SOIL SURVEY OF

Lenoir County, North Carolina

United States Department of Agriculture
Soil Conservation Service
In cooperation with
North Carolina Agricultural Experiment Station and
Lenoir 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.

Major fieldwork for this soil survey was completed in the period 1969–71. Soil names and descriptions were approved in 1971. 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 Lenoir County Board of Commissioners. It is part of the technical assistance furnished to the Lenoir Soil and Water Conservation District.

HOW TO USE THIS SOIL SURVEY

THIS SOIL SURVEY contains information that can be applied in managing farms and woodlands; 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 Lenoir 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 of each. It also shows the page where each soil is described and the woodland suitability group in which the soil has been placed.

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 section "Management of Soils for Crops and Pasture."

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

Game managers, sportsmen, and others can find information about soils and wildlife in the section "Use of Soils for Wildlife."

Community planners and others can read about soil properties that affect the choice of sites for dwellings and industrial buildings in the section "Engineering Interpretations of Soils."

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 how the soils formed and how they are classified in the section "Formation and Classification of the Soils."

Newcomers in Lenoir County 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 in the section "General Nature of the County."

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SOIL SURVEY OF LENOIR COUNTY, NORTH CAROLINA

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SOILS SURVEYED BY WILLIAM L. BARNHILL, J. A. MEADOWS, JAMES DUNN, J. B. NEWMAN, AND JESSIE F. CAMPBELL

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

LENOIR COUNTY is in the east-central part of North Carolina (fig. 1). The county is 255,936 acres or about 400 square miles in size. According to the 1970 census the population of the county was 55,204. Kinston, the county seat, had a population of 22,309.

Lenoir County is in the Coastal Plain physiographic province. The elevation ranges from 10 feet near the Neuse River and 60 feet near the Trent River to 161 feet at the corner boundary with Duplin and Wayne Counties. The land surface is smooth. Most of the county is nearly level or gently sloping, but short breaks separate the uplands and flood plains in many places.

Lenoir County is mainly in farms. The short, mild winters and long, hot summers permit a wide range of farming and choice of crops. Tobacco, corn, and soybeans are the main cash crops. The other important crops are small grain, sweet potatoes, vegetables, and forest products. The county also produces poultry and eggs, hogs, beef, and dairy products.

How This Survey Was Made

Soil scientists made this survey to learn what kinds of soils are in Lenoir 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; 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 the action of plant roots.

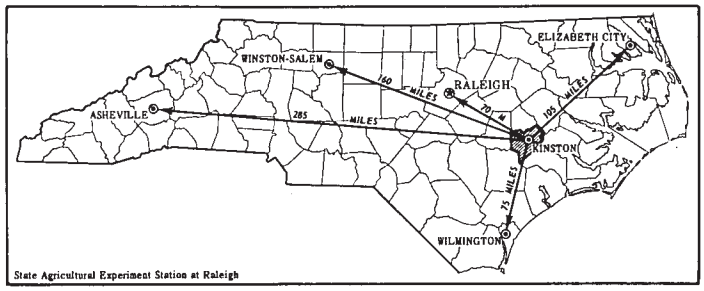

Figure 1.—Location of Lenoir County in North Carolina.

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. Kenansville and Goldsboro, for example, are the 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 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, 2 to 6 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 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, an undifferentiated group, is shown on the soil map of Lenoir County.

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 is one dominant series represented in the group, the name of the group ordinarily consists of the name of the dominant soil series. Bibb soils is an example.

In most areas surveyed there are places where the soil material is 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 called land types and are given descriptive names.

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 for structures, foundations for structures, 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 its seasonal 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 characteristics 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 Lenoir 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, recreational 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 similar structure, because the soils in any one association ordinarily differ in slope, depth, stoniness, drainage, and other characteristics that affect their management.

Soil associations on the general soil map in this soil survey do not fully agree with those of the general soil maps in adjacent counties. Differences in the maps are the result of improvements in the classification of soils, particularly in the modifications or refinements in soil series concepts. In addition, more precise and detailed maps are needed because the uses of the general soil maps have expanded in recent years. The more modern maps meet this need.

The soil associations in Lenoir County are discussed in the following paragraphs.

1. Norfolk-Goldsboro association

Well drained and moderately well drained soils that have a loamy subsoil; on uplands

This association consists of nearly level to sloping soils on broad, slightly convex interstream divides. The association is dissected by many drainageways. The nearly level and gently sloping soils are on the broad uplands. The sloping soils are on the short breaks adjacent to the drainageways.

This association makes up 30 percent of the county. It is about 46 percent Norfolk soils and 15 percent Goldsboro soils. Minor soils make up 39 percent and are chiefly Lynchburg, Rains, Wagram, Stallings, Woodington, Pocalla, Torhunta, Bibb, Pantego, and Craven soils.

Norfolk soils are well drained. The surface layer is grayish brown loamy sand, and the subsurface layer is pale-brown loamy sand. The subsoil is light yellowish-brown sandy loam and yellowish-brown and brownish-yellow sandy clay loam.

Goldsboro soils are moderately well drained. The surface layer is grayish-brown loamy sand, and the subsurface layer is pale-brown loamy sand. The subsoil is light yellowish-brown sandy loam and yellowish-brown, pale-brown, and gray sandy clay loam.

Most of this association is cultivated. A small acreage is pasture, and some is used for nonfarm purposes.

The major soils are well suited to all locally grown crops. The main crops are corn, tobacco, soybeans, small grain, and some truck crops.

A seasonal high water table, slope, and runoff are the main limitations in the use and management of these soils.

2. *Pocalla-Wagram-Lakeland association*

Well-drained to excessively drained soils that mainly have a loamy subsoil; on uplands

This association consists of nearly level to strongly sloping soils on broad, smooth interstream divides. The association is dissected by many drainageways. The nearly level and gently sloping soils are on the broad uplands. The sloping and strongly sloping soils are on the short breaks adjacent to the drainagways.

This association makes up about 25 percent of the county. It is 43 percent Pocalla soils, 18 percent Wagram soils, and 11 percent Lakeland soils. Minor soils make up 28 percent of this association and are chiefly Blanton, Pactolus, Norfolk, Stallings, Woodington, Lynchburg, Rains, Leon, and Bibb soils.

Pocalla soils are somewhat excessively drained. The surface layer is grayish-brown loamy sand, and the subsurface layer is pale-brown sand. The subsoil is light yellowish-brown and yellowish-brown sandy loam.

Wagram soils are well drained. The surface layer is grayish-brown loamy sand, and the subsurface layer is pale-brown loamy sand. The subsoil is yellowish-brown, brownish-yellow, and light yellowish-brown sandy clay loam.

Lakeland soils are excessively drained. The surface layer is brown sand. The underlying layers are brownish-yellow, yellow, and very pale brown sand.

Most of this association is cultivated. The rest is pastured, wooded, or used for nonfarm purposes. Most of the acreage is suited or fairly well suited to most locally grown crops, and the rest is poorly suited. The main crops are corn, soybeans, tobacco, small grain, and some truck crops. The important tree species are pine and oak.

Leaching of plant nutrients, low available water capacity, the hazard of soil blowing, and slope are the main limitations in the use and management of these soils.

3. *Rains-Lynchburg association*

Poorly drained and somewhat poorly drained soils that have a loamy subsoil; on uplands

This association consists of nearly level soils in broad, smooth interstream areas. The association is dissected by several shallow drainageways. The soils are on flats and in depressions.

This association makes up 15 percent of the county. It is 45 percent Rains soils and 28 percent Lynchburg soils. Minor soils make up 27 percent and are chiefly Coxville, Grifton, Meggett, Pantego, Stallings, Torhunta, and Woodington soils and Umbric Ochraqualfs.

Rains soils are poorly drained. The surface layer is dark-gray sandy loam, and the subsurface layer is light brownish-gray sandy loam. The subsoil is light brownish-gray and gray sandy clay loam.

Lynchburg soils are somewhat poorly drained. The surface layer is dark-gray sandy loam, and the subsurface layer is light brownish-gray sandy loam. The subsoil is pale-brown and gray sandy clay loam.

Most of this association is wooded. The important tree species are loblolly and pond pines. If drained, these soils are well suited to a few locally grown crops. Cultivated areas are used for corn, soybeans, tobacco, small grain, and pasture.

A seasonal high water table and surface ponding are the main limitations in the use and management of these soils.

4. *Johnston-Chewacla-Kinston association*

Very poorly drained to somewhat poorly drained soils that are mainly loamy throughout, but some are underlain by sandy material; on flood plains

This association consists of nearly level soils along the major streams. These soils are frequently flooded.

This association makes up about 8 percent of the county. It is 35 percent Johnson soils, 28 percent Chewacla soils, and 20 percent Kinston soils. Minor soils make up 17 percent and are chiefly Bibb and Pamlico soils.

