness.
Lumbee: Lu	Severe: wetness; floods.	Severe: wetness	Severe: wetness	Severe: wetness.
Lynchburg: Ly	Severe: wetness	Moderate: wetness	Severe: wetness	Moderate: wetness.
Marlboro:				
MaA	Slight	Slight	Slight	Slight.
MaB	Slight	Slight	Moderate: slope	Slight.
McColl: Mc	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.
Meggett: Me	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.
Nahunta: Na	Moderate: wetness	Moderate: wetness	Moderate: wetness	Moderate: wetness.
Norfolk:				
NoA	Slight	Slight	Slight	Slight.
NoB	Slight	Slight	Moderate: slope	Slight.
NsC:				
Norfolk part	Moderate: slope	Moderate: slope	Severe: slope	Slight.
Faceville part	Moderate: slope	Moderate: slope	Severe: slope	Slight.
Pactolus: Pa	Moderate: wetness; too sandy.	Moderate: wetness; too sandy.	Moderate: wetness; too sandy.	Moderate: too sandy.
Pantego: Pg	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness.
Plummer:				
Pm:				
Plummer part	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.
Osier part	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.
Pocalla: PoB	Moderate: too sandy	Moderate: too sandy	Severe: too sandy	Severe: too sandy.
Ponzer: Pr	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods	Severe: wetness; floods.
Portsmouth: Pt	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.
Rains: Ra	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness.
Rutlege: Ru	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.
Toisnot: Ta	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.
Torhunta: To	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.
Trebloc: Tr	Severe: wetness; floods.	Severe: wetness	Severe: wetness; floods.	Severe: wetness.
Udorthents, loamy: Ud. Too variable to be rated.				
Wagram:				
WaB	Moderate: too sandy	Moderate: too sandy	Severe: slope	Moderate: too sandy.
WaC	Moderate: slope; too sandy.	Moderate: slope; too sandy.	Severe: slope	Moderate: too sandy.
Wakulla: WkB	Severe: too sandy	Severe: too sandy	Severe: too sandy	Severe: too sandy.

for soils subject to flooding vary depending on the duration of the flooding, as well as the season.

Several tables in the section "Engineering Uses of the Soils" contain additional information useful in planning and developing recreation facilities. Especially helpful are interpretations for septic tank absorption fields in table 10 and for dwellings without basements and local roads and streets in table 11.

In table 5, the soil limitations are expressed as *slight*, *moderate*, or *severe* for the specified use. Slight means that soil properties are generally favorable and that the limitations are so minor that they can easily be overcome. A moderate limitation can be overcome or modified by special design or maintenance. A severe limitation means that costly soil reclamation, special design, intense maintenance, or a combination of these is required.

Camp areas are used intensively as sites for tents

and small camp trailers and for the accompanying activities of outdoor living. Little preparation of the site is required, other than shaping and leveling for tent and parking areas. Camp areas are subject to heavy foot traffic and limited vehicular traffic. The best soils are gently sloping, are not subject to flooding, have a surface that is firm after rains and not dusty when dry, and do not perc slowly (water does not percolate through the soil slowly).

Picnic areas are attractive natural or landscaped tracts that are subject to heavy foot traffic. Most of the vehicular traffic, however, is confined to access roads. The best soils are firm when wet and not dusty when dry, are not subject to flooding during the period of use, and do not have slopes and stones that greatly increase the cost of leveling sites or of building access roads.

Playgrounds are areas used intensively for baseball, football, badminton, and similar organized games. Soils suitable for this use should be able to withstand intensive foot traffic. The best soils are nearly level and have a surface free of coarse fragments and rock outcrops, are well drained, are not subject to flooding during periods of heavy use, are firm after rains, and are not dusty when dry. If grading and leveling are required, the depth to rock is an important consideration.

Paths and trails are used for local and cross-country travel on foot or horseback. The design and layout should require little or no cutting and filling. The best soils are at least moderately well drained, are firm when wet, are not dusty when dry, are not subject to flooding more than once during the period of use, have slopes of less than 15 percent, and have few or no rocks or stones on the surface.

Engineering Uses of the Soils [5]

This section is useful to those who need information about soils used as structural material or as foundation upon which structures are built. Among those who can benefit from this section are planning commissions, town and city managers, land developers, engineers, contractors, and farmers.

Among properties of soils highly important in engineering are permeability, strength, compaction characteristics, soil drainage condition, shrink-swell potential, grain size, plasticity, and reaction. Also important are depth to the water table, depth to bedrock, and slope. These properties, in various degrees and combinations, affect construction and maintenance of roads, airports, pipelines, foundations for small buildings, irrigation systems, ponds and small dams, and systems for disposal of sewage and refuse.

Information in this section of the soil survey can be helpful to those who—

1. Select potential residential, industrial, commercial, and recreation areas.
2. Evaluate alternative routes for roads, highways, pipelines, and underground cables.
3. Seek sources of gravel or sand.
4. Plan farm drainage systems, irrigation systems, ponds, terraces, and other structures for controlling water and conserving soil.
5. Correlate performance of structures already built with properties of the kinds of soil on which they are built for the purpose of predicting performance of structures on the same or similar kinds of soil in other locations.
6. Predict the trafficability of soils for cross-country movement of vehicles and construction equipment.
7. Develop preliminary estimates pertinent to construction in a particular area.

Most of the information in this section is presented in tables, which are table 6, engineering test data; table 7, engineering properties and classifications; table 8, estimated physical and chemical properties; table 9, soil and water features; table 10, sanitary facilities; table 11, construction sites; table 12; construction material; and table 13, water management.

This information, along with the soil map and other parts of this publication, can be used to make interpretations in addition to those given in tables 10 through 13. It can also be used to make other useful maps.

The information in this section does not eliminate the need for further investigation at sites selected for engineering works, especially works that involve heavy loads or that require excavations to depths greater than those shown in the tables, generally depths greater than 72 inches. Also, inspection of sites, especially the small ones, is needed because many delineated areas of a given soil mapping unit may contain small areas of other kinds of soil that have strongly contrasting properties and different suitabilities or limitations for soil engineering.

Some of the terms used in this soil survey have special meaning to soil scientists. Many of these terms are defined in the Glossary.

Engineering classification systems

The two systems most commonly used in classifying samples of soils for engineering are the Unified system (*2*) used by the engineers of the Soil Conservation Service, Department of Defense, and others and the AASHTO system (*1*) adopted by the American Association of State Highway and Transportation Officials.

In the Unified system soils are classified according to particle-size distribution, plasticity, liquid limit, and the content of organic matter. Soils are grouped in 15 classes. There are eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt. Soils on the borderline between two classes are designated by symbols for both classes; for example, SP–SM.

The AASHTO system is used to classify soils according to those properties that affect use in highway construction and maintenance. In this system, a soil is placed in one of seven basic groups, ranging from A–1 to A–7, on the basis of grain-size distribution, liquid limit, and plasticity index. In group A–1 are

[5] SIDNEY F. GRAY, geologist, engineering section, Soil Conservation Service, Raleigh, helped prepare this section.

gravelly soils of high bearing strength, or the best soils for subgrade (foundation). At the other extreme, in group A–7, are clayey soils that have low strength when wet and that are the poorest soils for subgrade.

Soil test data

Table 6 contains engineering test data for some of the major soils in Robeson County. These tests were made to help evaluate the soils for engineering purposes. The engineering classifications given are based on data obtained by mechanical analyses and by tests to determine liquid limits and plastic limits. The mechanical analyses were made by combined sieve and hydrometer methods.

Moisture-density (or compaction) data are important in earthwork. If a soil material is compacted at successively higher moisture content, assuming that the compactive effort remains constant, the density of the compacted material increases until the *optimum moisture content* is reached. After that, density decreases with increase in moisture content. The highest dry density obtained in the compactive test is termed *maximum dry density*. As a rule, maximum strength of earthwork is obtained if the soil is compacted to the maximum dry density.

Liquid limit and plasticity index indicate the effect of water on the strength and consistence of soil material. As the moisture content of a clayey soil is increased from a dry state, the material changes from a semisolid to a plastic state. If the moisture content is further increased, the material changes from a plastic to a liquid state. The plastic limit is the moisture content at which the soil material changes from the semisolid to plastic state; and the liquid limit, from a plastic to a liquid state. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content within which a soil material is plastic.

Soil properties significant in engineering

Several estimated soil properties significant in engineering are given in tables 7, 8, and 9. These estimates are made for the representative profile of each soil series. Estimates are given for the whole soil or for layers sufficiently different to have different significance for soil engineering. The estimates are based on field observations made in the course of mapping, on test data for these and similar soils, and on experience with the same kinds of soil in other survey areas. Following are explanations of some of the columns in table 7.

Soil texture is described in table 7 in the standard terms used by the U.S. Department of Agriculture. These terms take into account the percentage of sand, silt, and clay in soil material that is less than 2 millimeters in diameter. "Loam," for example, is soil material that contains 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the soil contains gravel or other particles coarser than sand, an appropriate modifier is added, as for example, "gravelly loamy sand." "Sand," "silt," "clay," and some of the other terms used in USDA textural classification are defined in the glossary.

The estimated Unified and AASHTO classifications are also given. For an explanation of these terms, see the section "Engineering Classification Systems."

The columns headed "Percentage passing sieve number" show estimated particle-size distribution according to standard sieve sizes.

In table 8 are estimated physical and chemical properties of the soil. Following are explanations of some of the terms used.

Permeability is that quality of a soil that enables it to transmit water or air. It is estimated on basis of those soil characteristics observed in the field, particularly structure and texture. The estimates in table 8 do not take into account lateral seepage or such transient soil features as plowpans and surface crusts.

Available water capacity is the ability of soils to hold water for use by most plants. It is commonly defined as the difference between the amount of water in the soil at field capacity and the amount at the wilting point of most crop plants. Available water capacity is influenced greatly by soil texture, density, the content of salts, and the content of organic matter.

Reaction is the degree of acidity or alkalinity of a soil, expressed in pH values. The pH values and terms used to describe soil reaction are explained in the Glossary.

Shrink-swell potential is the change in the volume of soil material when the content of moisture changes. It is the extent to which the soil shrinks as it dries out or swells when it gets wet. This shrinking and swelling is influenced by the amount and kind of clay in the soil. Shrinking and swelling of soils cause much damage to building foundations, roads, and other structures. A *high* shrink-swell potential indicates a hazard to maintenance of structures built in, on, or with material having this rating.

Corrosivity pertains to potential soil-induced chemical action that dissolves or weakens uncoated steel or concrete. Corrosivity to uncoated steel is related to such soil properties as drainage, texture, total acidity, and electrical conductivity of the soil material. Corrosivity to concrete is influenced not only by the content of sodium or magnesium sulfate but also by soil texture and acidity. Installations of uncoated steel that intersect the boundaries of soils or soil horizons are more susceptible to corrosion than installations entirely in one kind of soil or in one soil horizon. *Low* corrosivity means that damage from soil-induced corrosion is not likely. *High* means that the risk of damage is high, so that protective measures for steel as well as the more resistant concrete should be used to avoid or minimize damage.

Table 9 contains information about flooding and high water tables.

Flooding is the temporary covering of soils by water from overflowing streams, by runoff from adjacent slopes, and by tides. It does not include standing water for short periods after rains, nor does it include water that commonly covers swamps and marshes.

Flooding is estimated in terms of frequency, duration, and probable time of occurrence. Frequency of flooding is expressed as *none*, which means that flooding is not reasonably possible, *rare*, which means that flooding is unlikely but is possible in unusual weather, and *common*, which means that flooding is

TABLE 6.—*Engineering*

[Tests performed by the North Carolina Department of Transportation, Division of Highways, according

Soil name and location	Parent material	Report No. S69NC78–	Depth	Moisture-density data [1]	
				Maximum dry density	Optimum moisture
			Inches	*Percent*	*Percent*
Aycock very fine sandy loam: 2 miles southwest of Purvis, ¼ mile west of State Road 1184, and ¼ mile south of State Road 1134, in a cultivated field. (Modal)	Coastal plain sediments.	2–1	0–7	111	11
		2–2	7–38	113	15
		2–4	48–70	110	16
Coxville loam: 1½ miles northeast of Lumberton High School, 800 feet west of State Road 1945, and 75 feet north of farm road. (Modal)	Coastal plain sediments.	3–1	0–8	118	11
		3–3	12–20	114	14
		3–4	20–64	104	20
Norfolk loamy fine sand: ¼ mile northeast of Centerville Church and 125 feet south of State Highway 41. (Modal)	Coastal plain sediments.	5–1	0–10	109	11
		5–4	19–36	114	14
		5–6	58–68	107	18

[1] Based on AASHTO Designation T 99, Method A (*1*).

[2] Mechanical analyses according to AASHTO Designation T 88 (*1*). Results by this procedure may differ somewhat from results obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHTO procedure, the fine material is analyzed by the hydrometer method, and the various grain-size fractions are calculated on the basis of all the material, including that coarser than 2 millimeters in diameter. In the SCS procedure, the fine material is analyzed by the pipette method,

TABLE 7.—*Engineering properties and classifications*

[The symbol < means less than. Dashes indicate that data were not estimated]

Soil series and map symbols	Depth	USDA texture	Classification		Percent of material smaller than 3 inches passing sieve—				Liquid limit	Plasticity index
			Unified	AASHTO	No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)		
	Inches								*Percent*	
Aycock: AyA, AyB.	0–7	Very fine sandy loam.	SM, SM–SC, SC, ML, CL, CL–ML	A–4	100	100	80–95	36–55	<25	[1] NP–10
	7–70	Loam, clay loam.	CL	A–6, A–7	100	100	85–100	50–80	20–45	11–25
	70–100	Sandy loam	CL–ML, SM–SC, SC, CL	A–2, A–4	100	100	60–70	30–55	10–25	4–10
Bibb: BB.	0–26	Sandy loam	SC, SM, SM–SC	A–2, A–4	100	100	60–70	30–40	10–20	2–10
	26–64	Loamy sand, sand.	SM, SP–SM	A–3, A–2	100	100	50–75	5–30	-----	NP
Byars: By.	0–15	Loam, clay loam.	CL–ML	A–4	100	100	85–100	60–80	10–15	4–7
	15–64	Clay	CH	A–7	100	100	90–100	75–95	50–80	30–50
Coxville: Co.	0–8	Loam	CL, CL–ML, SC, SM–SC	A–4	100	100	85–95	46–70	15–25	4–10
	8–80	Clay loam, sandy clay, loam, clay.	CL, CH	A–6, A–7	100	100	80–100	51–85	30–55	17–33
Dunbar: Dn.	0–8	Sandy loam	SM, SM–SC	A–2	100	100	60–70	25–35	<15	NP–5
	8–92	Clay loam, sandy clay.	SC, CL, CH	A–7	100	100	85–100	45–70	40–55	25–35

See footnotes at end of table.

test data

to procedures of the American Association of State Highway and Transportation Officials (AASHTO) (*1*)]

Mechanical analysis [2]							Liquid limit	Plasticity index	Classification	
Percentage passing sieve—			Percentage smaller than—							
No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)	0.05 mm	0.02 mm	0.005 mm	0.002 mm			AASHTO [3]	Unified [4]
							Percent			
100	95	39	25	10	4	3	16	NP [5]	A-4	SM
100	97	61	51	40	31	29	32	14	A-6	CL
100	98	51	44	35	27	25	43	21	A-7	CL
100	95	46	40	31	20	16	19	4	A-4	SM
100	94	53	49	43	34	29	33	17	A-6	CL
100	95	62	60	56	46	42	51	31	A-7	CH
100	95	17	12	8	4	3	14	NP	A-2	SM
100	96	39	36	33	30	27	29	9	A-4	SC
100	96	45	42	40	34	31	39	16	A-6	SC

and the material coarser than 2 millimeters in diameter is excluded from calculations of grain-size fractions. The mechanical analyses used in this table are not suitable for use in naming textural classes for soil.

[3] Based on AASHTO Designation M 145-49 (*1*).

[4] Based on the Unified Soil Classification System (*2*).

[5] NP means nonplastic.

TABLE 7.—*Engineering properties and classifications*—Continued

Soil series and map symbols	Depth	USDA texture	Classification		Percent of material smaller than 3 inches passing sieve—				Liquid limit	Plasticity index
			Unified	AASHTO	No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)		
	Inches								*Percent*	
Duplin: DpA, DpB.	0–8	Sandy loam	SM, SM-SC	A-2, A-4	100	100	60–70	30–40	<15	[1] NP–5
	8–100	Sandy clay, sandy clay loam.	SC, CL	A-4, A-6, A-7	100	100	80–95	40–60	20–45	8–25
Exum: ExA.	0–9	Very fine sandy loam.	CL-ML, CL	A-4, A-6	100	100	85–95	51–65	10–30	5–20
	9–80	Clay loam	CL	A-6	100	100	90–100	70–80	22–40	12–27
Faceville: FaA, FaB.	0–6	Fine sandy loam.	SM, SM-SC	A-4, A-2	100	95–100	70–85	30–40	<15	NP–5
	6–70	Clay	CL	A-6	100	95–100	90–100	60–95	29–45	12–25
Goldsboro: GoA.	0–10	Loamy sand	SM	A-2	90–100	85–100	50–75	15–30	-----	NP
	10–70	Sandy clay loam, sandy loam.	SM, SM-SC, SC, ML, CL-ML, CL	A-2, A-4, A-6	100	100	60–90	30–55	10–35	3–17
Johns: Jo.	0–9	Sandy loam	SM	A-2, A-4	100	100	60–70	30–40	-----	NP
	9–39	Sandy clay loam, sandy loam.	SM, SM-SC, SC, ML, CL-ML, CL	A-4, A-6	100	100	80–90	36–55	15–35	3–15
	39–60	Sand	SC, ML, SM, SP-SM	A-2, A-3	100	90–100	50–75	5–20	-----	NP
Johnston: JT.	0–32	Mucky loam	OL	A-4, A-5	100	100	85–95	60–75	<50	NP–6
	32–60	Sandy loam, loamy sand, sand.	SM	A-2	100	100	50–75	15–30	-----	NP

TABLE 7.—*Engineering properties and classifications*—Continued

Soil series and map symbols	Depth	USDA texture	Classification		Percent of material smaller than 3 inches passing sieve—				Liquid limit	Plasticity index
			Unified	AASHTO	No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)		
	Inches								*Percent*	
Kalmia: KaA.	0–10	Loamy sand	SM	A–2	100	95–100	65–90	15–30		NP
	10–36	Sandy loam, sandy clay loam.	SM–SC, SC, SM	A2, A–4	100	90–100	70–90	30–50	15–35	4–10
	36–68	Coarse sand	SP–SM, SM	A–2	100	90–100	50–70	10–15		NP
Lakeland: LaB.	0–90	Sand	SP–SM	A–3	100	100	50–70	5–10		NP
Leon: Le.	0–82	Sand	SP, SP–SM	A–2, A–3	100	100	80–100	2–12		NP
Lumbee: Lu.	0–13	Sandy loam	SM	A–2	100	100	60–70	20–35		NP
	13–36	Sandy clay loam, sandy loam.	SM–SC, SC	A–4, A–6	100	100	70–90	36–49	15–35	4–15
	36–73	Loamy sand	SP–SM, SM	A–2, A–3	100	90–100	60–80	5–25		NP
Lynchburg: Ly.	0–7	Sandy loam	SM, SM–SC, SC	A–2, A–4	100	100	70–95	25–45	8–20	2–10
	7–68	Sandy clay loam.	SM–SC, SC, CL–ML, CL	A–4, A–6	100	100	75–95	36–55	15–40	4–17
Marlboro: MaA, MaB.	0–9	Sandy loam	SM	A–2, A–4	100	100	70–90	20–45		NP
	9–63	Sandy clay, sandy clay loam.	CL	A–6, A–7	100	100	80–100	50–70	25–45	11–25
	63–75	Sandy loam	SM, SM–SC, SC	A–2, A–4	100	100	70–100	25–50	10–20	2–10
McColl: Mc.	0–4	Loam	CL–ML, CL	A–4	100	95–100	85–95	50–70	15–30	4–10
	4–18	Sandy clay	SC, CL	A–6, A–7	100	95–100	75–90	40–75	30–45	11–25
	18–51	Sandy clay loam.	SC	A–4, A–6	100	95–100	80–90	35–50	20–40	8–20
	51–64	Sandy loam, sandy clay loam.	SC, SM–SC	A–4, A–6	100	95–100	60–80	36–50	20–40	5–20
Meggett: Me.	0–10	Fine sandy loam.	SM	A–4	100	100	90–100	40–50		NP
	10–41	Sandy clay, clay.	SC, CL, MH, CH	A–7	100	100	90–100	45–80	40–70	25–40
	41–55	Loamy fine sand, sand.	SM	A–2	100	100	30–70	15–30		NP
Nahunta: Na.	0–10	Loam, very fine sandy loam.	ML, CL–ML, CL	A–4	100	100	85–95	50–65	10–25	2–10
	10–64	Clay loam	ML, CL	A–6, A–7	100	100	90–100	65–80	20–45	10–20
Norfolk: NoA, NoB, NsC. For the Faceville part of NsC, see the Faceville series.	0–17	Loamy sand, sandy loam.	SM	A–2, A–4	100	100	50–95	16–40		NP
	17–82	Sandy clay loam.	SM–SC, SC	A–2, A–4, A–6	100	100	80–90	30–49	20–40	4–17
Osier. Mapped only with Plummer soils.	0–75	Sand	SP–SM, SM	A–2	100	100	95–100	10–15		NP
Pactolus: Pa.	0–36	Loamy sand	SM	A–2	100	100	50–75	15–30		NP
	36–72	Sand	SM, SP–SM	A–2, A–3	100	100	50–70	5–15		NP
Pantego: Pg.	0–14	Fine sandy loam.	SM, SM–SC	A–4	100	100	70–85	40–49	10–20	2–7
	14–80	Sandy clay loam.	SM–SC, SC, ML, CL–ML, CL, SM	A–2, A–4, A–6	100	100	80–90	35–55	20–40	5–15

TABLE 7.—*Engineering properties and classifications*—Continued

Soil series and map symbols	Depth	USDA texture	Classification		Percent of material smaller than 3 inches passing sieve—				Liquid limit	Plasticity index
			Unified	AASHTO	No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)		
	Inches								*Percent*	
Plummer: Pm.	0–13	Loamy sand	SM	A–2	100	100	50–75	15–30	-----	NP
For the Osier part of Pm, see the Osier series.	13–56	Sand	SP–SM, SM	A–2, A–3	100	100	50–70	5–15	-----	NP
	56–65	Sandy loam	SM	A–2, A–4	100	100	60–70	30–40	<10	NP–4
Pocalla: PoB.	0–22	Loamy sand, sand.	SM, SP–SM	A–2, A–3	100	100	50–75	5–30	-----	NP
	22–47	Sandy loam, loamy sand.	SM	A–2, A–4	100	100	50–75	15–40	-----	NP
	47–72	Sandy clay loam.	SM–SC, SC	A–2, A–4, A–6	100	100	80–90	35–49	10–35	4–17
Ponzer: Pr.	0–31	Muck	Pt	------	------	------	------	------	------	------
	31–42	Clay loam	CL	A–6	100	100	90–100	70–80	20–40	10–20
	42–47	Sandy loam, loamy sand.	SM	A–2, A–4	100	100	50–75	15–40	-----	NP
	47–60	Sand	SM, SP–SM	A–2, A–3	100	90–100	50–70	5–15	-----	NP
Portsmouth: Pt.	0–16	Loam, sandy loam.	ML, CL–ML, CL	A–4, A–6	100	100	60–95	50–75	<25	NP–15
	16–56	Sandy loam, sandy clay loam.	SM, SM–SC, SC	A–2, A–4, A–6	100	100	60–90	30–49	10–35	3–17
	56–62	Loamy sand, sand.	SM, SP–SM	A–2, A–3	100	100	50–75	5–30	-----	NP
Rains: Ra.	0–7	Sandy loam	SM–SC, SC, CL, CL–ML	A–4	100	100	70–80	40–55	10–25	5–10
	7–62	Sandy clay loam.	SM–SC, SC, CL–ML, CL	A–2, A–4, A–6	100	100	85–100	35–55	20–40	4–17
	62–72	Sandy loam	SM–SC, SM SC	A–2, A–4	100	100	60–70	30–40	10–20	2–8
Rutlege: Ru.	0–72	Loamy sand, sand.	SP–SM, SM	A–2, A–3	100	100	95–100	5–30	-----	NP
Toisnot: Ta.	0–13	Loam, loamy sand.	SM, SM–SC, SC, ML, CL–ML, CL	A–2, A–4	100	100	50–95	15–75	<30	NP–10
	13–45	Sandy loam	SM, SM–SC, SC	A–2, A–4	100	100	60–70	30–40	15–25	2–10
	45–80	Sandy clay loam, sandy clay.	SM–SC, SC, CL–ML, CL	A–4, A–6	100	100	80–95	36–60	25–40	5–20
Torhunta: To.	0–9	Loam	ML	A–4	100	100	85–95	60–75	<10	NP–2
	9–64	Sandy loam, loamy sand.	SM	A–2, A–4	100	100	50–75	15–40	-----	NP
Trebloc: Tr.	0–19	Loam, silt loam.	CL–ML, CL	A–4	100	100	85–100	60–90	10–30	5–10
	19–84	Clay loam, clay.	ML, CL	A–7, A–6	100	100	90–100	70–95	30–48	12–21
Udorthents, loamy: Ud. Too variable to be classified.										
Wagram: WaB, WaC.	0–28	Loamy sand	SM	A–2	100	100	50–75	15–30	-----	NP
	28–78	Sandy clay loam, loam, sandy	SM–SC, SC	A–2, A–4, A–6	100	100	60–90	30–49	10–30	4–15
	78–100	Loamy sand	SM	A–2	100	100	50–75	15–30	-----	NP

TABLE 7.—*Engineering properties and classifications*—Continued

Soil series and map symbols	Depth	USDA texture	Classification		Percent of material smaller than 3 inches passing sieve—				Liquid limit	Plasticity index
			Unified	AASHTO	No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)		
	Inches								*Percent*	
Wakulla: WkB.	0–24	Sand	SP–SM, SM	A–3, A–2	100	100	50–70	5–15		NP
	24–42	Loamy sand	SM	A–2	100	100	50–75	15–30		NP
	42–83	Sand	SP–SM, SM	A–3, A–2	100	100	50–70	5–15		NP

[1] NP means nonplastic.