Johnston soils are very poorly drained. The surface layer is black mucky loam in the upper part and fine sandy loam in the lower part. The underlying layers are dark grayish-brown sandy loam and light brownish-gray soil.

Chewacla soils are somewhat poorly drained. The surface layer is brown loam. The subsoil is yellowish-brown loam, brown clay loam, and light brownish-gray sandy loam.

Kinston soils are poorly drained. The surface layer is dark grayish-brown loam. The subsoil is gray clay loam.

Most of this association is wooded. The rest is cultivated or is in pasture. These soils are suited or well suited to a few locally grown crops. Cultivated areas are used for corn and soybeans. Other areas are in pasture. The tree species are mixed hardwoods, including gum, maple, and oak.

The hazard of stream overflow, water ponding on the surface, a seasonal high water table, and frequent or very frequent flooding are the main limitations in the use and management of these soils.

5. *Kalmia-Johns-Kenansville association*

Well-drained to somewhat poorly drained soils that have a loamy or sandy subsoil; on stream terraces

This association consists of soils on fairly broad and long, low ridges separated by shallow depressions. The soils are on stream terraces. The landscape is dissected by shallow drainageways.

This association makes up 10 percent of the county. It is 32 percent Kalmia soils, 26 percent Johns soils, and 22 percent Kenansville soils. Minor soils make up 20 percent and are chiefly Lumbee, Wickham, Portsmouth, Stallings, Woodington, Pactolus, Leaf, Lakeland, and Bibb soils.

Kalmia soils are well drained. The surface layer is grayish-brown loamy sand, and the subsurface layer is pale-brown loamy sand. The subsoil is light yellowish-brown and yellowish-brown sandy clay loam

and brownish-yellow sandy loam.

Johns soils are moderately well drained or somewhat poorly drained. The surface layer is dark-gray sandy loam, and the subsurface layer is pale-brown sandy loam. The subsoil is pale-brown and light yellowish-brown sandy clay loam and gray sandy loam.

Kenansville soils are well drained. The surface layer is grayish-brown loamy sand, and the subsurface layer is light yellowish-brown loamy sand. The subsoil is yellowish-brown sandy loam and loamy sand.

Most of this association is cultivated or in pasture. The rest is wooded or used for nonfarm purposes. The major soils are well suited or fairly well suited to most locally grown crops. The important crops are corn, soybeans, small grain, tobacco, and truck crops. The important tree species are loblolly pine, oak, gum, holly, dogwood, and maple.

Leaching of plant nutrients, the hazard of soil blowing, very low available water capacity, and a seasonal high water table are the main limitations in the use and management of these soils.

6. *Torhunta-Lumbee association*

Very poorly drained and poorly drained soils that have a loamy subsoil; on stream terraces and uplands

This association consists of soils on broad, smooth, flat stream terraces. The association is dissected by shallow drainageways.

This association makes up 6 percent of the county. It is 45 percent Torhunta soils and 28 percent Lumbee soils. Minor soils make up 27 percent and are chiefly Pamlico, Portsmouth, Leaf, Pactolus, Woodington, Stallings, and Johns soils.

Torhunta soils are very poorly drained. The surface layer is black loam in the upper part and very dark grayish-brown loam in the lower part. The subsoil is grayish-brown sandy loam.

Lumbee soils are poorly drained. The surface layer is dark-gray sandy loam, and the subsurface layer is light brownish-gray sandy loam. The subsoil is light brownish-gray and gray sandy clay loam and gray sandy loam.

Most of this association is wooded. The rest is cultivated or in pasture. The important tree species are pond and loblolly pine, gum, and maple. Cultivated areas are used chiefly for corn and soybeans. If drained, these soils are suited or well suited to a few locally grown crops.

Water ponding on the surface and a seasonal high water table are the main limitations in the use and management of these soils.

7. *Leon-Murville association*

Somewhat poorly drained and very poorly drained soils that have a sandy subsoil; on uplands

This association is on broad, smooth flats and depressions in wide interstream areas. The association is dissected by a few shallow drainageways.

This association makes up 3 percent of the county. It is 45 percent Leon soils and 25 percent Murville soils. Minor soils make up 30 percent and are Pocalla, Stallings, Woodington, Torhunta, and Pactolus soils.

Leon soils are somewhat poorly drained. The surface layer is dark-gray sand, and the subsurface layer is light-gray sand. The subsoil is black and dark-brown sand.

Murville soils are very poorly drained. The surface layer is black fine sand. The subsoil is very dark gray and black fine sand in the upper part and mottled, very dark gray and black fine sand in the lower part.

Nearly all of this association is wooded. The important tree species are loblolly, pond, and longleaf pine. Most of the acreage is poorly suited to locally grown crops. If drained, the rest is suited to a few locally grown crops.

Leaching of plant nutrients, hardpan in the subsoil, water ponding on the surface, and a seasonal high water table are the main limitations in the use and management of these soils.

8. *Leaf-Craven-Lenoir association*

Poorly drained to moderately well drained soils that have a loamy or clayey subsoil; on stream terraces or uplands

This association consists of broad, smooth divides that are slightly rounded and slope gently toward the drainageways. The association is dissected by a few shallow drainageways.

This association makes up 3 percent of the county. It is 30 percent Leaf soils, 20 percent Craven soils, and 13 percent Lenoir soils. Minor soils make up 37 percent and are chiefly Lumbee, Meggett, Portsmouth, Rains, Lynchburg, and Bibb soils.

Leaf soils are poorly drained. The surface layer is very dark gray loam, and the subsurface layer is gray loam. The subsoil is gray clay or clay loam.

Craven soils are moderately well drained. The surface layer is grayish-brown fine sandy loam, and the subsurface layer is pale-brown fine sandy loam. The subsoil is light yellowish-brown loam, yellowish-brown and light yellowish-brown clay, and gray clay loam.

Lenoir soils are somewhat poorly drained. The surface layer is dark-gray loam, and the subsurface layer is light brownish-gray loam. The subsoil is pale-brown and gray clay.

Most of this association is wooded. The rest is cultivated or in pasture. The important forest species are loblolly and pond pine. If drained, these soils are suited to a few locally grown crops. The major crops are corn, soybeans, tobacco, small grain, and pasture plants.

Moderate shrink-swell potential, slow permeability, a seasonal high water table, water ponding on the surface of nearly level and depressional soils, runoff on the more sloping soils, and other problems caused by slope are the main limitations in the use and management of these soils.

Descriptions of the Soils

In this section the soils of Lenoir 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. 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. Color terms are for moist soils unless otherwise stated.

Following 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 are the capability unit and woodland suitability group in which the mapping unit has been placed. The page for the description of each mapping unit can be learned by referring to the "Guide to Mapping Units" at the back of this survey.

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 (*6*).[1]

Names in this soil survey do not fully agree with soil maps in Duplin County. Differences are the result of better knowledge of soils, modifications in series concepts, and the extent of soils within the survey.

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 layer extends to a depth of 70 inches. It is mottled,

[1] Italic numbers in parentheses refer to literature cited, p. 64.

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

Soil	Acres	Percent
Bibb soils, frequently flooded	8,189	3.2
Blanton sand, 0 to 6 percent slopes	3,327	1.3
Chewacla loam, frequently flooded	6,910	2.7
Coxville loam	2,559	1.0
Craven fine sandy loam, 1 to 4 percent slopes	2,047	0.8
Craven fine sandy loam, 4 to 8 percent slopes	511	0.2
Goldsboro loamy sand, 0 to 2 percent slopes	13,564	5.3
Grifton sandy loam	2,303	0.9
Johns sandy loam	6,654	2.6
Johnston soils	7,934	3.1
Kalmia loamy sand, 0 to 2 percent slopes	4,862	1.9
Kalmia loamy sand, 2 to 6 percent slopes	3,327	1.3
Kenansville loamy sand, 0 to 6 percent slopes	5,630	2.2
Kinston loam, frequently flooded	4,094	1.6
Lakeland sand, 0 to 6 percent slopes	7,678	3.0
Leaf loam	3,327	1.3
Lenoir loam	1,279	0.5
Leon sand	4,094	1.6
Lumbee sandy loam	5,886	2.3
Lynchburg sandy loam	12,284	4.8
Meggett fine sandy loam	767	0.3
Murville fine sand	2,303	0.9
Norfolk loamy sand, 0 to 2 percent slopes	17,659	6.9
Norfolk loamy sand, 2 to 6 percent slopes	18,171	7.1
Norfolk loamy sand, 6 to 10 percent slopes	3,583	1.4
Pactolus loamy sand	4,350	1.7
Pamlico muck	4,862	1.9
Pantego loam	5,118	2.0
Pocalla loamy sand, 0 to 6 percent slopes	28,685	11.2
Portsmouth loam	2,815	1.1
Rains sandy loam	18,683	7.3
Stallings loamy sand	11,005	4.3
Torhunta loam	9,725	3.8
Umbric Ochraqualfs	511	0.2
Wagram loamy sand, 0 to 6 percent slopes	8,189	3.2
Wagram loamy sand, 6 to 10 percent slopes	2,303	0.9
Wagram loamy sand, 10 to 15 percent slopes	2,559	1.0
Wickham loamy sand, 1 to 6 percent slopes	511	0.2
Woodington loamy sand	7,678	3.0
Total	255,936	100.0

dark-gray and gray sandy loam in the upper part and grayish-brown loamy sand in the lower part.