TABLE 8.—*Estimated physical and chemical properties*

[Dashes mean that properties were not estimated]

Soil series and map symbols	Depth	Permeability	Available water capacity	Reaction	Shrink-swell potential	Corrosivity to	
						Steel	Concrete
	Inches	*Inches per hour*	*Inches per inch of soil*	*pH*			
Aycock: AyA, AyB.	0–7	2.0–6.0	0.13–0.20	5.1–6.5	Low	Moderate	Moderate.
	7–70	0.6–2.0	0.15–0.20	5.1–5.5	Moderate		
	70–100	0.6–2.0	0.10–0.14	5.1–5.5	Low		
Bibb: BB.	0–26	2.0–6.0	0.10–0.14	4.5–5.0	Low	High	High.
	26–64	2.0–6.0	0.05–0.10	4.5–5.0	Low		
Byars: By.	0–15	0.06–0.2	0.15–0.20	4.5–5.0	Low	High	High.
	15–64	0.06–0.2	0.12–0.18	4.5–5.0	High		
Coxville: Co.	0–8	0.6–2.0	0.15–0.20	4.5–5.5	Low	High	High.
	8–80	0.2–0.6	0.12–0.18	4.5–5.5	Moderate		
Dunbar: Dn.	0–8	2.0–6.0	0.10–0.14	4.5–5.5	Low	High	High.
	8–92	0.2–0.6	0.14–0.18	4.5–5.5	Moderate		
Duplin: DpA, DpB.	0–8	2.0–6.0	0.10–0.14	4.5–7.3	Low	High	High.
	8–100	0.2–0.6	0.14–0.18	4.5–5.0	Moderate		
Exum: ExA.	0–9	2.0–6.0	0.13–0.20	4.5–6.5	Low	Moderate	Moderate.
	9–80	0.6–2.0	0.15–0.20	4.5–5.5	Low		
Faceville: FaA, FaB.	0–6	2.0–6.0	0.11–0.15	4.5–6.0	Low	High	High.
	6–70	0.6–2.0	0.12–0.18	4.5–5.5	Moderate	High	High.
Goldsboro: GoA.	0–10	2.0–6.0	0.06–0.10	4.5–6.0	Low	Moderate	High.
	10–70	0.6–2.0	0.12–0.17	4.5–5.0	Low		
Johns: Jo.	0–9	2.0–6.0	0.10–0.14	4.5–5.5	Low	Moderate	High.
	9–39	0.6–2.0	0.12–0.15	4.5–5.5	Low		
	39–60	6.0–20	0.03–0.08	4.5–5.5	Low		
Johnston: JT.	0–32	0.6–2.0	0.15–0.20	4.5–5.5	Low	High	High.
	32–60	2.0–6.0	0.05–0.10	4.5–5.5	Low		
Kalmia: KaA.	0–10	2.0–6.0	0.06–0.10	4.5–6.5	Low	Moderate	High.
	10–36	0.6–2.0	0.12–0.17	4.5–5.5	Low		
	36–68	6.0–20	0.02–0.04	4.5–5.5	Low		
Lakeland: LaB.	0–90	6.0–20	0.02–0.05	4.5–6.0	Low	Low	High.
Leon: Le.	0–82	0.6–2.0	0.01–0.06	4.0–5.0	Low	High	High.
Lumbee: Lu.	0–13	2.0–6.0	0.10–0.14	4.5–6.0	Low	High	High.
	13–36	0.6–2.0	0.12–0.17	4.5–5.5	Low		
	36–73	6.0–20	0.06–0.10	4.5–5.5	Low		
Lynchburg: Ly.	0–7	2.0–6.0	0.10–0.14	4.5–5.5	Low	High	High.
	7–68	0.6–2.0	0.12–0.17	4.5–5.5	Low		

TABLE 8.—*Estimated physical and chemical properties*—Continued

Soil series and map symbols	Depth	Permeability	Available water capacity	Reaction	Shrink-swell potential	Corrosivity to	
						Steel	Concrete
	Inches	*Inches per hour*	*Inches per inch of soil*	*pH*			
Marlboro: MaA, MaB.	0–9	2.0–6.0	0.10–0.14	4.5–6.0	Low	High	High.
	9–63	0.6–2.0	0.14–0.18	4.5–5.5	Low		
	63–75	2.0–6.0	0.10–0.14	4.5–5.5	Low		
McColl: Mc.	0–4	0.6–2.0	0.15–0.20	4.5–5.5	Low	High	High.
	4–18	0.2–0.6	0.12–0.17	4.5–5.5	Low		
	18–51	0.06–0.2		4.5–5.5	Low		
	51–64	2.0–6.0		4.5–5.5	Low		
Meggett: Me.	0–10	2.0–6.0	0.11–0.15	5.6–6.0	Low	High	Low.
	10–41	0.06–0.2	0.12–0.18	6.6–8.4	High		
	41–55	6.0–20	0.06–0.10	6.6–8.4	Low		
Nahunta: Na.	0–10	2.0–6.0	0.15–0.17	4.5–5.5	Low	High	High.
	10–64	0.6–2.0	0.15–0.20	4.5–5.5	Low		
Norfolk: NoA, NoB, NsC. For the Faceville part of NsC, see the Faceville series.	0–17	2.0–6.0	0.06–0.10	4.5–6.0	Low	Moderate	High.
	17–82	0.6–2.0	0.12–0.15	4.5–5.5	Low		
Osier. Mapped only with Plummer soils.	0–75	6.0–20	0.02–0.05	4.5–6.0	Low	High	High.
Pactolus: Pa.	0–36	6.0–20	0.05–0.09	4.5–5.5	Low	Moderate	High.
	36–72	6.0–20	0.03–0.06	4.5–5.5	Low		
Pantego: Pg.	0–14	2.0–6.0	0.11–0.15	4.5–6.0	Low	Moderate	High.
	14–80	0.6–2.0	0.12–0.17	4.5–5.5	Low		
Plummer: Pm. For the Osier part of Pm, see the Osier series.	0–13	2.0–6.0	0.05–0.09	4.5–5.5	Low	High	High.
	13–56	2.0–20	0.02–0.06	4.5–5.5	Low		
	56–65	2.0–6.0	0.10–0.14	4.5–5.5	Low		
Pocalla: PoB.	0–22	6.0–20	0.03–0.08	4.5–6.0	Low	Low	High.
	22–47	0.6–6.0	0.07–0.14	4.5–5.5	Low		
	47–72	0.6–2.0	0.12–0.17	4.5–5.5	Low		
Ponzer: Pr.	0–31	0.6–2.0	0.24–0.26	4.0–5.0	(1)	High	High.
	31–42	0.6–2.0	0.15–0.20	4.0–5.0	Moderate		
	42–47	0.6–6.0	0.07–0.13	4.0–5.0	Low		
	47–60	6.0–20	0.02–0.06	4.0–5.0	Low		
Portsmouth: Pt.	0–16	0.6–6.0	0.14–0.18	4.5–5.5	Low	High	High.
	16–56	0.6–2.0	0.12–0.17	4.5–5.5	Low		
	56–62	6.0–20	0.03–0.07	4.5–5.5	Low		
Rains: Ra.	0–7	2.0–6.0	0.10–0.15	4.0–5.5	Low	High	High.
	7–62	0.6–2.0	0.10–0.14	4.5–5.5	Low		
	62–72	2.0–6.0	0.10–0.14	4.5–5.5	Low		
Rutlege: Ru.	0–72	6.0–20	0.03–0.05	4.5–5.5	Low	High	High.
Toisnot: Ta.	0–13	2.0–6.0	0.07–0.12	4.5–5.5	Low	High	High.
	13–28	0.06–.20	0.06–0.14	4.5–5.5	Low		
	28–45	0.06–.20		4.5–5.5	Low		
	45–80	.20–2.0		4.5–5.5	Low		
Torhunta: To.	0–9	2.0–6.0	0.10–0.15	4.5–6.5	Low	High	High.
	9–64	2.0–6.0	0.07–0.11	4.5–5.5	Low		
Trebloc: Tr.	0–19	0.6–2.0	0.16–0.20	4.5–5.5	Low	High	High.
	19–84	0.06–0.6	0.12–0.18	4.5–5.5	Moderate		
Udorthents, loamy: Ud. Properties are too variable to be estimated.							
Wagram: WaB, WaC.	0–28	2.0–6.0	0.06–0.10	4.5–5.5	Low	Low	High.
	28–78	2.0–6.0	0.08–0.13	4.5–5.5	Low		
	78–100	2.0–6.0	0.06–0.10	4.5–5.5	Low		

See footnotes at end of table.

TABLE 8.—*Estimated physical and chemical properties*—Continued

Soil series and map symbols	Depth	Permeability	Available water capacity	Reaction	Shrink-swell potential	Corrosivity to	
						Steel	Concrete
	Inches	*Inches per hour*	*Inches per inch of soil*	*pH*			
Wakulla: WkB.	0–24	6.0–20	0.02–0.05	4.5–6.0	Low	Low	High.
	24–42	6.0–20	0.05–0.10	4.5–5.5	Low		
	42–83	6.0–20	0.02–0.05	4.5–5.5	Low		

[1] Subject to subsidence if the soil is drained.

TABLE 9.—*Soil and water features*

[Dashes indicate that the feature is not a concern. See text for definitions of such terms as "frequent" and "brief." The symbol > means more than]

Soil series and map symbols	Flooding			High water table	
	Frequency	Duration	Months	Depth	Month
				Feet	
Aycock: AyA, AyB	None			>5	
Bibb: BB	Very frequent	Brief	November to July	(1)	November to July.
Byars: By	(2)	Brief	December to March	(1)	November to April.
Coxville: Co	(2)	Brief	December to March	(1)	November to April.
Dunbar: Dn	None			1–1½	November to May.
Duplin: DpA, DpB	None			2	December to April.
Exum: ExA	None			2½	November to April.
Faceville: FaA, FaB	None			>6	
Goldsboro: GoA	None			2½	December to March.
Johns: Jo	Rare	Very brief	February to April	1½	November to April.
Johnston: JT	Very frequent	Long	November to July	(1)	November to July.
Kalmia: KaA	Rare	Very brief	February to April	>5	
Lakeland: LaB	None			>5	
Leon: Le	None			1½	November to April.
Lumbee: Lu	Rare	Very brief	February to April	(1)	November to April.
Lynchburg: Ly	None			1½	November to April.
Marlboro: MaA, MaB	None			>5	
McColl: Mc	(2)	Long	November to May	(1)	November to April.
Meggett: Me	Frequent	Brief	February to April	(1)	November to April.
Nahunta: Na	None			1½	November to April.
Norfolk: NoA, NoB, NsC For the Faceville part of NsC, see the Faceville series.	None			>5	
Osier Mapped only with Plummer soils.	Frequent	Brief	December to March	1½	November to April.
Pactolus: Pa	None			2½	January to March.
Pantego: Pg	(2)	Very brief	November to February.	(1)	November to April.
Plummer: Pm For the Osier part of Pm, see the Osier series.	Frequent	Brief	December to March	1½	November to April.
Pocalla: PoB	None			>5	
Ponzer: Pr	(2)	Long	November to June	(1)	November to July.
Portsmouth: Pt	Frequent	Very brief	February to May	(1)	November to May.
Rains: Ra	(2)	Very brief	November to February.	(1)	November to April.
Rutlege: Ru	(2)	Brief	November to March	(1)	November to April.
Toisnot: Ta	(2)	Brief	January to June	(1)	December to April.
Torhunta: To	Frequent	Long	January to April	(1)	November to April.
Trebloc: Tr	(2)	Brief	January to April	(1)	November to April.
Udorthents, loamy: Ud. Variable.					
Wagram: WaB, WaC	None			>5	
Wakulla: WkB	None			>5	

[1] The water table is at or near the soil surface.
[2] Not subject to flooding, but shallow water stands on the surface during or soon after a rain.

likely in the usual weather. Common flooding may be further described as *occasional* if it occurs once in 2 years or less on the average, or *frequent* if it occurs more than once in 2 years. Duration of flooding is expressed as *very brief*, if less than 2 days, *brief*, if 2 to 7 days, or *long*, if 7 days or longer. Time of flooding is given in table 9 as the months when flooding normally happens.

Information given for high water tables includes the distance from the surface of the soil to the highest level that ground water reaches for significant periods during most years and the months when the water table is highest.

Engineering interpretations

The engineering interpretations in tables 10 through 13 are based on the estimated properties of soils shown in tables 7, 8, and 9 and on the experience of engineers and soil scientists with the soils of Robeson County. In these tables, the limitations or suitability of the soils for specified purposes are rated.

Soil limitations are expressed as *slight*, *moderate*, or *severe*. Slight means that the soil properties are generally favorable for the specified use and that any limitations are minor and easily overcome. Moderate means that some soil properties are unfavorable but can be overcome or modified by special planning and design. Severe means that the soil properties are so unfavorable and so difficult to correct or overcome as to require major soil reclamation, special design, or intensive maintenance.

Soil suitability is expressed as *good*, *fair*, and *poor*, which have meanings approximately parallel to the terms for limitations of slight, moderate, and severe, respectively. In addition, the term *unsuited* is used for soils that have no potential as a source of sand or gravel.

SANITARY FACILITIES

Table 10 shows the limitations to the use of soils for sanitary facilities. Following are explanations of some of the terms used.

Septic tank absorption fields are subsurface systems of tile or perforated pipe that distribute effluent from a septic tank into natural soil. The soil material between depths of 18 and 72 inches is evaluated for this use. The soil properties considered are those that affect both the absorption of effluent and the construction and operation of the system. Properties that affect absorption are permeability, depth to water table or rock, and susceptibility to flooding. Properties that affect difficulty of layout and construction are slope, risk of soil erosion, and lateral seepage. Slope and lateral seepage also affect the flow of effluent. Large rocks and boulders increase the cost of construction of septic tank absorption fields.

Sewage lagoons are shallow ponds constructed to hold sewage at a depth of 24 to 60 inches long enough for bacteria to decompose the solid waste. A lagoon has a nearly level floor and has sides, or embankments, of compacted soil material. In determining the limitations of soils for the construction of sewage lagoons, properties are considered that affect the pond floor and the embankments. Those that affect the pond floor are permeability, content of organic matter, slope, and, if the floor needs to be leveled, depth to bedrock. The soil characteristics that commonly affect embankments are shear strength, compressibility, permeability of the compacted soil, susceptibility to piping, compactibility, and the amount of stones. Stones influence the ease of excavation and the ease of compaction of the embankment material.

Sanitary landfill is used to dispose of refuse. The waste is spread in thin layers, compacted, and covered with soil. These landfill areas are subject to heavy vehicular traffic. Some soil properties that affect suitability for landfill use are ease of excavation, hazard of polluting ground water, and trafficability. Ratings apply only to a depth of about 72 inches, and therefore ratings of *slight* or *moderate* may not be valid if excavations are much deeper. For some soils, reliable predictions can be made to greater depths, but in most instances geologic investigations are needed below a depth of about 72 inches.

The trench type of sanitary landfill is dug so that refuse can be buried in trenches daily, or more frequently if necessary. The refuse is covered with a layer of soil material at least 6 inches thick; generally the soil material is excavated in digging the trench. When the trench is full, a final cover of soil material, at least 24 inches thick, is placed over the landfill.

In the area type of sanitary landfill, refuse is placed on the surface of the soil in successive layers. The daily and final cover material generally must be shipped in from another area. A final cover of soil material, at least 24 inches thick, is placed over the completed fill.

CONSTRUCTION SITES

Table 11 shows limitations to the use of the soils as construction sites. Following are explanations of some of the columns in that table.

Shallow excavations are those that require digging or trenching to a depth of less than 72 inches. Examples are excavations for pipelines, sewer lines, telephone and power transmission lines, basements, open ditches, and cemeteries. Desirable soil properties are good workability, resistance to sloughing, gentle slopes, absence of rock outcrops or big stones, and freedom from flooding or a high water table.

The limitations to the use of soils for dwellings and small commercial buildings given in table 11 are for structures not more than three stories high and supported by foundation footings placed in undisturbed soil. They are shown both for dwellings that do have basements and those that do not. Suitabilities for small commercial buildings are given for structures without basements. The features that are limitations to the use of a soil for dwellings are those that relate to the capacity to support a load and the ability to resist settlement under load as well as those that relate to the ease of excavation. Soil properties that affect the capacity to support a load are wetness, susceptibility to flooding (fig. 11), density, plasticity, texture, and shrink-swell potential. Those that affect ease of excavation are wetness, slope, depth to bedrock, and content of stones and rocks.

The limitations to the use of soils for roads and streets given in table 11 are for an all-weather surface

Figure 11.—**Flooding in an area of Johns sandy loam.**

expected to carry automobile traffic all year. These roads and streets have a subgrade of underlying soil material; a base consisting of gravel, crushed rock, or soil material stabilized with lime or cement; and a flexible or rigid surface, commonly asphalt or concrete. They are graded to shed water and have ordinary provisions for drainage. They are built mainly from soil at hand, and most cuts and fills are less than 72 inches deep.

Soil properties that most affect design and construction of roads and streets are the load-supporting capacity and stability of the subgrade and the workability and quantity of cut and fill material available. The AASHTO and Unified classifications and the shrink-swell potential indicate the traffic-supporting capacity of a soil. Wetness and flooding affect the stability of soils. Slope, depth to hard rock, content of stones and rocks, and wetness affect the ease of excavation of soils and the amount of cut and fill needed to reach an even grade.

CONSTRUCTION MATERIAL

Table 12 contains information on the suitability of soils as sources of various construction materials. Following are explanations of the columns in the table.

Road fill is soil material used in embankments for roads. The suitability ratings reflect the predicted performance of soil after it has been placed in an embankment that has been properly compacted and provided with adequate drainage and the relative ease of excavating the material at borrow areas.

Sand and gravel are used in great quantities in many kinds of construction. The ratings in table 12 provide guidance about where to look for probable sources of sand and gravel. A soil rated as a *good* or *fair* source generally has a layer of sand or gravel at least 36 inches thick, the top of which is within a depth of 72 inches. The ratings do not take into account thickness of overburden, location of the water table, or other factors that affect mining of the materials, and they do not indicate the quality of the deposit.

Topsoil is used to topdress an area where vegetation is to be established and maintained. Suitability is affected mainly by ease of working and spreading the soil material, as for preparing a seedbed; natural fertility of the material, or the response of plants when fertilizer is applied; and absence of substances toxic to plants. The texture of a soil and the content of coarse fragments affect the suitability of a soil for use as topdressing. Also considered in the ratings is the damage that results in the area from which the topsoil is taken.

Daily cover for landfill must frequently be obtained from a source away from the site of the landfill. Soils rated as suitable can be used as both daily and final cover material. The suitability of a soil for use as cover is based on properties that reflect workability; ease of digging, moving, and spreading over the refuse daily during both wet and dry periods; slope; and thickness of the soil material. Also considered in the ratings is the damage that results in the area from which the soil material is taken.

WATER MANAGEMENT

Table 13 shows limitations to the use of soils and suitability of the soils for water management. Fol-

lowing are explanations of the columns in that table.

Pond reservoir areas hold water behind a dam or embankment. Soils suitable for use as pond reservoir areas have low seepage, which is related to their permeability and depth to fractured or permeable bedrock or other permeable material.

Embankments, dikes, and levees require soil material that is resistant to seepage and piping and that has favorable stability, shrink-swell potential, shear strength, and compactibility. Stones or organic matter in a soil are limitations to the use of a soil for embankments, dikes, and levees.

Drainage of soils is affected by such features as permeability; texture; structure; depth to cemented pan, rock, or other layers that influence rate of water movement; depth of the water table; slope; stability of ditchbanks; susceptibility to stream overflow; salinity and alkalinity; and availability of outlets for drainage.

Irrigation is affected by such features as slope; susceptibility to flooding, water erosion, and soil blowing; texture; content of stones; accumulation of salts and alkali; depth of the root zone; rate of water intake at the surface; permeability of the soil below the surface; available water capacity; need for drainage; depth of the water table; and depth to bedrock.

Terraces and diversions are low ridges constructed across a slope to intercept runoff and allow it to soak into the soil or flow slowly to a prepared outlet. Features that affect suitability of a soil for terraces and diversions are uniformity and steepness of slope, depth to bedrock or other unfavorable material, stoniness, permeability, and resistance to water erosion, soil slipping, and soil blowing. A suitable soil provides outlets for runoff and is not difficult to vegetate.

Grassed waterways are used to carry runoff water safely to outlets. The features that affect the use of soils for waterways are permeability, erodibility, and suitability for permanent vegetation.

Formation and Classification of the Soils

In this section the factors of soil formation are described and the effect these factors have had on the soils of Robeson County is discussed. The current system of soil classification is explained and the soil series are placed in higher categories of classification. The soil series, including a description of a representative profile for each series, are described in the section, "Descriptions of the Soils."

TABLE 10.—*Sanitary facilities*

["Percs slowly" and some of the other terms that describe restrictive soil features are defined in the Glossary. See text for definitions for "slight," "moderate," and "severe"]

Soil series and map symbols	Septic tank absorption fields	Sewage lagoons	Sanitary landfill (trench)	Sanitary landfill (area)
Aycock:				
AyA	Moderate: percs slowly.	Moderate: percs slowly.	Slight	Slight.
AyB	Moderate: percs slowly.	Moderate: slope; seepage.	Slight	Slight.
Bibb: BB	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness floods.
Byars: By	Severe: wetness; floods.	Moderate: excess humus.	Severe: wetness; floods.	Severe: wetness; floods.
Coxville: Co	Severe: wetness; floods; percs slowly.	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.
Dunbar: Dn	Severe: wetness; percs slowly.	Severe: wetness	Severe: wetness	Severe: wetness.
Duplin: DpA, DpB	Severe: wetness; percs slowly.	Severe: wetness	Moderate: too clayey; wetness.	Moderate: wetness.
Exum: ExA	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness.
Faceville:				
FaA	Slight	Moderate: seepage	Moderate: too clayey	Slight.
FaB	Slight	Moderate: slope; seepage.	Moderate: too clayey	Slight.
Goldsboro: GoA	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness.
Johns: Jo	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness.
Johnston: JT	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.
Kalmia: KaA	Slight	Moderate: seepage	Slight	Slight.
Lakeland: LaB	Slight	Severe: seepage	Severe: too sandy; seepage.	Severe: seepage.
Leon: Le	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness.
Lumbee: Lu	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness	Severe: wetness.
Lynchburg: Ly	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness.
Marlboro:				
MaA	Moderate: percs slowly.	Moderate: seepage	Moderate: too clayey	Slight.

TABLE 10.—*Sanitary facilities*—Continued

Soil series and map symbols	Septic tank absorption fields	Sewage lagoons	Sanitary landfill (trench)	Sanitary landfill (area)
MaB	Moderate: percs slowly.	Moderate: slope; seepage.	Moderate: too clayey	Slight.
McColl: Mc	Severe: percs slowly; wetness; floods.	Slight	Severe: wetness; floods.	Severe: wetness; floods.
Meggett: Me	Severe: percs slowly; wetness; floods.	Severe: wetness	Severe: wetness; too clayey; floods.	Severe: wetness; floods.
Nahunta: Na	Severe: wetness	Severe: wetness	Moderate: wetness	Severe: wetness.
Norfolk:				
NoA	Slight	Moderate: seepage	Slight	Slight.
NoB	Slight	Moderate: slope; seepage.	Slight	Slight.
NsC:				
Norfolk part	Moderate: slope	Severe: slope	Slight	Moderate: slope.
Faceville part	Moderate: slope	Severe: slope	Moderate: too clayey	Moderate: slope.
Pactolus: Pa	Severe: wetness	Severe: wetness; seepage.	Severe: seepage	Severe: seepage.
Pantego: Pg	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness.
Plummer:				
Pm:				
Plummer part	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.
Osier part	Severe: wetness; floods.	Severe: wetness; seepage; floods.	Severe: wetness; seepage; floods.	Severe: wetness; seepage; floods.
Pocalla: PoB	Slight	Moderate: seepage	Slight	Slight.
Ponzer: Pr	Severe: wetness; floods.	Severe: wetness; floods; excess humus.	Severe: wetness; floods.	Severe: wetness; floods.
Portsmouth: Pt	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.
Rains: Ra	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness.
Rutlege: Ru	Severe: wetness; floods.	Severe: wetness; seepage; floods.	Severe: wetness; seepage; floods.	Severe: wetness; seepage; floods.
Toisnot: Ta	Severe: wetness; cemented pan; floods.	Severe: wetness; cemented pan; floods.	Severe: wetness; cemented pan; floods.	Severe: wetness; floods.
Torhunta: To	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.
Trebloc: Tr	Severe: wetness; percs slowly; floods.	Severe: floods	Severe: wetness; floods.	Severe: wetness; floods.
Udorthents, loamy: Ud. Too variable to be rated.				
Wagram:				
WaB	Slight	Severe: seepage	Severe: seepage	Severe: seepage.
WaC	Moderate: slope	Severe: seepage; slope.	Severe: seepage	Severe: seepage; slope.
Wakulla: WkB	Slight	Severe: seepage	Severe: seepage	Severe: seepage.