Bibb soils are low in natural fertility and content of organic matter. Permeability is moderate, and available water capacity is medium. Shrink-swell potential is low. The seasonal high water table is at the surface. These soils flood frequently for brief periods. Flooding is more frequent in winter and in spring.

Nearly all of the acreage is wooded. A small acreage is cultivated and pastured.

Representative profile of Bibb sandy loam from an area of Bibb soils, frequently flooded, in a wooded area 4 miles south of Hugo, 0.3 mile north of intersection of State Roads 1700 and 1731 and 50 feet east of bridge on State Road 1731:

A1—0 to 12 inches, dark-gray (10YR 4/1) sandy loam; few, fine, faint, dark reddish-brown stains around old roots; moderate, medium, granular structure; very friable; many large roots; very strongly acid; clear, wavy boundary.

C1g—12 to 45 inches, mottled, dark-gray (10YR 4/1) and gray (10YR 5/1) sandy loam; few thin strata of loam and loamy sand; few, fine, distinct, yellowish-brown and brown mottles; massive; very friable, slightly sticky and slightly plastic; few fine and medium roots; very strongly acid; gradual, wavy boundary.

C2g—45 to 70 inches, grayish-brown (10YR 5/2) loamy sand; massive; very friable; strongly acid.

Reaction is very strongly acid or strongly acid unless the soils are limed. The A horizon is dark-gray or dark grayish-brown sandy loam, loam, or loamy sand. The C horizon is dark-gray, gray, grayish-brown, or light brownish-gray sandy loam or loam. In places this horizon has thin strata of sand and silt loam. The C horizon, below a depth of about 45 inches, is loamy sand or sand. Few to common brown mottles are in the upper part of the C horizon.

Bibb soils, frequently flooded (BB).—These soils are in narrow drainageways. Slopes are less than 1 percent. The surface layer is sandy loam, loam, or loamy sand. In a few of these soils the underlying layer is nonacid, and marl is at depth of 4 to 7 feet. The areas are long and narrow and range from 30 acres to several hundred acres in size. They are generally larger than those mapped elsewhere in the county, but mapping has been controlled well enough to make the interpretations for the anticipated uses.

Included with these soils in mapping are several areas of Kinston and Johnston soils.

Infiltration is moderate, and runoff is slow. Water is ponded in places. If properly drained, these soils are suited to a few locally grown crops. Surface and subsurface drainage and protection from floods are needed for all crops.

Because of lack of suitable outlets, construction of drainage systems is difficult in places where marl underlies these soils. Water ponding on the surface, moderate permeability, a seasonal high water table, and frequent flooding are the main limitations in the use and management of these soils. Capability subclass Vw, frequently flooded; woodland suitability group 2w9.

Blanton Series

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

In a representative profile the surface layer is light brownish-gray sand about 3 inches thick. The subsurface layer is very pale brown sand about 52 inches thick. The subsoil is 43 inches thick. The upper part is brownish-yellow sandy loam. The middle part is yellowish-brown sandy clay loam that is mottled with brown and gray. The lower part is light yellowish-brown sandy clay loam that is mottled with brown and gray. Below this layer, to a depth of 120 inches, is pale-brown loamy sand that is mottled with brown and gray.

Blanton soils are very low in natural fertility and content of organic matter. Permeability is moderate, and available water capacity is very low. Shrink-swell potential is low. The seasonal high water table remains below a depth of about 5 feet.

Most of the acreage is wooded. The rest is cultivated or used for nonfarm purposes.

Representative profile of Blanton sand, 0 to 6 percent slopes, in a wooded area 1 mile southwest of LaGrange, 0.2 mile south of intersection of U.S. Highway 70 and State Road 1323, and 50 feet east of State Road 1323:

A1—0 to 3 inches, light brownish-gray (10YR 6/2) sand; very weak, medium, granular structure; very friable; common roots; very strongly acid; gradual, wavy boundary.

A2—3 to 55 inches, very pale brown (10YR 7/4) sand; single grained; loose; few lenses of light-gray sand in the lower part; very strongly acid; gradual, wavy boundary.

B1—55 to 63 inches, brownish-yellow (10YR 6/8) sandy loam; weak, fine, subangular blocky structure; very friable; very strongly acid; gradual, wavy boundary.

B2t—63 to 80 inches, yellowish-brown (10YR 5/8) sandy clay loam; common, medium, distinct, strong-brown (7.5YR 5/8) mottles and few, medium, distinct, gray (10YR 6/1) mottles; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; thin, discontinuous clay films on faces of peds; very strongly acid; gradual, wavy boundary.

B3—80 to 98 inches, light yellowish-brown (10YR 6/4) sandy clay loam; few, medium, distinct, strong-brown (7.5YR 5/8) and gray (10YR 5/1) mottles; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; very strongly acid; gradual, wavy boundary.

C—98 to 120 inches, pale-brown (10YR 6/3) loamy sand, few, medium, distinct, strong-brown (7.5YR 5/6) and gray (10YR 6/1) mottles; massive; very friable; few pebbles; strongly acid.

The solum is more than 60 inches thick. Reaction is very strongly acid or strongly acid unless the soils are limed. The Ap and A1 horizons are grayish brown, light brownish gray, or light gray. The A2 horizon is very pale brown or pale brown. The B horizon is light yellowish-brown, brownish-yellow, yellowish-brown, or strong-brown sandy clay loam or sandy loam that is mottled with brown, gray, and red. The C horizon is loamy sand, sandy loam, or sandy clay loam.

Blanton sand, 0 to 6 percent slopes (Bn).—This soil is on broad, smooth and slightly rounded divides. The areas range from about 5 to 50 acres in size and are about as broad as they are long.

Included with this soil in mapping are small areas of Wagram, Lakeland, and Pocalla soils. In places long, narrow areas of Leon soils are included at the foot of slopes.

Infiltration is rapid, and runoff is slow.

This soil is fairly well suited to most locally grown crops, such as Coastal bermudagrass, tobacco, and small grain. Practices are needed to control the hazard of soil blowing in cultivated areas.

Leaching of plant nutrients, moderate permeability, very low available water capacity, and the hazard of soil blowing are the main limitations in the use and management of this soil. Capability unit IIIs–1; woodland suitability group 3s2.

Chewacla Series

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

In a representative profile the surface layer is brown loam about 6 inches thick. The subsoil is 42 inches thick. The upper part is yellowish-brown loam that is mottled with brown. The middle part is brown clay loam that is mottled with gray and brown. The lower part is light brownish-gray sandy loam that is mottled with brown. Below the subsoil, to a depth of about 65 inches, is light-gray loamy sand that is mottled with brown.

Chewacla soils are low in natural fertility and content of organic matter. Permeability is moderate, and available water capacity is high. Shrink-swell potential is low. The seasonal high water table is at a depth of about 18 inches. These soils flood frequently for brief periods. Flooding is more frequent in winter and spring.

Most of the acreage is wooded. The rest is pastured or cultivated.

Representative profile of Chewacla loam, frequently flooded, 1 mile southwest of Kinston, in a wooded area, 0.5 mile southeast of intersection of U.S. Highway 702 and U.S. Highway 70, 300 feet northwest of Neuse River Bridge on U.S. Highway 70:

A1—0 to 6 inches, brown (10YR 4/3) loam; moderate, medium, granular structure; friable; common fine roots; common fine flakes of mica; strongly acid; clear, wavy boundary.

B1—6 to 12 inches, yellowish-brown (10YR 5/4) loam; few, medium, faint, pale-brown (10YR 6/3) mottles and common, fine, distinct, strong-brown mottles; weak, medium, subangular blocky structure; friable, slightly sticky and slightly plastic; common fine roots; common fine flakes of mica; strongly acid; clear, wavy boundary.

B2—12 to 27 inches, brown (10YR 5/3) clay loam; common, fine, distinct, light brownish-gray and yellowish-brown mottles; weak, medium, subangular blocky structure; friable, slightly sticky and slightly plastic; common fine flakes of mica; strongly acid; abrupt, wavy boundary.