TABLE 11.—*Construction sites*

["Low strength" and some of the other terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe"]

Soil series and map symbols	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Roads and streets
Aycock:					
AyA	Slight	Slight	Slight	Slight	Moderate: low strength.
AyB	Slight	Slight	Slight	Moderate: slope	Moderate: low strength.
Bibb: BB	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.
Byars: By	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.
Coxville: Co	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.
Dunbar: Dn	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: low strength; wetness.

TABLE 11.—*Construction sites*—Continued

Soil series and map symbols	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Roads and streets
Duplin:					
DpA	Moderate: too clayey; wetness.	Moderate: shrink-swell.	Moderate: wetness; shrink-swell.	Moderate: wetness; shrink-swell.	Severe: low strength.
DpB	Moderate: too clayey; wetness.	Moderate: shrink-swell.	Moderate: wetness; shrink-swell.	Moderate: slope; shrink-swell.	Severe: low strength.
Faceville:					
FaA	Moderate: too clayey.	Moderate: shrink-swell; low strength.	Moderate: shrink-swell; low strength.	Moderate: shrink-swell; low strength.	Severe: low strength.
FaB	Moderate: too clayey.	Moderate: shrink-swell; low strength.	Moderate: shrink-swell; low strength.	Moderate: shrink-swell; slope; low strength.	Severe: low strength.
Goldsboro: GoA	Moderate: wetness.	Slight	Moderate: wetness.	Moderate: wetness.	Slight.
Johns: Jo	Severe: wetness; cutbanks cave.	Severe: floods	Severe: wetness; floods.	Severe: wetness; floods.	Moderate: wetness.
Johnston: JT	Severe: floods; wetness.	Severe: floods; wetness.	Severe: floods; wetness.	Severe: floods; wetness.	Severe: floods; wetness.
Kalmia: KaA	Moderate: cutbanks cave; floods.	Severe: floods	Severe: floods	Severe: floods	Slight.
Lakeland: LaB	Severe: cutbanks cave.	Slight	Slight	Slight	Slight.
Leon: Le	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness.
Lumbee: Lu	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness.
Lynchburg: Ly	Severe: wetness	Moderate: wetness.	Severe: wetness	Severe: wetness	Moderate: wetness.
Marlboro:					
MaA	Moderate: too clayey.	Moderate: low strength.	Moderate: low strength.	Moderate: low strength.	Moderate: low strength.
MaB	Moderate: too clayey.	Moderate: low strength.	Moderate: low strength.	Moderate: slope; low strength.	Moderate: low strength.
McColl: Mc	Severe: wetness; cemented pan.	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.
Meggett: Me	Severe: wetness; too clayey.	Severe: wetness; shrink-swell; floods.	Severe: wetness; shrink-swell; floods.	Severe: wetness; shrink-swell; floods.	Severe: wetness; shrink-swell; floods.
Nahunta: Na	Severe: wetness	Moderate: wetness.	Severe: wetness	Severe: wetness	Severe: low strength.
Norfolk:					
NoA	Slight	Slight	Slight	Slight	Slight.
NoB	Slight	Slight	Slight	Moderate: slope	Slight.
NsC:					
Norfolk part	Moderate: slope	Moderate: slope	Moderate: slope	Severe: slope	Moderate: slope.
Faceville part	Moderate: slope; too clayey.	Moderate: shrink-swell; low strength; slope.	Moderate: shrink-swell; low strength; slope.	Severe: slope	Severe: low strength.
Pactolus: Pa	Severe: wetness; cutbanks cave.	Moderate: wetness.	Severe: wetness	Severe: wetness	Moderate: wetness.
Pantego: Pg	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness.
Plummer:					
Pm:					
Plummer part	Severe: wetness; cutbanks cave.	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.
Osier part	Severe: wetness; cutbanks cave.	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.
Pocalla: PoB	Severe: cutbanks cave.	Slight	Slight	Slight	Slight.
Ponzer: Pr	Severe: wetness; floods.	Severe: wetness; floods; low strength.	Severe: wetness; floods; low strength.	Severe: wetness; floods; low strength.	Severe: wetness; floods; low strength.
Portsmouth: Pt	Severe: wetness	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.
Rains: Ra	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness.
Rutlege: Ru	Severe: wetness; cutbanks cave.	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.
Toisnot: Ta	Severe: wetness; cemented pan; floods.	Severe: wetness; floods.	Severe: wetness; cemented pan; floods.	Severe: wetness; floods.	Severe: wetness; floods.
Torhunta: To	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.

TABLE 11.—*Construction sites*—Continued

Soil series and map symbols	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Roads and streets
Trebloc: Tr	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.	Severe: wetness; floods.
Udorthents, loamy: Ud. Too variable to be rated.					
Wagram:					
WaB	Slight	Slight	Slight	Slight	Slight.
WaC	Moderate: slope	Moderate: slope	Moderate: slope	Severe: slope	Moderate: slope.
Wakulla: WkB	Severe: cutbanks cave.	Slight	Slight	Slight	Slight.

TABLE 12.—*Construction material*

["Low strength" and some of the other terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," "poor," and "unsuited"]

Soils series and map symbols	Road fill	Sand	Gravel	Topsoil	Daily cover for landfill
Aycock: AyA, AyB	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer	Fair: too clayey.
Bibb: BB	Poor: wetness	Poor: excess fines	Unsuited: excess fines.	Poor: wetness	Poor: wetness.
Byars: By	Poor: wetness	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness	Poor: wetness.
Coxville: Co	Poor: wetness	Poor: excess fines	Unsuited: excess fines.	Poor: wetness	Poor: wetness.
Dunbar: Dn	Poor: low strength; wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer	Fair: too clayey.
Duplin: DpA, DpB	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer	Fair: too clayey.
Exum: ExA	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer	Fair: too clayey.
Faceville: FaA, FaB	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer	Poor: too clayey.
Goldsboro: GoA	Good	Unsuited: excess fines.	Unsuited: excess fines.	Good	Good.
Johns: Jo	Fair: wetness	Poor: excess fines	Unsuited: excess fines.	Fair: thin layer	Good.
Johnston: JT	Poor: wetness	Poor: excess fines	Poor: excess fines	Poor: wetness	Poor: wetness.
Kalmia: KaA	Good	Poor: excess fines	Unsuited: excess fines.	Fair: too sandy; thin layer.	Good.
Lakeland: LaB	Good	Good	Unsuited: excess fines.	Poor: too sandy	Poor: too sandy.
Leon: Le	Poor: wetness	Poor: excess fines	Unsuited: excess fines.	Poor: wetness	Poor: wetness.
Lumbee: Lu	Poor: wetness	Poor: excess fines	Unsuited: excess fines.	Poor: wetness	Poor: wetness.
Lynchburg: Ly	Fair: wetness	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer	Good.
Marlboro: MaA, MaB	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer	Fair: too clayey.
McColl: Mc	Poor: wetness	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer	Poor: wetness.
Meggett: Me	Poor: shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer, wetness.	Poor: too clayey, wetness.
Nahunta: Na	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer	Poor: too clayey.
Norfolk:					
NoA, NoB	Good	Unsuited: excess fines.	Unsuited: excess fines.	Good	Good.
NsC:					
Norfolk part	Good	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope	Fair: slope.
Faceville part	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer	Poor: too clayey.
Pactolus: Pa	Fair: wetness	Fair: excess fines	Unsuited: excess fines.	Poor: too sandy	Poor: too sandy.

TABLE 12.—*Construction material*—Continued

Soils series and map symbols	Road fill	Sand	Gravel	Topsoil	Daily cover for landfill
Pantego: Pg	Poor: wetness	Poor: excess fines	Unsuited: excess fines.	Poor: wetness	Poor: wetness.
Plummer: Pm:					
Plummer part	Poor: wetness	Poor: excess fines	Unsuited: excess fines.	Poor: wetness; too sandy.	Poor: wetness; too sandy.
Osier part	Poor: wetness	Fair: excess fines	Unsuited: excess fines.	Poor: wetness; too sandy.	Poor: wetness; too sandy.
Pocalla: PoB	Good	Fair: excess fines	Poor: excess fines	Poor: too sandy	Poor: too sandy.
Ponzer: Pr	Poor: wetness; excess humus; low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness	Poor: excess humus; wetness; hard to pack.
Portsmouth: Pt	Poor: wetness	Poor: excess fines	Unsuited: excess fines.	Poor: wetness	Poor: wetness.
Rains: Ra	Poor: wetness	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness	Poor: wetness.
Rutlege: Ru	Poor: wetness	Poor: excess fines	Unsuited: excess fines.	Poor: wetness	Poor: wetness.
Toisnot: Ta	Poor: wetness	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness	Poor: wetness.
Torhunta: To	Poor: wetness	Poor: excess fines	Unsuited: excess fines.	Poor: wetness	Poor: wetness.
Trebloc: Tr	Poor: wetness; low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness	Poor: wetness.
Udorthents, loamy: Ud. Too variable to be rated.					
Wagram:					
WaB	Good	Poor: excess fines	Unsuited: excess fines.	Poor: too sandy	Good.
WaC	Good	Poor: excess fines	Unsuited: excess fines.	Poor: too sandy	Fair: slope.
Wakulla: WkB	Good	Fair: excess fines	Unsuited: excess fines.	Poor: too sandy	Fair: too sandy.

TABLE 13.—*Water management*

["Piping" and some of the other terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe"]

Soil series and map symbols	Limitations for—		Features affecting—			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
Aycock:						
AyA	Slight	Moderate: piping.	Not needed	Favorable	Not needed	Favorable.
AyB	Slight	Moderate: piping.	Not needed	Favorable	Favorable	Favorable.
Bibb: BB	Moderate: seepage.	Moderate: seepage; piping.	Wetness; floods; poor outlets.	Wetness; floods	Not needed	Not needed.
Byars: By	Slight	Moderate: compressible; shrink-swell.	Wetness; percs slowly.	Wetness; percs slowly.	Not needed	Not needed.
Coxville: Co	Slight	Moderate: compressible.	Percs slowly	Wetness	Not needed	Not needed.
Dunbar: Dn	Moderate: seepage.	Moderate: compressible.	Percs slowly	Wetness	Not needed	Not needed.
Duplin:						
DpA	Moderate: seepage.	Slight	Favorable	Wetness	Not needed	Favorable.
DpB	Moderate: seepage.	Slight	Slope	Favorable	Favorable	Favorable.
Exum: ExA	Slight	Moderate: low strength.	Favorable	Favorable	Not needed	Favorable.

TABLE 13.—*Water management*—Continued

Soil series and map symbols	Limitations for—		Features affecting—			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
Faceville:						
FaA	Moderate: seepage.	Slight	Not needed	Favorable	Not needed	Favorable.
FaB	Moderate: seepage.	Slight	Not needed	Favorable	Favorable	Favorable.
Goldsboro: GoA	Moderate: seepage.	Slight	Favorable	Favorable	Not needed	Favorable.
Johns: Jo	Moderate: seepage.	Moderate: seepage.	Cutbanks cave	Wetness	Not needed	Not needed.
Johnston: JT	Severe: seepage.	Severe: piping.	Poor outlets	Wetness	Not needed	Not needed.
Kalmia: KaA	Moderate: seepage.	Moderate: seepage.	Not needed	Favorable	Not needed	Favorable.
Lakeland: LaB	Severe: seepage.	Severe: seepage; piping.	Not needed	Droughty; seepage; fast intake.	Not needed	Not needed.
Leon: Le	Severe: seepage.	Severe: seepage.	Cemented pan	Wetness	Not needed	Not needed.
Lumbee: Lu	Moderate: seepage.	Moderate: seepage.	Cutbanks cave; poor outlets.	Wetness	Not needed	Not needed.
Lynchburg: Ly	Moderate: seepage.	Moderate: piping.	Favorable	Wetness	Not needed	Not needed.
Marlboro:						
MaA	Moderate: seepage.	Moderate: seepage.	Not needed	Favorable	Not needed	Favorable.
MaB	Moderate: seepage.	Moderate: seepage.	Not needed	Favorable	Favorable	Favorable.
McColl: Mc	Slight	Moderate: piping; erodes easily.	Cemented pan	Wetness	Not needed	Not needed.
Meggett: Me	Slight	Moderate: shrink-swell; compressible.	Percs slowly	Percs slowly; wetness.	Not needed	Not needed.
Nahunta: Na	Slight	Severe: low strength.	Favorable	Favorable	Not needed	Not needed.
Norfolk:						
NoA	Moderate: seepage.	Slight	Not needed	Favorable	Not needed	Favorable.
NoB	Moderate: seepage.	Slight	Not needed	Favorable	Favorable	Favorable.
NsC:						
Norfolk part	Moderate: seepage.	Slight	Not needed	Slope	Favorable	Favorable.
Faceville part	Moderate: seepage.	Slight	Not needed	Slope	Slope	Favorable.
Pactolus: Pa	Severe: seepage.	Severe: seepage.	Cutbanks cave	Wetness; fast intake.	Not needed	Not needed.
Pantego: Pg	Moderate: seepage.	Moderate: piping.	Favorable	Wetness	Not needed	Not needed.
Plummer:						
Pm:						
Plummer part	Moderate: seepage.	Moderate: seepage.	Cutbanks cave	Wetness	Not needed	Not needed.
Osier part	Severe: seepage.	Severe: seepage; piping; erodes easily.	Cutbanks cave; wetness.	Wetness	Not needed	Not needed.
Pocalla: PoB	Severe: seepage.	Moderate: piping; erodes easily.	Not needed	Droughty; fast intake.	Not needed	Not needed.
Ponzer: Pr	Moderate: seepage.	Severe: excess humus.	Wetness; poor outlets.	Wetness	Not needed	Not needed.
Portsmouth: Pt	Moderate: seepage.	Moderate: hard to pack; low strength.	Wetness; poor outlets.	Wetness	Not needed	Not needed.
Rains: Ra	Moderate: seepage.	Slight	Wetness	Wetness	Not needed	Not needed.
Rutlege: Ru	Severe: seepage.	Severe: piping; seepage.	Cutbanks cave; wetness.	Wetness	Not needed	Not needed.
Toisnot: Ta	Slight	Moderate: seepage.	Cemented pan; percs slowly.	Wetness; percs slowly.	Not needed	Not needed.