B3g—27 to 48 inches, light brownish-gray (10YR 6/2) sandy loam; common, medium, distinct, yellowish-brown (10YR 5/4) mottles; massive; very friable, slightly sticky and slightly plastic; common fine flakes of mica; strongly acid; abrupt, wavy boundary.

Cg—48 to 65 inches, light-gray (10YR 7/1) loamy sand; common, coarse, distinct, yellowish-brown (10YR 5/4) mottles; massive; very friable; strongly acid.

The solum is 36 to 60 inches thick. Reaction is medium acid or strongly acid unless the soils are limed. The A horizon is dark grayish-brown, grayish-brown, or brown loam or silt loam. The B horizon is light yellowish-brown, yellowish-brown, brown, light brownish-gray, or gray loam, clay loam, sandy clay loam, or sandy loam that is mottled with brown or gray. The C horizon is sandy loam, loamy sand, or sand.

Chewacla loam, frequently flooded (Ch).—This soil is along large streams. Slopes are less than 2 percent. The areas are very long and are 100 feet to about one-eighth of a mile wide.

Included with this soil in mapping are a few areas of soils that are sandy throughout and some areas of soils that are better drained than this soil. Also included are small areas of Kinston soils.

Infiltration is moderate, and runoff is slow.

This soil is well suited to a few locally grown crops, mainly corn and soybeans. Drainage and flood prevention are required for most uses.

Frequent flooding (fig. 2), water ponding on the surface, and a seasonal high water table are the main limitations in the use and management of this soil. Capability subclass Vw, frequently flooded; woodland suitability group 1w8.

Coxville Series

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

In a representative profile the surface layer is dark-gray loam about 8 inches thick. The subsoil is 54 inches thick. The upper part is light brownish-gray loam that is mottled with brown, and the lower part is gray clay loam that is mottled with yellow and red. Below the subsoil, to a depth of 75 inches, is light-gray sandy loam that is mottled with brown.

Coxville soils are medium in natural fertility and low in content of organic matter. Permeability is mod-

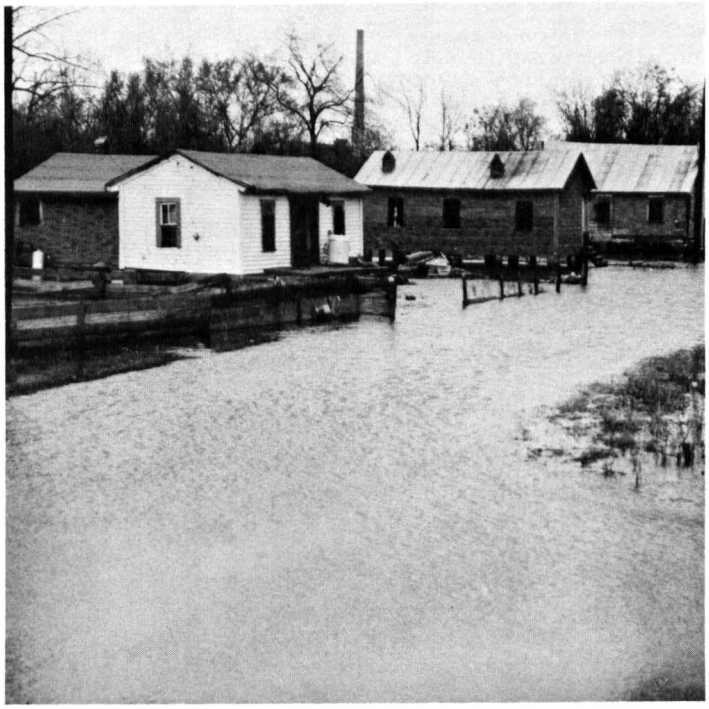

Figure 2.—Flooded area of Chewacla loam.

erately slow, and available water capacity is medium to high. Shrink-swell potential is moderate. The seasonal high water table is at the surface.

Most of the acreage is wooded. The rest is cultivated and pastured.

Representative profile of Coxville loam, 2 miles southeast of LaGrange, in a cultivated field, 0.4 mile east of intersection of U.S. Highway 70 and State Road 1327, 0.3 mile southeast of State Road 1327, and 20 feet southwest of farm road:

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

B1g—8 to 12 inches, light brownish-gray (10YR 6/2) loam; few, medium, distinct, light yellowish-brown (10YR 6/4) mottles; weak, fine, subangular blocky structure; friable; few fine roots; few pores filled with dark-gray loam; very strongly acid; clear, wavy boundary.

B21tg—12 to 27 inches, gray (10YR 6/1) clay loam; common, medium, distinct, brownish-yellow (10YR 6/6) mottles; weak, fine, angular blocky structure; firm, sticky and plastic; few fine roots; thin, discontinuous clay films on faces of peds and on pore walls; very strongly acid; gradual, wavy boundary.

B22tg—27 to 40 inches, gray (10YR 6/1) clay loam; common, coarse, distinct, brownish-yellow (10YR 6/6) mottles and few, fine, prominent, red mottles; weak, fine, angular blocky structure; firm, sticky and plastic; thin, discontinuous clay films on faces of peds and on pore walls; very strongly acid; gradual boundary.

B3g—40 to 62 inches, gray (10YR 6/1) clay loam; common, medium, distinct, brownish-yellow (10YR 6/6) mottles and few, medium, prominent, red (2.5YR 4/8) mottles; weak, fine, angular blocky structure; firm, sticky and plastic; thin clay films on pore walls; very strongly acid; gradual, wavy boundary.

Cg—62 to 75 inches, light-gray (10YR 7/1) sandy clay loam that has lenses of sandy loam; common, medium, faint, pale-brown (10YR 6/3) mottles; massive; friable, slightly sticky and slightly plastic; very strongly acid.

The solum is 60 inches to more than 80 inches thick. Reaction is very strongly acid or strongly acid unless the soils are limed. The A horizon is gray, dark gray, or very dark gray. The very dark gray part of the A horizon, if present, is less than 8 inches thick. The B horizon is light brownish-gray or gray loam, clay loam, or sandy clay that is mottled with yellow, red, and brown. The C horizon is sandy clay, sandy clay loam, or sandy loam.

Coxville loam (Co).—This soil is on broad, smooth flats on stream terraces and in shallow depressions on upland interstream areas. Slopes are less than 2 percent. The areas are generally small and narrow.

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

Infiltration is slow, and runoff is slow. Water ponds in some places. This soil is difficult to keep in good tilth and can be worked within only a narrow range of moisture content.

This soil, if drained, is well suited to a few locally grown crops, mainly corn and soybeans. Surface and subsurface drainage is needed for most uses.

Moderately slow permeability, water ponding on the surface, and a seasonal high water table are the main limitations in the use and management of this soil. Capability unit IIIw–2, drained; capability subclass IVw, undrained; woodland suitability group 2w9.

Craven Series

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

In a representative profile the surface layer is grayish-brown fine sandy loam about 8 inches thick. The subsurface layer is pale-brown fine sandy loam about 2 inches thick. The subsoil is 42 inches thick. The upper part is light yellowish-brown loam, the middle part is yellowish-brown and light yellowish-brown clay that is mottled with brown and gray, and the lower part is gray clay loam that is mottled with brown and red. Below the subsoil, to a depth of about 80 inches, is gray sandy clay loam that is mottled with yellow and brown.

Craven soils are medium in natural fertility and low in content of organic matter. Permeability is slow, and available water capacity is medium. Shrink-swell potential is moderate. The seasonal high water table remains at a depth of about 30 inches.

About one-half of the acreage is wooded. Most of the rest is cultivated, but a small part of it is pastured.

Representative profile of Craven fine sandy loam, 1 to 4 percent slopes, 9 miles northeast of Kinston, 200 feet east of intersection of State Roads 1804 and 1803 and 25 feet north of State Road 1803:

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

A2—8 to 10 inches, pale-brown (10YR 6/3) fine sandy loam; weak, medium, granular structure; very friable; many fine roots; strongly acid; clear, wavy boundary.

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

B21t—13 to 23 inches, yellowish-brown (10YR 5/8) clay; few, medium, faint, strong-brown (7.5YR 5/8) mottles; moderate, fine, angular blocky structure; very firm, sticky and very plastic; thin clay films on faces of peds; very strongly acid; gradual, wavy boundary.

B22t—23 to 37 inches, light yellowish-brown (10YR 6/4) clay; common, medium, distinct, gray (10YR 6/1) and strong-brown (7.5YR 5/8) mottles; moderate, fine, angular blocky structure; very firm, sticky and very plastic; thin clay films on faces of peds and in pores; very strongly acid; gradual, wavy boundary.

B3g—37 to 52 inches, gray (10YR 6/1) clay loam; common, medium, distinct, yellowish-brown (10YR 5/8) mottles and few, medium, prominent, red (2.5YR 4/8) mottles; weak, fine, angular blocky structure; very firm, sticky and plastic; few fine flakes of mica; thin clay films in pores; very strongly acid; gradual, wavy boundary.

Cg—52 to 80 inches, gray (10YR 6/1) sandy clay loam that has lenses of sandy loam and sandy clay; common, coarse, distinct, brownish-yellow (10YR 6/8) mottles and few, medium, distinct, strong-brown (7.5YR 5/8) mottles; massive; friable, sticky and plastic; few fine flakes of mica and soft mineral grains; very strongly acid.

The solum is 40 to 60 inches thick. Reaction is very strongly acid or strongly acid unless the soils are limed. The Ap and A1 horizon is grayish brown or dark gray. The B horizon is yellowish brown or light yellowish brown and is mottled with gray and brown in the upper part. It is gray and mottled with few to common mottles of brown,

gray, and red in the lower part. The gray mottles are between 18 and 30 inches below the surface. The C horizon is commonly sandy clay loam or sandy clay.

Craven fine sandy loam, 1 to 4 percent slopes (Cr).—This soil is on gently sloping sides of divides. The areas are irregularly shaped and range from 5 to 30 acres in size. This soil has the profile described as representative for the series.

Included with this soil in mapping are a few areas of eroded soil and some areas of soil where the slope is less than 1 percent. Also included are small areas of Lenoir, Goldsboro, and Johns soils and a few short narrow strips of Bibb soils. Some delineations have a few small spots of wet soils in depressions. A wet spot symbol is used to show these spots.

Infiltration is moderately slow, and runoff is slow to medium.

This soil is well suited to all locally grown crops and small grain. Practices are needed to control runoff and erosion. Water collects in the low spots in fields for brief periods after heavy rainstorms. Drainage is needed in places where the particular use requires a well-drained condition.

Moderate shrink-swell potential, slow permeability, and runoff are the main limitations in the use and management of this soil. Capability unit IIIe–1; woodland suitability group 3w2.

Craven fine sandy loam, 4 to 8 percent slopes (Cv).—This soil is between the gently sloping areas and flood plains or stream terraces. The areas are narrow and long and range from 5 to 50 acres in size.

Included with this soil in mapping are a few areas of soils that have a surface layer of clay loam. Also included are small areas of Bibb, Norfolk, and Wagram soils.

Infiltration is slow, and runoff is rapid.

This soil is suited to all locally grown crops, but the short length and gradient of the slopes limit the use of this soil for row crops. Runoff causes a hazard of erosion if this soil is cultivated, and practices are needed to control runoff and erosion.

Moderate shrink-swell potential, slow permeability, runoff, and slope are the main limitations in the use and management of this soil. Capability unit IVe–1; woodland suitability group 3w2.

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 8 inches thick. The subsurface layer is pale-brown loamy sand about 4 inches thick. The subsoil is 56 inches thick. The upper part is light yellowish-brown sandy loam, the middle part is yellowish-brown and pale-brown sandy clay loam that is mottled with gray, yellow, and brown, and the lower part is gray sandy clay loam that is mottled with yellow and red. Below the subsoil, to a depth of 80 inches, is light-gray sandy clay loam that is mottled with red and brown.

Goldsboro soils are low in natural fertility and content of organic matter. Permeability is moderate, and available water capacity is medium. Shrink-swell potential is low. The seasonal high water table is at a depth of about 30 inches.

Most of the acreage is cultivated. The rest is pastured or wooded or is used for nonfarm purposes.

Representative profile of Goldsboro loamy sand, 0 to 2 percent slopes, 2 miles south of Hugo in a cultivated field, 0.1 mile east of intersection of State Roads 1726 and 1727 and 50 feet north of State Road 1727:

Ap—0 to 8 inches, grayish-brown (10YR 5/2) loamy sand; weak, medium, granular structure; very friable; few roots; strongly acid; abrupt, smooth boundary.

A2—8 to 12 inches, pale-brown (10YR 6/3) loamy sand; weak, medium, granular structure; very friable; few roots; few pores filled with grayish-brown loamy sand from the surface layer; very strongly acid; clear, wavy boundary.

B1—12 to 16 inches, light yellowish-brown (10YR 6/4) sandy loam; weak, fine, subangular blocky structure; friable; few fine roots; very strongly acid; clear, wavy boundary.

B21t—16 to 23 inches, yellowish-brown (10YR 5/6) sandy clay loam; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; thin, discontinuous clay films on faces of peds; very strongly acid; gradual, wavy boundary.

B22t—23 to 45 inches, pale-brown (10YR 6/3) sandy clay loam; common, medium, distinct gray (10YR 6/1) and brownish-yellow (10YR 6/8) mottles and few, medium, distinct, strong-brown (7.5YR 5/8) mottles; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; thin, discontinuous clay films on faces of peds; very strongly acid; gradual, wavy boundary.

B3g—45 to 68 inches, gray (10YR 6/1) sandy clay loam; common, medium, distinct, brownish-yellow (10YR 6/8) and red (2.5YR 4/8) mottles; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; thin, patchy clay films in pores; very strongly acid; gradual, wavy boundary.

Cg—68 to 80 inches, light-gray (10YR 7/1) sandy clay loam that has thin lenses of sandy clay and sandy loam; few fine, prominent, red mottles and common, medium, pale-brown (10YR 6/3) mottles; friable, slightly sticky and slightly plastic; very strongly acid.

The solum is 60 to about 85 inches thick. Reaction is very strongly acid or strongly acid unless the soils are limed. The Ap or A1 horizon is grayish brown or dark grayish brown. The B horizon is sandy clay loam or sandy loam. The B1 and B2 horizons are pale brown, light yellowish brown, or yellowish brown and are mottled with gray, yellow, and brown. The C horizon is commonly sandy clay loam or sandy loam.

Goldsboro loamy sand, 0 to 2 percent slopes (Go).—This soil is near shallow drainageways on broad, smooth divides. The areas are nearly as broad as they are long and range from 10 to 30 acres in size.

Included with this soil in mapping are a few areas of soils that have a surface layer of sandy loam and very fine sandy loam and some that have a siltier subsoil than this soil. Also included are a few small areas of Norfolk and Lynchburg soils.

Infiltration is moderate, and runoff is slow.

This soil is well suited to all locally grown crops and is used mainly for corn, soybeans, tobacco, small grain, pasture plants, and truck crops. If drained, it is well suited to tobacco (fig. 3). Some drainage is needed (fig. 4) in places where the type of use requires a well-drained condition.

A seasonal high water table is the main limitation in

Figure 3.—Tobacco growing on Goldsboro loamy sand.

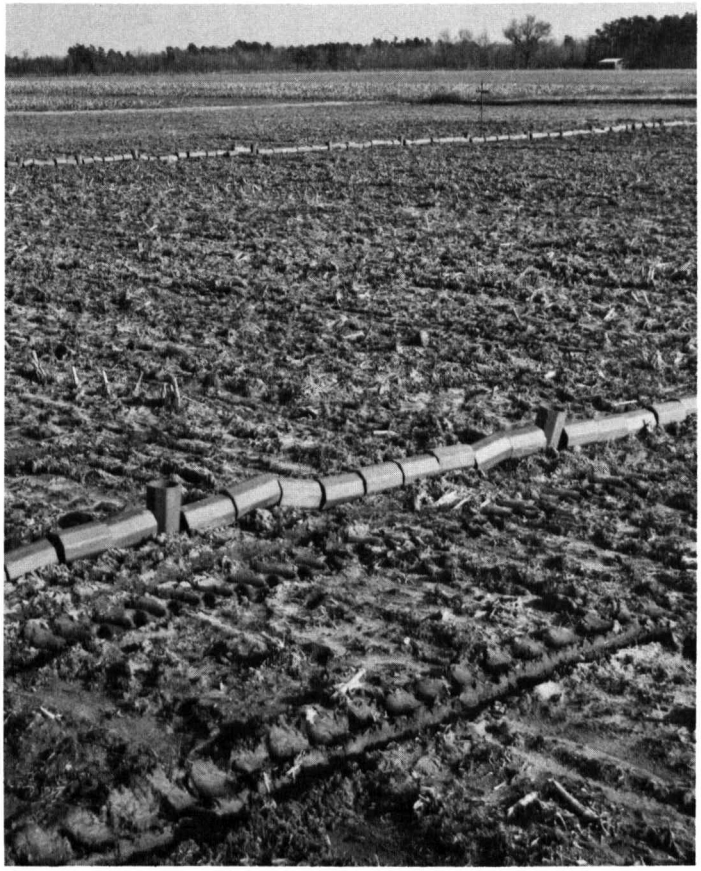

Figure 4.—Tile laid out for installation on Goldsboro loamy sand.

the use and management of this soil. Capability unit IIw–1; woodland suitability group 2w8.