TABLE 13.—*Water management*—Continued

Soil series and map symbols	Limitations for—		Features affecting—			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
Torhunta: To	Severe: seepage.	Moderate: piping.	Poor outlets; cutbanks cave.	Wetness	Not needed	Not needed.
Trebloc: Tr	Slight	Moderate: erodes easily; unstable fill.	Wetness; poor outlets.	Wetness	Not needed	Not needed.
Udorthents, loamy: Ud. Too variable to be rated.						
Wagram:						
WaB	Severe: seepage.	Moderate: piping.	Not needed	Fast intake	Favorable	Favorable.
WaC	Severe: seepage.	Moderate: piping.	Not needed	Fast intake; slope.	Slope	Slope.
Wakulla: WkB	Severe: seepage.	Severe: seepage.	Not needed	Fast intake; seepage.	Too sandy	Not needed.

Factors of Soil Formation

Soils are formed by processes of the environment acting upon soil materials that are deposited or accumulated by geologic agents. The characteristics of a soil at any given point are determined by (1) the physical and mineralogical composition of the parent material; (2) the climate under which the soil material accumulated and has existed since it accumulated; (3) the plants and animals in and on the soil; (4) the relief or lay of the land that influences drainage; and (5) the length of time these processes have acted on the soil material. All of these factors have influenced the formation of each soil in Robeson County and throughout the world.

The relative importance of each factor differs from place to place. In some areas one factor can be more important than the other, and in a few places one factor may dominate in the formation of a soil and determine most of its properties, as is common when the parent material is pure quartz sand. Quartz sand is highly resistant to weathering, and the soils formed in it generally have faint horizons. Even in quartz sand, however, a distinct profile can form under certain kinds of vegetation if the relief is low and flat and the water table is high.

Parent material

The parent materials of the soils of Robeson County are unconsolidated rock material, sand, silt, and clay that make up the sediments on the Coastal Plain uplands and soil material washed from the Coastal Plain uplands and deposited in drainageways on flood plains or terraces as alluvium. Both kinds of parent material are closely related. In some places the material has also been moved by wind or gravity.

The parent materials in the county differ in mineral and chemical composition and in physical makeup. Major differences, such as in texture, can be observed in the field. More obscure differences, such as mineral composition, can be determined only by careful laboratory examination.

Many of the differences among the soils of Robeson County reflect the varying geologic materials from which the soils formed. Lakeland, Leon, Pactolus, and Wakulla soils formed in sediments mostly of sand. Aycock, Exum, Nahunta and Trebloc soils formed in sediments that have a high content of very fine sand and silt. Norfolk, Goldsboro, Lynchburg, and Rains soils formed in sediments that have a low content of silt and very fine sand and a moderate amount of sand and clay. Marlboro, Duplin, Dunbar, and Coxville soils formed in sediments that have a high content of clay. Bibb and Johnston soils formed in alluvial deposits on flood plains, and Kalmia, Johns, Lumbee, and Portsmouth soils formed in alluvial deposits on stream terraces.

Climate

Climate, primarily rainfall and temperature, affects the physical and chemical weathering and the biological forces that work on the soil material. The climate in Robeson County is warm and humid. The average annual temperature is about 63° F., and the average annual rainfall is about 46 inches per year. Winters are mild, and only occasionally are the soils frozen to a depth of as much as 2 or 3 inches.

Because the climate is generally warm and moist, chemical and biological reactions are rapid. Most soils are highly leached by the water from the abundant rainfall and are low in organic-matter content. Only the wet soils contain a significant amount of organic matter.

Hydrogen is the dominant cation in the soils of Robeson County. Because calcium, magnesium, and other basic elements are replaced by hydrogen, the soils are acid. Because of the translocation of bases, colloidal matter, and other soluble material, the soils

of Robeson County have a more sandy surface layer and are less fertile than they formerly were.

Variations of climate within the county are small and probably are not the cause of local differences in the soils.

Plant and animal life

The plants and animals that live on and in the soil strongly influence its development and many of its profile characteristics. They determine the kinds of organic matter and the way in which it is incorporated with the soil. Plants and animals transfer nutrient elements from one horizon to another. They also affect the addition and removal of organic matter, nitrogen, and other plant nutrients and influence soil structure, porosity, and certain other soil characteristics.

Pine forests originally covered most of the uplands in Robeson County. Cypress, gum, and miscellaneous hardwoods were dominant on the lower flood plains along the large drainageways. As fallen leaves, twigs, roots, and whole plants decay, plant nutrients and organic acids are released to percolate down through the soil horizons. Roots take up some of the nutrients. Organic acids act to dissolve more slowly soluble mineral components and hasten the rate of removal of soluble inorganic materials from the surface layer. The effect of these organic acids on soil formation is conditioned by climate. Climate modifies the rate of chemical reaction and rate of leaching and, to a large degree, determines the kind of plants and animals living in and on the soil.

Organic matter decays more rapidly in the surface of well-drained soils, such as Norfolk and Wagram soils, because the periods of saturation are shorter than for poorly drained soils. There is very little accumulation of organic matter in the surface layer of well-drained soils, and the surface layer remains light colored. Decay of organic matter is retarded in the surface layer of poorly drained soils, such as Portsmouth, Torhunta, and Johnston soils, because the period of saturation ranges from one day to several weeks each year. The excess moisture retards oxidation and allows wet soils to accumulate much organic matter in the surface layer. This causes the surface to be darker colored than the surface of well-drained soils.

Organic matter probably is the energy source for microorganisms involved in oxygen consumption in saturated A horizons. Wet soils are saturated for longer periods, and the biological activity can reduce the oxygen level of the ground water so that anaerobic conditions can exist for several days or weeks.

The reduction of oxygen and the saturation can cause gray colors in the subsoil of poorly drained soils.

Relief

Relief has been an important factor in soil formation in this county. It strongly influences drainage, aeration, runoff, erosion, and exposure to sun and wind. Relief largely governs natural drainage, and several different types of soil may form from similar parent material because of differences in drainage.

The soils in most of Robeson County are nearly level to sloping. Soil material is continually being removed from the steeper slopes or is being mixed by erosion and soil creep. The more sloping soils are shallower and generally are less well developed than those on the smoother, well-drained plains.

The deepest water tables are near the short, sharply rounded side slopes. Deep water tables are associated with thick A2 horizons and fine-textured B horizons that have bright colors. The well-drained Wagram and Norfolk soils have these characteristics.

High water tables are associated with thin A2 horizons and gray colors in the subsoil or low-contrast mottling. The soils in the interstream areas, such as Lynchburg, Rains, and Pantego soils, have the characteristics associated with high water tables. They also have less distinct genetic horizons than well-drained soils.

Soils that formed in recent alluvium on flood plains are poorly drained and lack distinct genetic horizons.

Time

The length of time required for a well-developed soil profile to form depends on the degree that the other factors affect soil formation. Less time is generally required for a profile to develop in a warm, humid climate than is required in a cold, dry climate because moisture and a warm temperature accelerate the chemical and biological activity in the soil material. Also, less time is required for the formation of a distinct profile in moderately permeable soil material than in slowly permeable material. If time is sufficient, the soil material is modified so that genetic horizons of an A, B, and C sequence are formed.

In Robeson County, the soils that formed in alluvium along streams, such as Bibb and Osier soils, lack well-defined, genetically related horizons because the soil material has not been in place long enough for a well-defined profile to form. Norfolk soils, on the other hand, formed in materials that have been in place significantly longer. Their profiles exhibit a sandy A horizon and a clay-enriched B horizon.

Classification of the Soils

Soils are classified so that we can more easily remember their significant characteristics. Classification enables us to assemble knowledge about the soils, to see their relationship to one another and to the whole environment, and to develop principles that help us to understand their behavior and their response to manipulation. First through classification, and then through the use of soil maps, we can apply our knowledge of soils to specific fields and other tracts of land.

The narrow categories of classification, such as those used in detailed soil surveys, allow us to organize and apply knowledge about soils in managing farms, fields, and woodlands, in developing rural areas, in engineering work, and in many other ways. Soils are placed in broad classes to facilitate study and comparison in large areas, such as countries and continents.

The system of soil classification currently used was adopted by the National Cooperative Soil Survey in 1965 and is called soil taxonomy.[6]

[6] Unpublished working document used in the Soil Conservation Service: "Soil Taxonomy of the National Cooperative Soil Survey." Copy available in the SCS office.

The soil taxonomy has six categories. Beginning with broadest, these categories are order, suborder, great group, subgroup, family, and series. In this system the criteria used as a basis for classification are soil properties that are observable and measurable. The properties are chosen, however, so that the soils of similar genesis, or mode of origin, are grouped. In table 14, the soil series of Robeson County are classified according to soil taxonomy. Classes of soil taxonomy are briefly defined in the following paragraphs.

Order.—Ten soil orders are recognized. The properties used to differentiate among soil orders are those that tend to give broad climatic groupings of soils. The three exceptions to this are the Entisols, Inceptisols, and Histosols, which occur in many different climates. Each order is named with a word of three or four syllables ending in *sol.*

Suborder.—Each order is divided into suborders that are based primarily on those soil characteristics that seem to produce classes with the greatest genetic similarity. The suborders narrow the broad climatic range permitted in the orders. The soil properties used to separate suborders are mainly those that reflect either the presence or absence of water-logging or soil differences resulting from the climate or vegetation. The names of suborders have two syllables. The last syllable indicates the order.

Great group.—Soil suborders are separated into great groups on the basis of uniformity in the kinds and sequence of major soil horizons and features. The horizons used to make separations are those in which clay, iron, or humus have accumulated; those that have pans that interfere with the growth of roots, movement of water, or both; and thick, dark-colored surface horizons. The features used are the self-mulching properties of clay, soil temperature, major differences in chemical composition (mainly calcium, magnesium, sodium, and potassium), dark-red and dark-brown colors associated with basic rocks, and the like. The names of great groups have three or four syllables and are made by adding a prefix to the name of the suborder.