Grifton Series

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

In a representative profile the surface layer is dark-gray sandy loam about 8 inches thick. The subsurface layer is grayish-brown sandy loam about 4 inches thick. The subsoil is 46 inches thick. The upper part is light brownish-gray sandy loam that is mottled with gray. The middle part is gray sandy clay loam or sandy loam that is mottled with yellow and brown. The lower part is gray loamy sand. Below the subsoil, to a depth of 70 inches, is greenish-gray marl that crushes to sandy loam.

Grifton soils are low in natural fertility and content of organic matter. Permeability is moderate, and available water capacity is medium. Shrink-swell potential is low. The seasonal high water table is within 10 inches of the surface.

Most of the acreage is wooded. The rest is cultivated or pastured.

Representative profile of Grifton sandy loam in a cultivated field 7 miles southeast of Kinston, one-fourth of a mile southeast of intersection of State Roads 1915 and 1903 and south of State Road 1915:

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

A2—8 to 12 inches, grayish-brown (10YR 5/2) sandy loam; weak, medium, granular structure; very friable; common fine roots; strongly acid; clear, wavy boundary.

B1g—12 to 15 inches, light brownish-gray (10YR 6/2) sandy loam; common, medium, faint, gray (10YR 6/1) mottles; weak, fine, subangular blocky structure; very friable; common fine roots; strongly acid; gradual, wavy boundary.

B21tg—15 to 32 inches, gray (10YR 6/1) sandy clay loam that has lenses of sandy loam; common, fine, distinct, reddish-yellow mottles; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; common fine and medium pores; thin, discontinuous clay films on faces of peds and on pore walls; strongly acid; gradual, wavy boundary.

B22tg—32 to 40 inches, gray (10YR 6/1) sandy loam that has lenses of sandy clay loam and loamy sand; common, coarse, distinct, yellowish-brown (10YR 5/6) and brown (10YR 5/3) mottles; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; common fine and medium pores; neutral; gradual, wavy boundary.

B3g—40 to 58 inches, gray (10YR 6/1) loamy sand that has thin lenses of sandy clay loam; massive; friable; moderately alkaline; gradual, wavy boundary.

IICg—58 to 70 inches, greenish-gray (5GY 5/1) marl that crushes to sandy loam that has thin lenses of clay; massive; friable; moderately alkaline.

The solum is 40 to 70 inches thick. Reaction is strongly acid in the upper part of the B horizon to moderately alkaline in the lower part of the B horizon and the C horizon. The Ap or A1 horizon is dark gray or very dark gray. Where present, the very dark gray surface layer is less than 8 inches thick. The B2 horizon is gray or light brownish-gray sandy clay loam or sandy loam that is mottled with gray, brown, and yellow. The C horizon is sandy loam, sandy clay loam, or sandy clay. In places the lower part of the B horizon and the C horizon have friable to hard marl fragments and iron and manganese concretions.

Grifton sandy loam (Gr).—This soil is on smooth, broad interstream areas. Slopes are 0 to 1 percent. The areas are broad and range from 10 to 100 acres in size.

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

Infiltration is medium, and runoff is slow to ponded.

The main tree species is loblolly pine. If drained, this soil is well suited to a few locally grown crops, chiefly corn and soybeans. Surface and subsurface drainage is needed if the soil is cultivated or pastured. This soil may be underlain by sandy marl or hard marl, which may present a problem to construction of drainage systems.

A seasonal high water table and water ponding on the surface are the main limitations in the use and management of this soil. Capability unit IIIw–3, drained; capability subclass VIw, undrained; woodland suitability group 2w9.

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 7 inches thick. The subsurface layer is pale-brown sandy loam about 7 inches thick. The subsoil is 20 inches thick. The upper part is pale-brown and light yellowish-brown sandy clay loam that is mottled with gray and brown. The lower part is gray sandy loam that is mottled with yellow. Below the subsoil, to a depth of about 65 inches, is light-gray sand that is mottled with gray.

Johns soils are low in natural fertility and content of organic matter. Permeability is moderate, and available water capacity is medium. Shrink-swell potential is low. The seasonal high water table is at a depth of about 18 inches.

Most of the acreage is cultivated and pastured. The rest is wooded.

Representative profile of Johns sandy loam in a cultivated field, 1.7 miles west of Grifton, 0.8 mile west of the intersection of State Roads 1704 and 1709 and 10 feet north of State Road 1704:

Ap—0 to 7 inches, dark-gray (10YR 4/1) sandy loam; weak, medium, granular structure; very friable; common fine roots; strongly acid; abrupt, smooth boundary.

A2—7 to 14 inches, pale-brown (10YR 6/3) sandy loam; weak, medium, granular structure; very friable; common fine roots; strongly acid; clear, wavy boundary.

B1—14 to 16 inches, pale-brown (10YR 6/3) sandy clay loam; few, fine, faint, yellowish-brown mottles; weak, fine, subangular blocky structure; friable; common fine roots; very strongly acid; clear, wavy boundary.

B21t—16 to 23 inches, light yellowish-brown (10YR 6/4) sandy clay loam; few, medium, distinct, light brownish-gray (10YR 6/2) and strong-brown (7.5YR 5/8) mottles; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; thin, discontinuous clay films on faces of peds; very strongly acid; clear, wavy boundary.

B22t—23 to 30 inches, pale-brown (10YR 6/3) sandy clay loam; common, medium, distinct, strong-brown (7.5YR 5/8) and light brownish-gray (10YR 6/2) mottles; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; thin, discontinuous clay films on faces of peds; very strongly acid; gradual, wavy boundary.

B3g—30 to 34 inches, gray (10YR 6/1) sandy loam; common, medium, distinct, brownish-yellow (10YR 6/6) mottles; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; very strongly acid; gradual, wavy boundary.

IICg—34 to 65 inches, light-gray (10YR 7/1) sand; common, coarse, distinct, light brownish-gray (10YR 6/2) mottles; single grained; loose; few fine flakes of mica and dark minerals; very strongly acid.

The solum is commonly about 34 inches thick, but ranges from 28 to 40 inches. Reaction is very strongly acid or strongly acid unless the soils are limed. The Ap or A1 horizon is dark gray or dark grayish brown. The A2 horizon is pale brown or grayish brown. The B horizon is pale-brown, light yellowish-brown, or brownish-yellow sandy clay loam or sandy loam that is mottled with gray, brown, and yellow. The C horizon is sand or loamy sand.

Johns sandy loam (Jo).—This soil is on broad, low ridges. Slopes are 0 to 2 percent. The areas range from 5 to 40 acres in size and are much longer than they are wide.

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

Infiltration is moderate, and runoff is medium to slow.

If drained, this soil is well suited to most locally grown crops, mainly corn and soybeans. The main tree species is loblolly pine. Surface and subsurface drainage are needed for most uses. The sandy substratum is unstable in ditchbanks. This is a hazard to installation and maintenance of drainage systems.

A seasonal high water table is the main limitation in the use and management of this soil. Capability unit IIw–2; woodland suitability group 2w2.

Johnston Series

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

In a representative profile, the surface layer is about 27 inches thick. The upper part is black mucky loam, and the lower part is black fine sandy loam. The underlying layer is dark grayish-brown sandy loam 11 inches thick and is mottled with gray. Below this layer, to a depth of 60 inches, is light brownish-gray sand that is mottled with brown.

Johnston soils are low in natural fertility and me-

dium in content of organic matter. Permeability is moderately rapid, and available water capacity is high. Shrink-swell potential is low. The seasonal high water table is at the surface. There soils flood very frequently for long periods.

Most of the acreage is wooded. The rest is pastured and cultivated.

Representative profile of Johnston mucky loam in pasture in an area of Johnston soils, 3 miles north of LaGrange in a pasture, 1.2 miles northeast of intersection of State Roads 1504 and 1002, 50 feet south of State Road 1504, and 30 feet east of bridge:

A11—0 to 8 inches, black (10YR 2/1) mucky loam; moderate, medium, granular structure; friable; common fine and medium roots; very strongly acid; gradual, smooth boundary.

A12—8 to 27 inches, black (10YR 2/1) fine sandy loam; weak, medium, granular structure; friable; few fine roots; very strongly acid; gradual, wavy boundary.

AC—27 to 38 inches, dark grayish-brown (10YR 4/2) sandy loam that has thin strata of light-gray (10YR 7/1) uncoated sand; massive; friable; very strongly acid; gradual, wavy boundary.

C—38 to 60 inches, light brownish-gray (10YR 6/2) sand; few, medium, faint, dark grayish-brown (10YR 4/2) mottles; single grained; loose; strongly acid.

Reaction is very strongly acid or strongly acid unless the soils are limed. The A horizon is black or very dark gray loam, mucky loam, sandy loam, or fine sandy loam. The AC horizon is dark grayish-brown, dark-gray, or gray sandy loam or loam. In places it has a few mottles of brown or gray. In places the C horizon is stratified coarse sand to sandy clay loam.

Johnston soils (JS).—These soils are in wide, flat drainageways. Slopes are less than 1 percent. The surface layer is loam, mucky loam, or sandy loam. Some areas of these soils are sandy throughout and lack the dark-colored surface layer. The areas are long and range from 25 to more than 100 acres in size. They are generally larger than those mapped elsewhere in the county, but mapping has been controlled well enough to make the interpretations for the anticipated uses.

Included with these soils in mapping are a few areas of soils that have a thin surface layer of muck. Also included are some small areas of Kinston and Pamlico soils.

Infiltration is moderate. Runoff is very slow, and the surface is ponded in low places.

These soils, if drained, are suited to a few locally grown crops, chiefly corn and soybeans. Surface and subsurface drainage and flood prevention are needed. Lack of suitable outlets is a limitation to installation of drainage systems.

The hazard of stream overflow, water ponding on the surface, a seasonal high water table, and very frequent flooding are the main limitations in the use and management of these soils. Capability unit IVw–4, drained; capability subclass VIIw, undrained; woodland suitability group 1w9.

Kalmia Series

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

In a representative profile the surface layer is grayish-brown loamy sand about 8 inches thick. The subsurface layer is pale-brown loamy sand about 6 inches thick. The subsoil is 24 inches thick. The upper part is light yellowish-brown sandy clay loam, the middle part is yellowish-brown sandy clay loam that is mottled with brown, and the lower part is brownish-yellow sandy loam that is mottled with brown. Below the subsoil, to a depth of 65 inches, is very pale brown sand that is mottled with gray and yellow.

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

Most of the acreage is cultivated. The rest is pastured and used for nonfarm purposes.

Representative profile of Kalmia loamy sand, 0 to 2 percent slopes, in a cultivated field 4 miles northeast of Kinston, 0.2 mile east of intersection of North Carolina Highway 55 and State Road 1810, and 20 feet south of North Carolina Highway 55:

Ap—0 to 8 inches, grayish-brown (10YR 5/2) loamy sand; weak, medium, granular structure; very friable; common fine roots; strongly acid; abrupt, smooth boundary.

A2—8 to 14 inches, pale-brown (10YR 6/3) loamy sand; weak, medium, granular structure; very friable; common fine roots; strongly acid; clear, wavy boundary.

B1—14 to 16 inches, light yellowish-brown (10YR 6/4) sandy clay loam; weak, fine, subangular blocky structure; friable; common fine roots; very strongly acid; clear, wavy boundary.

B21t—16 to 28 inches, yellowish-brown (10YR 5/8) sandy clay loam; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; thin, discontinuous clay films on faces of peds; very strongly acid; gradual, wavy boundary.

B22t—28 to 34 inches, yellowish-brown (10YR 5/8) sandy clay loam; common, medium, distinct, strong-brown (7.5YR 5/8) mottles; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; thin, discontinuous clay films on faces of peds; very strongly acid; gradual, wavy boundary.

B3—34 to 38 inches, brownish-yellow (10YR 6/8) sandy loam; common, fine, distinct, pale-brown mottles; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; few fine flakes of mica; very strongly acid; gradual, wavy boundary.

IIC—38 to 65 inches, very pale brown (10YR 7/3) sand; common, medium, distinct, light-gray (10YR 7/1) and brownish-yellow (10YR 6/6) mottles; single grained; loose; uncoated; very strongly acid.

The solum is commonly about 38 inches thick, but thickness ranges from 26 to 40 inches. Reaction is very strongly acid or strongly acid unless the soils are limed. The Ap or A1 horizon is grayish brown or dark grayish brown, and the A2 horizon is pale brown or very pale brown. The B horizon is yellowish-brown, brownish-yellow, or strong-brown sandy clay loam or sandy loam that is mottled with brown in the lower part. The C horizon is sand or loamy sand. In places it contains fine gravel.

Kalmia loamy sand, 0 to 2 percent slopes (Ka).—This soil is on broad, smooth, low ridges that are separated by shallow depressions. The areas are much longer than they are wide and range from 10 to 30 acres in size. This soil has the profile described as representative for the series.

Included with this soil in mapping are a few areas of soils that have a surface layer of fine sandy loam.

Also included are a few small areas of Wickham, Johns, and Kenansville soils. A few soils that are sandy throughout and spots of wet soils in depressions are also included. These are shown by special spot symbols.

Infiltration is moderate, and runoff is slow.

This soil is well suited to all locally grown crops, including corn, tobacco, soybeans, small grain, and truck crops.

There are no major limitations in the use and management of this soil. Capability unit I–1; woodland suitability group 2o7.

Kalmia loamy sand, 2 to 6 percent slopes (Kb).—This soil (fig. 5) is on broad, smooth, slightly rounded low ridges. The areas are much longer than they are wide and range from 5 to 20 acres in size.

Included with this soil in mapping are a few areas of soils that have a surface layer of sandy loam. Also included are a few small areas of Wickham and Kenansville soils and short, narrow strips of Bibb soils in drainageways. A soil that is sandy throughout the spots of a wet soil in depressions are also included. These small areas are shown by special spot symbols.

Infiltration is moderate, and runoff is medium.

Figure 5.—**Profile of Kalmia loamy sand.**

This soil is well suited to most locally grown crops, mainly corn, soybeans, tobacco, and small grain.

Runoff is the main limitation in the use and management of this soil. Capability unit IIe–1; woodland suitability group 2o7.

Kenansville Series

The Kenansville series consists of nearly level to gently sloping, well-drained soils on stream terraces.

In a representative profile the surface layer is grayish-brown loamy sand about 8 inches thick. The subsurface layer is light yellowish-brown loamy sand 16 inches thick. The subsoil is 18 inches thick. The upper part is yellowish-brown sandy loam, and the lower part is yellowish-brown loamy sand. Below the subsoil, to a depth of 80 inches, is very pale brown sand.

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

Most of the acreage is cultivated. The rest is pastured or wooded or used for nonfarm purposes.

Representative profile of Kenansville loamy sand, 0 to 6 percent slopes, in a cultivated field, 11 miles northeast of Kinston and 1.2 miles northwest of Grifton, 100 feet northeast of intersection of North Carolina Highway 11 and State Road 1704:

Ap—0 to 8 inches, grayish-brown (10YR 5/2) loamy sand; weak, medium, granular structure; very friable; common fine roots; medium acid; abrupt, smooth boundary.

A2—8 to 24 inches, light yellowish-brown (10YR 6/4) loamy sand; weak, medium, granular structure; very friable; few fine roots; medium acid; gradual, wavy boundary.

B2t—24 to 36 inches, yellowish-brown (10YR 5/8) sandy loam; weak, medium, subangular blocky structure; very friable; sand grains coated and bridged with clay; common fine pores; very strongly acid; gradual, wavy boundary.

B3—36 to 42 inches, yellowish-brown (10YR 5/8) loamy sand; weak, medium, granular structure; very friable; clay coatings on sand grains; very little bridging of grains by clay; strongly acid; gradual, wavy boundary.

C—42 to 80 inches, very pale brown (10YR 7/3) sand; few, fine, distinct, strong-brown mottles and common, medium, faint, light-gray (10YR 7/2) mottles; single grained; loose; strongly acid.

The solum is 36 to 50 inches thick. Reaction is very strongly acid or strongly acid unless the soils are limed. The Ap or A1 horizon is grayish brown or brown, and the A2 horizon is pale brown or light yellowish brown. The B horizon is brownish-yellow, yellowish-brown, or strong-brown sandy loam or loamy sand. The C horizon is very pale brown or light gray. In places it contains fine gravel.

Kenansville loamy sand, 0 to 6 percent slopes (Ke).—This soil is on smooth, slightly rounded low ridges separated by depressions. The areas are much longer than they are wide and range from 5 to about 30 acres in size.

Included with this soil in mapping are small areas of Kalmia, Lakeland, and Pactolus soils. Also included are narrow strips of Bibb or Lumbee soils in drainage-

ways. A few included wet spots are shown by special spot symbols.

Infiltration is moderately rapid, and runoff is slow.

This soil is fairly well suited to most locally grown crops. The main crops are corn, tobacco, soybeans, and small grain.

Leaching of plant nutrients, the hazard of soil blowing, and very low available water capacity are the main limitations in the use and management of this soil. Capability unit IIs–1; woodland suitability group 3s2.