Subgroup.—Great groups are divided into subgroups, one representing the central (typic) segment of the group and others, called intergrades, that have properties of the group and also one or more properties of another great group, suborder, or order. Subgroups may also be made in those instances where soil properties intergrade outside of the range of any other

TABLE 14.—*Soil series classified according to the current system of classification*

Series	Family	Subgroup	Order
Aycock[1]	Fine-silty, siliceous, thermic	Typic Paleudults	Ultisols.
Bibb	Coarse-loamy, siliceous, acid, thermic	Typic Fluvaquents	Entisols.
Byars	Clayey, kaolinitic, thermic	Umbric Paleaquults	Ultisols.
Coxville	Clayey, kaolinitic, thermic	Typic Paleaquults	Ultisols.
Dunbar	Clayey, kaolinitic, thermic	Aeric Paleaquults	Ultisols.
Duplin	Clayey, kaolinitic, thermic	Aquic Paleudults	Ultisols.
Exum	Fine-silty, siliceous, thermic	Aquic Paleudults	Ultisols.
Faceville	Clayey, kaolinitic, thermic	Typic Paleudults	Ultisols.
Goldsboro	Fine-loamy, siliceous, thermic	Aquic Paleudults	Ultisols.
Johns	Fine-loamy over sandy or sandy-skeletal, siliceous, thermic.	Aquic Hapludults	Ultisols.
Johnston	Coarse-loamy, siliceous, acid, thermic	Cumulic Humaquepts	Inceptisols.
Kalmia	Fine-loamy over sandy or sandy-skeletal, siliceous, thermic.	Typic Hapludults	Ultisols.
Lakeland	Thermic, coated	Typic Quartzipsamments	Entisols.
Leon	Sandy, siliceous, thermic	Aeric Haplaquods	Spodosols.
Lumbee	Fine-loamy over sandy or sandy-skeletal, siliceous, thermic.	Typic Ochraquults	Ultisols.
Lynchburg	Fine-loamy, siliceous, thermic	Aeric Paleaquults	Ultisols.
Marlboro	Clayey, kaolinitic, thermic	Typic Paleudults	Ultisols.
McColl	Clayey, kaolinitic, thermic	Typic Fragiaquults	Ultisols.
Meggett	Fine, mixed, thermic	Typic Albaqualfs	Alfisols.
Nahunta	Fine-silty, siliceous, thermic	Aeric Paleaquults	Ultisols.
Norfolk	Fine-loamy, siliceous, thermic	Typic Paleudults	Ultisols.
Osier	Siliceous, thermic	Typic Psammaquents	Entisols.
Pactolus	Thermic, coated	Aquic Quartzipsamments	Entisols.
Pantego	Fine-loamy, siliceous, thermic	Umbric Paleaquults	Ultisols.
Plummer	Loamy, siliceous, thermic	Grossarenic Paleaquults	Ultisols.
Pocalla	Sandy, siliceous, thermic	Arenic Paleudults	Ultisols.
Ponzer variant	Loamy, siliceous, dysic, thermic	Terric Medisaprists	Histosols.
Portsmouth	Fine-loamy, siliceous, thermic	Typic Umbraquults	Ultisols.
Rains	Fine-loamy, siliceous, thermic	Typic Paleaquults	Ultisols.
Rutlege	Sandy, siliceous, thermic	Typic Humaquepts	Inceptisols.
Toisnot	Coarse-loamy, siliceous, thermic	Typic Fragiaquults	Ultisols.
Torhunta	Coarse-loamy, siliceous, acid, thermic	Typic Humaquepts	Inceptisols.
Trebloc	Fine-silty, siliceous, thermic	Typic Paleaquults	Ultisols.
Wagram	Loamy, siliceous, thermic	Arenic Paleaudults	Ultisols.
Wakulla	Sandy, siliceous, thermic	Psammentic Hapludults	Ultisols.

[1] The Aycock soils in Robeson County are taxadjuncts to the Aycock series because they have a slightly higher content of sand that is coarser than very fine sand and in places the lower part of the B horizon contains slightly more plinthite than is defined as within the range for the series.

great group, suborder, or order. The names of subgroups are derived by placing one or more adjectives before the name of the great group.

Family.—Soil families are separated within a subgroup primarily on the basis of properties important to the growth of plants or on the behavior of soils when used for engineering. Among the properties considered are texture, mineralogy, reaction, soil temperature, permeability, thickness of horizons, and consistence. A family name consists of a series of adjectives preceding the subgroup name. The adjectives are the class names for texture, mineralogy, and so on, that are used to differentiate families as shown in table 14.

General Nature of the County

The first inhabitants in what is now Robeson County were Lumbee Indians who had migrated from farther east and had settled along the banks of the Lumber River. Early settlers arrived about 1730. They grew wheat, corn, rice, potatoes, and cane. In the late 1800's after the invention of the cotton gin, the major crop was cotton, but by the 1930's it was tobacco.

In 1786, Robeson County was formed from what was then a part of Bladen County, but in 1911 part of Robeson County became Hoke County. Lumberton, the county seat, was created in 1787 and incorporated in 1852. It was established on the banks of the Lumber River, along the waterfront of which the first businesses were established.

The county is mainly agricultural. Currently, the foundation of the county's farming economy is tobacco, which accounts for about 50 percent of the total farm income and which is marketed locally at Fairmont and Lumberton. Because of the abundance of good soil, the availability of water, and the local market and transportation facilities, this area is ideal for farming.

In recent years, industry has grown in Robeson County. It has helped to balance the economy and to use the surplus farm-labor force created by mechanization. Among the industries are those that produce bagging, beverages, clothing, electronic equipment, fertilizer, footwear, hosiery, knit goods, lumber, paper pulp, textile finishing, textured fibers, and tobacco as well as those that process food or store tobacco. The manufacturing plants total 58 and employ 6,946 workers. On a seasonal basis, the tobacco processors employ 2,500 additional persons.

Among the transportation facilities, which are excellent, are several major highways, 17 trucking lines, a busline, and two railroads. The major highways are Interstate Highway 95, U.S. Highway 301 and 74, and State Highways 211, 72, and 41. Also, just outside Lumberton is the Lumberton Municipal Airport, a class 4 airport.

A variety of recreation activities is available in the county. There are five golf courses. Horseback riding, swimming, fishing, tennis, and bowling facilities are available.

Physiography, Relief, and Drainage

Robeson County is in southeastern North Carolina and is within the Atlantic Coastal Plain physiographic region.

Most of Robeson County is on the Sunderland geomorphic surface where the elevation is 100 to 170 feet. The extreme northern part of the county is on the Coharie geomorphic surface, where elevation is between 170 and 200 feet.

The soils formed in unconsolidated sand, silt, and clay deposited by water. Most of the sediment is in nearly level or gently sloping beds that overlie black to gray, interbedded sand, clay, and marl of the Black Creek formation.

The broad plains are dissected by permanent and intermittent streams that drain the county. All of the county, except the westernmost tip, drains directly into tributaries of the Lumber River, which meanders from north to south through the approximate center of the county. The broad interstream divides are pocketed with thousands of shallow, oval depressions, called Carolina bays. These bays are oriented in a northwest-southeast direction and range in size from less than 1 acre to more than 1,700 acres. The bays have no natural drainage outlets, and the soils in them are poorly drained or very poorly drained.

Water Supply

The Lumber River and its tributaries provide an abundant supply of surface water for all purposes. Major tributaries in the county include Big Swamp, which forms the eastern boundary of the county, Big Marsh Swamp, Raft Swamp, Richland Swamp, Back Swamp, Hog Swamp, and Ashpole Swamp. Shoe Heel Creek drains the western tip of the county.

Ground water is abundant and is near the surface in most of the county. It is easily tapped by wells for household use, for livestock, and for irrigation. Excavated ponds also are a common source of water for livestock and irrigation.

The water table fluctuates seasonally, depending on the amount of precipitation and degree of evapotranspiration. The water level peaks late in winter and early in spring and is at the lowest point late in summer and early in fall.

The chemical quality of water in the aquifers is not uniform throughout the county. Shallow aquifers commonly contain water that has an objectionable amount of iron but are generally acceptable otherwise. Water from deeper aquifers is generally of better quality.

Climate [7]

The climate of Robeson County is influenced by latitude, elevation, distance from the ocean, location on the continent, and other factors. Observational data from the Lumberton area represent the climate of most of the county. Temperature and precipitation data from records kept at Lumberton are given in table 15.

The average length of the growing season is about 225 days, from late March until early November. Table

[7] By A. V. HARDY, climatologist for North Carolina, National Weather Service, U.S. Department of Commerce.

16 gives information on the probability of freezing temperatures in spring and fall. In the nearly 70 years that records have been kept, the temperature at Lumberton has never been as low as 0° F. The highest temperature on record is 108°. The temperature reaches 100° in only about half the summers, but it rises to 90° or higher on more than half the days in each summer.

A large part of the rainfall during the growing season comes from summer thunderstorms and therefore varies widely from year to year, season to season, month to month, and even from place to place in the county. There can be periods of 5 to 20 days when local areas have no significant rain while other areas nearby have substantial showers. In such cases, irrigation may be worthwhile.

Frequently in autumn and occasionally in summer, tropical storms pass through the coastal waters or inland and increase rainfall. In dry seasons such rains may be beneficial.

Rainfall in winter generally results from low-pressure storms passing through or near the area and is less variable than in summer. Although several days may pass without significant rain, this is less important in winter because of the lower evaporation and transpiration.

A little snow or sleet occurs almost every winter, but the accumulation is ordinarily small and melts in a few hours. The blanketing effect of a layer of snow lasting several days is extremely rare. About once in 10 years, on the average, as much as 8 inches may accumulate; perhaps one in three of such rare accumulations may remain on the ground a week or more.

Cloudiness is variable; the sun shines, on the aver-

TABLE 15.—*Temperature and precipitation data*

[All data from Lumberton]

Month	Temperature				Precipitation					Estimated average temperature of bare, level soil at a depth of 4 inches
	Average daily maximum	Average daily minimum	2 years in 10 will have at least 4 days with—		Average total	1 year in 10 will have—		Number of days with snow cover of 1 inch or more	Average depth of snow on days with snow cover	
			Maximum temperature equal to or higher than—	Minimum temperature equal to or lower than—		Less than—	More than—			
	°F	°F	°F	°F	Inches	Inches	Inches		Inches	°F
January	56	35	74	16	2.8	1.2	5.0	1	1	46
February	59	36	76	19	3.5	.8	5.5	(1)	1	47
March	66	42	86	24	3.9	2.0	5.9	(1)	1	54
April	76	50	89	35	3.9	1.3	7.2	0		63
May	83	58	94	43	3.3	1.3	5.5	0		73
June	89	66	97	55	4.6	2.0	8.4	0		82
July	90	69	98	61	6.2	2.8	10.3	0		81
August	89	68	97	59	5.1	1.8	9.9	0		80
September	85	62	95	48	4.0	1.4	8.2	0		76
October	76	50	89	34	2.6	.4	6.4	0		66
November	65	41	80	25	2.7	.7	7.3	0		55
December	56	34	74	16	3.0	1.0	5.1	(1)	1	47
Year	74	51	[2] 100	[3] 14	45.6	36.2	57.1	2	1	64

[1] Less than one-half day.
[2] Average annual highest temperature.
[3] Average annual lowest temperature.

TABLE 16.—*Probabilities of last freezing temperatures in spring and first in fall*

[All data from Lumberton]

Probability	Dates for given probability and temperature				
	16° F or lower	20° F or lower	24° F or lower	28° F or lower	32° F or lower
Spring:					
1 year in 10 later than	February 17	March 1	March 16	April 4	April 16
2 years in 10 later than	January 28	February 25	March 7	March 27	April 9
5 years in 10 later than	January 20	February 10	February 24	March 14	March 28
Fall:					
1 year in 10 earlier than	December 9	November 24	November 9	October 29	October 17
2 years in 10 earlier than	December 20	December 3	November 16	November 5	October 24
5 years in 10 earlier than	December 30	December 12	November 25	November 14	November 2

age, more than half the daylight hours in winter and about two-thirds in other seasons. The average relative humidity is about 85 percent at sunrise and drops to near 50 percent at midafternoon.

Tropical storms with destructive winds move in from the coast and reach Robeson County less than once in 10 years on the average. Tornadoes are equally rare. High winds more often result from summer thunderstorms; such winds are very local and of brief duration. Surface winds are variable in all seasons, but the prevailing direction is from the southwest most of the year. In one or more autumn months, northeasterlies often prevail. The average surface wind speed is about 8 miles per hour.

Literature Cited

(1) American Association of State Highway [and Transportation] Officials. 1961. Standard specifications for highway materials and methods of sampling and testing. Ed. 8, 2 vol., illus.
(2) American Society for Testing Materials. 1974. Standard method for classification of soils for engineering purposes. ASTM Stand. D2487. *In* 1974 Annual Book of ASTM Standards, Part 19.
(3) Schumacher, F.X., and Coile, T.S. 1960. Growth and yields of natural stands of the southern pines. Durham, N.C., 115 pp., illus.
(4) United States Department of Agriculture. 1929. Volume, yield, and stand tables for second-growth southern pines. Misc. publ. 50, 202 pp., illus. [Out of print.]
(5) United States Department of Agriculture. 1951. Soil survey manual. U.S. Dep. Agric. Handb. 18, 503 pp., illus.
(6) United States Department of Agriculture. 1966. North Carolina's timber. Resource Bul. SE-5. Southeastern Forest Exp. Station, Forest Service, Asheville, N.C., 47 pp., illus.
(7) United States Department of Commerce. 1969. Census of Agriculture. Part 26, North Carolina.

Glossary

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as crumbs, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Soil material, such as sand, silt, or clay, that has been deposited on land by streams.

Available water capacity (also termed 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 capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil.

Carolina bay. A shallow, oval-shaped depression that lacks a natural drainage outlet. Such bays are oriented in a northwest-southwest direction and range from 5 acres to more than 500 acres in size. Most have standing water unless they are drained.

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 clay on the surface of a soil aggregate. Synonyms: clay coat, clay skin.

Compressible. This soil is relatively soft and decreases excessively in volume when a load is applied.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrations of compounds, or of soil grains cemented together. The composition of some concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are examples of material commonly found in concretions.

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

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

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

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

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

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

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

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

Cemented.—Hard and brittle; little affected by moistening.

Cutbanks cave. Walls of cuts are not stable. The soil sloughs easily.

Diversion, or diversion terrace. A ridge of earth, generally a terrace, that is built to divert runoff from its natural course and, thus, to protect areas downslope from the effects of such runoff.

Drainage class (natural). Refers to the conditions of frequency and duration of periods of saturation or partial saturation that existed during the development of the soil, 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 different classes of natural soil drainage are recognized.

Excessively drained soils are commonly very porous and rapidly permeable and have a low available water capacity.

Somewhat excessively drained soils are also very permeable and are free from mottling throughout their profile.

Well-drained soils are nearly free from mottling and are commonly of intermediate texture.

Moderately well drained soils commonly have a slowly permeable layer in or immediately beneath the solum. They have uniform color in the A and B horizons and mottling in the lower B and the C horizons.

Somewhat poorly drained soils are wet for significant periods but not all the time, and some soils commonly have mottling at a depth below 6 to 16 inches.

Poorly drained soils are wet for long periods and are light gray and generally mottled from the surface downward, although mottling may be absent or nearly so in some soils.

Very poorly drained soils are wet nearly all the time. They have a dark-gray or black surface layer and are gray or light gray, with or without mottling, in the deeper parts of the profile.

Erosion. The wearing away of the land surface by wind (sandblast), running water, and other geological agents.

Excess fines. The soil contains too much silt and clay for use as gravel or sand in construction.

Fast intake. Water infiltrates the soil rapidly.

Favorable. Features of the soil are favorable for the intended use.

Fertility, soil. The quality of a soil that enables it to provide compounds, in adequate amounts and in proper balance, for the growth of specified plants, when other growth factors such as light, moisture, temperature, and the physical condition of the soil are favorable.

Flood plain. Nearly level land, consisting of stream sediments, that borders a stream and is subject to flooding unless protected artificially.

Fragipan. A loamy, brittle, subsurface horizon that is very low in organic-matter content and clay but is rich in silt or very fine sand. The layer is seemingly cemented. When dry, it is hard or very hard and has a high bulk density in comparison with the horizon or horizons above it. When moist, the fragipan tends to rupture suddenly if pressure

is applied, rather than to deform slowly. The layer is generally mottled, is slowly or very slowly permeable to water, and has few or many bleached fracture planes that form polygons. Fragipans are a few inches to several feet thick; they generally occur below the B horizon, 15 to 40 inches below the surface.

Horizon, soil. A layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil-forming processes. These are the major horizons:

O horizon.—The layer of organic matter on the surface of a mineral soil. This layer consists of decaying plant residues.

A horizon.—The mineral horizon at the surface or just below an O horizon. This horizon is the one in which living organisms are most active and therefore is marked by the accumulation of humus. The horizon may have lost one or more of soluble salts, clay, and sesquioxides (iron and aluminum oxides).

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or some combination of these; (2) by prismatic or blocky structure; (3) by redder or stronger colors than the A horizon; or (4) by some combination of these. Combined A and B horizons are usually called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The weathered rock material immediately beneath the solum. In most soils this material is presumed to be like that from which the overlying horizons were formed. If the material is known to be different from that in the solum, a Roman numeral precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock usually underlies a C horizon but may be immediately beneath an A or B horizon.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Basin.—Water is applied rapidly to relatively level plots surrounded by levees or dikes.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops, or in orchards, to confine the flow of water to one direction.

Furrow.—Water is applied in small ditches made by cultivation implements used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Irrigation water, released at high points, flows onto the field without controlled distribution.

Low strength. The soil has inadequate strength to support loads.

Mottling, soil. Irregularly marked with spots of different colors that vary in number and size. Mottling in soils usually indicates poor aeration and lack of 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 these: *fine,* less than 5 millimeters (about 0.2 inch) in diameter along the greatest dimension; *medium,* ranging from 5 millimeters to 15 millimeters (about 0.2 to 0.6 inch) in diameter along the greatest dimension; and *coarse,* more than 15 millimeters (about 0.6 inch) in diameter along the greatest dimension.

Parent material. Disintegrated and partly weathered rock from which soil has formed.

Ped. An individual natural soil aggregate, such as a crumb, a prism, or a block, in contrast to a clod.

Percs slowly. Water moves through the soil slowly, affecting the specified use.

Permeability. The quality that enables the soil to transmit water or air. Terms used to describe permeability are as follows: *very slow, slow, moderately slow, moderate, moderately rapid, rapid,* and *very rapid.*

pH value. A numerical means for designating acidity and alkalinity in soils. A pH value of 7.0 indicates precise neutrality; a higher value, alkalinity; and a lower value, acidity.

Piping. The soil is susceptible to the formation of tunnels or pipelike cavities by moving water.

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents that commonly shows as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to hardpan or to irregular aggregates upon repeated wetting and drying. It is a form of laterite.

Poor outlets. Surface or subsurface drainage outlets are difficult or expensive to install.

Profile, soil. A vertical section of the soil through all its horizons and extending into the parent material.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is precisely neutral in reaction because it is neither acid nor alkaline. An acid, or "sour," soil is one that gives an acid reaction; an alkaline soil is one that is alkaline in reaction. In words, the degrees of acidity or alkalinity are expressed thus:

	pH		*pH*
Extremely acid	Below 4.5	Neutral	6.6 to 7.3
Very strongly acid	4.5 to 5.0	Mildly alkaline	7.4 to 7.8
Strongly acid	5.1 to 5.5	Moderately alkaline	7.9 to 8.4
Medium acid	5.6 to 6.0	Strongly alkaline	8.5 to 9.0
Slightly acid	6.1 to 6.5	Very strongly alkaline	9.1 and higher

Sand. Individual rock or mineral fragments in a soil that range in diameter from 0.05 to 2.0 millimeters. Most sand grains consist of quartz, but they may be of any mineral composition. The textural class name of any soil that contains 85 percent or more sand and not more than 10 percent clay.

Seepage. Water moves through the soil so quickly that it affects the specified use.

Shrink-swell. The soil expands on wetting and shrinks on drying, which may cause damage to roads, dams, buildings, foundations, or other structures.

Silt. Individual mineral particles in a soil that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). Soil of the silt textural class is 80 percent or more silt and less than 12 percent clay.

Soil. A natural, three-dimensional body on the earth's surface that supports plants and that 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: *Very coarse sand* (2.0 to 1.0 millimeter); *coarse sand* (1.0 to 0.5 millimeter); *medium sand* (0.5 to 0.25 millimeter); *fine sand* (0.25 to 0.10 millimeter); *very fine sand* (0.10 to 0.05 millimeter); *silt* (0.05 to 0.002 millimeter); and *clay* (less than 0.002 millimeter). The separates recognized by the International Society of Soil Science are as follows: I (2.0 to 0.2 millimeter); II (0.2 to 0.02 millimeter); III (0.02 to 0.002 millimeter); IV (less than 0.002 millimeter).

Solum. The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum in mature soil includes 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 other plant and animal life characteristic of the soil are largely confined to the solum.

Structure, soil. The arrangement of primary soil particles into compound particles or clusters that are separated from adjoining aggregates and have properties unlike those of an equal mass of unaggregated primary soil particles. 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 together without any regular cleavage, as in many claypans and hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. Technically, the part of the soil below the solum.

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 it may soak into the soil or flow slowly to a prepared outlet without harm. Terraces in fields are generally built so they can be farmed. Terraces intended mainly for drainage have a deep channel that is maintained in permanent sod.

Terrace (geological). An old alluvial plain, ordinarily flat or undulating, bordering a river, lake, or the sea. Stream terraces are frequently called second bottoms, as contrasted to flood plains, and are seldom subject to overflow. Marine terraces were deposited by the sea and are generally wide.

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. Suitable soil material not thick enough for use as borrow material or topsoil.

Tilth, soil. The condition of the soil in relation to the growth of plants, especially soil structure. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable, granular structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Unstable fill. Banks of fill are likely to cave in or slough.

Variant, soil. A soil having properties sufficiently different from those of other known soils to suggest establishing a new soil series, but a soil of such limited known area that creation of a new series is not believed to be justified.

Water table. The highest part of the soil or underlying rock material that is wholly saturated with water. In some places an upper, or perched, water table may be separated from a lower one by a dry zone.

Wilting point (or permanent wilting point). The moisture content of soil, on an oven-dry basis, at which plants (specifically sunflower) wilt so much that they do not recover when placed in a dark, humid atmosphere.

GUIDE TO MAPPING UNITS

For a full description of a mapping unit, read both the description of the mapping unit and that of the soil series to which the mapping unit belongs. Capability grouping is explained in the section that begins on page 32. Woodland suitability grouping is explained in the section that begins on page 36.

Map symbol	Mapping unit	Page	Capability unit	Woodland suitability group
			Symbol	Symbol
AyA	Aycock very fine sandy loam, 0 to 2 percent slopes--	6	IIe-1	2o1
AyB	Aycock very fine sandy loam, 2 to 6 percent slopes--	6	IIIe-1	2o1
BB	Bibb soils----------	7	Vw-1 (frequently flooded) IIIw-1 (occasionally flooded)	2w9
By	Byars loam----------	7	IVw-2	2w9
Co	Coxville loam----------	8	IIIw-2	2w9
Dn	Dunbar sandy loam----------	8	IIw-2	2w8
DpA	Duplin sandy loam, 0 to 2 percent slopes----------	9	IIw-1	2w8
DpB	Duplin sandy loam, 2 to 6 percent slopes----------	9	IIe-2	2w8
ExA	Exum very fine sandy loam, 0 to 1 percent slopes----	10	IIw-1	2w8
FaA	Faceville fine sandy loam, 0 to 2 percent slopes----	11	I-1	3o1
FaB	Faceville fine sandy loam, 2 to 6 percent slopes----	11	IIe-1	3o1
GoA	Goldsboro loamy sand, 0 to 2 percent slopes---------	11	IIw-1	2w8
Jo	Johns sandy loam----------	12	IIw-2	2w2
JT	Johnston soils----------	13	IVw-3 (drained) VIIw-1 (undrained)	1w9
KaA	Kalmia loamy sand, 0 to 2 percent slopes----------	14	I-1	2o7
LaB	Lakeland sand, 0 to 6 percent slopes----------	14	IVs-1	4s2
Le	Leon sand----------	15	IVw-1	4w2
Lu	Lumbee sandy loam----------	16	IIIw-3	2w9
Ly	Lynchburg sandy loam----------	16	IIw-2	2w8
MaA	Marlboro sandy loam, 0 to 2 percent slopes----------	18	I-1	3o1
MaB	Marlboro sandy loam, 2 to 6 percent slopes----------	18	IIe-1	3o1
Mc	McColl loam----------	18	IVw-2 (undrained) IIIw-2 (drained)	2w9
Me	Meggett fine sandy loam----------	19	IIIw-2 (not flooded) Vw-1 (flooded)	1w9
Na	Nahunta very fine sandy loam----------	20	IIw-2	2w8
NoA	Norfolk loamy sand, 0 to 2 percent slopes----------	21	I-1	2o1
NoB	Norfolk loamy sand, 2 to 6 percent slopes----------	21	IIe-1	2o1
NsC	Norfolk and Faceville soils, 6 to 10 percent slopes-	22	IVe-1	3o1
Pa	Pactolus loamy sand----------	22	IIIs-1	3w2
Pg	Pantego fine sandy loam----------	23	IIIw-3	1w9
Pm	Plummer and Osier soils----------	24	IVw-1	---
	Plummer soil----------	--	----------	2w3
	Osier soil----------	--	----------	3w3
PoB	Pocalla loamy sand, 0 to 3 percent slopes----------	24	IIs-1	3s2
Pr	Ponzer muck, siliceous subsoil variant----------	25	IVw-3 (drained) VIIw-1 (undrained)	4w3
Pt	Portsmouth loam----------	26	IIIw-3	1w9
Ra	Rains sandy loam----------	26	IIIw-3 (drained) Vw-1 (undrained)	2w3
Ru	Rutlege loamy sand----------	27	Vw-1	2w3
Ta	Toisnot loam----------	28	IVw-2	3w9
To	Torhunta loam----------	29	IIIw-3 (drained) VIw-1 (undrained)	2w9
Tr	Trebloc loam----------	30	IIIw-2 (drained) IVw-2 (undrained)	2w9
Ud	Udorthents, loamy----------	30	Unclassified	Unclassified
WaB	Wagram loamy sand, 0 to 6 percent slopes----------	30	IIs-1	3s2
WaC	Wagram loamy sand, 6 to 10 percent slopes----------	31	IIIs-1	3s2
WkB	Wakulla sand, 0 to 6 percent slopes----------	32	IIIs-1	3s2

☆ U.S. GOVERNMENT PRINTING OFFICE: 1977— 213-015/52

NRCS Accessibility Statement

This document is not accessible by screen-reader software. The Natural Resources Conservation Service (NRCS) is committed to making its information accessible to all of its customers and employees. If you are experiencing accessibility issues and need assistance, please contact our Helpdesk by phone at 1-800-457-3642 or by e-mail at ServiceDesk-FTC@ftc.usda.gov. For assistance with publications that include maps, graphs, or similar forms of information, you may also wish to contact our State or local office. You can locate the correct office and phone number at http://offices.sc.egov.usda.gov/locator/app.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.