Kinston Series

The Kinston 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 grayish-brown loam about 6 inches thick. The subsoil is gray clay loam 44 inches thick. It is mottled with yellow and brown. Below the subsoil, to a depth of 65 inches, is gray clay loam that is mottled with yellow.

Kinston soils are low to medium in natural fertility and medium in content of organic matter. Permeability is moderate, and available water capacity is high. Shrink-swell potential is low. The seasonal high water table is at the surface. These soils flood frequently for brief periods in winter and spring.

Most of the acreage is wooded. The rest is pastured.

Representative profile of Kinston loam, frequently flooded, 1 mile southwest of Kinston in a wooded area; 0.3 mile southeast of intersection of U. S. Highway 70 and Business U. S. Highway 70 and 150 feet south of exit from U. S. Highway 70:

A1—0 to 6 inches, dark grayish-brown (10YR 4/2) loam; common, fine, distinct, dark-brown mottles; moderate, medium, granular structure; friable; common roots; few flakes of mica; strongly acid; gradual, wavy boundary.

B2g—6 to 26 inches, gray (10YR 6/1) clay loam; common, medium, distinct, yellowish-brown (10YR 5/4) mottles; weak, medium, subangular blocky structure; friable, slightly sticky and slightly plastic; few, small, black concretions; few fine flakes of mica; very strongly acid; clear, wavy boundary.

B3g—26 to 50 inches, gray (10YR 6/1) clay loam; common, medium, distinct, brownish-yellow (10YR 6/6) mottles; weak, medium, subangular blocky structure; friable, slightly sticky and slightly plastic; few fine flakes of mica; dark-brown mottles around old roots; few, small, black concretions; very strongly acid; gradual, wavy boundary.

Cg—50 to 65 inches, gray (5YR 6/1) clay loam that has layers of sandy loam; common, fine, distinct, brownish-yellow mottles; massive; friable; few fine flakes of mica; dark-brown mottles around old roots; few, small, black concretions; strongly acid.

The solum is 40 to more than 60 inches thick. Reaction is strongly acid or very strongly acid unless the soils are limed. The A horizon is dark grayish brown or brown. The B horizon is gray or light-gray clay loam or sandy clay loam that has yellow and brown mottles. The C horizon is sand, sandy loam, or clay loam that has gravel in places.

Kinston loam, frequently flooded (Kn).—This soil is in long, narrow bands at the base of uplands. Slopes are less than 1 percent. The areas are parallel to the large streams and range from 10 to 50 acres in size.

Included with this soil in mapping are a few areas of soils that are sandy throughout. Also included are small areas of Chewacla and Bibb soils.

Infiltration is moderate, and runoff is slow. In places water ponds on the surface.

The trees are chiefly mixed hardwoods and pines. If drained, the soil is suited to a few locally grown crops, mainly corn, soybeans, and pasture plants. Drainage and flood prevention are needed for most uses and management of this soil.

Frequent flooding, water ponding on the surface, and a seasonal high water table are the main limitations in the use and management of this soil. Capability subclass IIIw, drained and protected from floods; capability subclass Vw, undrained and frequently flooded; woodland suitability group 1w9.

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 brown sand about 6 inches thick. The underlying layer, extending to a depth of 90 inches, is sand. It is brownish yellow in the upper part, yellow in the middle part, and very pale brown in the lower part.

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

Most of the acreage is wooded. The rest is used as feedlots for poultry and livestock and also for nonfarm purposes.

Representative profile of Lakeland sand, 0 to 6 percent slopes, 3 miles southeast of Grifton, in a wooded area (old cultivated field), 300 feet west of the end of State Road 1800 and 10 feet south of State Road 1800:

Ap—0 to 6 inches, brown (10YR 5/3) sand; single grained; loose; few medium roots; very strongly acid; abrupt, smooth boundary.

C1—6 to 42 inches, brownish-yellow (10YR 6/8) sand; single grained; loose; coated; very strongly acid; gradual, wavy boundary.

C2—42 to 64 inches, brownish-yellow (10YR 6/6) sand; single grained; loose; faint coats on grains; very strongly acid; gradual wavy boundary.

C3—64 to 72 inches, yellow (10YR 7/6) sand; single grained; loose; most grains clean; few thin (¼-inch), discontinuous lamellae of strong-brown loamy sand; very strongly acid; gradual, wavy boundary.

C4—72 to 90 inches, very pale brown (10YR 7/4) sand; single grained; loose; nearly clean grains; few dark-colored grains; very strongly acid.

These soils are sand to a depth of more than 72 inches. Reaction is very strongly acid or strongly acid unless the soils are limed. The A horizon is brown or dark grayish brown. The underlying layers are yellow, brownish yellow, yellowish brown, very pale brown, or strong brown.

Lakeland sand, 0 to 6 percent slopes (La).—This soil is on broad, undulating interstream areas and rounded divides. The areas are broad and long and range from 5 to about 50 acres in size.

Included with this soil in mapping are small areas of soils that have layers of loamy sand below the surface

layer. Also included are small areas of Blanton, Kenansville, and Leon soils.

Infiltration is rapid, and runoff is slow.

This soil is poorly suited to most locally grown crops.

Leaching of plant nutrients, the hazard of soil blowing, and very low available water capacity are the main limitations in the use and management of this soil. Capability unit IVs–1; woodland suitability group 4s2.

Leaf Series

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

In a representative profile the surface layer is very dark gray loam about 3 inches thick. The subsurface layer is gray loam about 7 inches thick. The subsoil is clay or clay loam 55 inches thick. It is mottled with yellow and brown. Below the subsoil, to a depth of about 80 inches, is gray clay that is mottled with yellow and brown.

Leaf soils are medium in natural fertility and low in content of organic matter. Permeability is slow, and available water capacity is high. Shrink-swell potential is moderate. The seasonal high water table is at the surface.

Most of the acreage is wooded. The rest is cultivated or pastured.

Representative profile of Leaf loam in a wooded area 8 miles east of Kinston, 0.5 mile southeast of intersection of State Roads 1806 and 1807, and 25 feet northeast of State Road 1807:

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

A2—3 to 10 inches, gray (10YR 5/1) loam; moderate, medium, granular structure; friable; common medium roots; common very dark gray soil in pores; very strongly acid; clear, wavy boundary.

B1g—10 to 13 inches, gray (10YR 6/1) clay loam; few, fine, distinct, brownish-yellow mottles; weak, fine, subangular blocky structure; firm, sticky and plastic; common fine roots; common dark-gray loam in pores; very strongly acid; clear, wavy boundary.

B21tg—13 to 42 inches, gray (10YR 6/1) clay; common, medium, brownish-yellow (10YR 6/8) mottles; moderate, fine, angular blocky structure; very firm, sticky and very plastic; few fine roots; thin clay films on faces of peds; few pores filled with dark-gray loam; few fine flakes of mica; very strongly acid, gradual, wavy boundary.

B22tg—42 to 48 inches, gray (10YR 6/1) clay; common, medium, distinct, strong-brown (7.5YR 5/8) and brownish-yellow (10YR 6/8) mottles; moderate, fine, angular blocky structure; very firm, sticky and very plastic; thin clay films on faces of peds; few fine flakes of mica; very strongly acid; gradual, wavy boundary.

B3g—48 to 65 inches, gray (10YR 5/1) clay loam; common, medium, distinct, brownish-yellow (10YR 6/6) mottles and few, fine, distinct, strong-brown mottles; weak, fine, angular blocky structure; very firm, sticky and very plastic; thin clay films in large pores; few fine flakes of mica; very strongly acid; gradual, wavy boundary.

Cg—65 to 80 inches, gray (5Y 6/1) clay that has lenses of sandy clay loam; common, medium, distinct, brownish-yellow (10YR 6/8) mottles and common, fine, distinct, strong-brown mottles; massive; very firm, sticky and very plastic; very strongly acid.

The solum is more than 60 inches thick. Reaction is very strongly acid or strongly acid unless the soils are limed. The A horizon is very dark gray, dark gray, or gray. The B horizon is gray or light-gray clay or clay loam that is mottled with yellow and brown. The C horizon is sandy loam, sandy clay loam, clay loam, silty clay, or clay.

Leaf loam (Le).—This soil is on smooth, broad interstream areas. Slopes are less than 1 percent. The areas are long and range from narrow to broad. They are 5 to 100 acres in size.

Included with this soil in mapping are a few small areas of soils that have a surface layer of silt loam and sandy loam. Also included are a few small areas of Lenoir, Lumbee, Portsmouth, and Coxville soils.

Infiltration is slow, and runoff is slow to ponded. The surface soil is difficult to keep in good tilth and can be worked only over a narrow range of moisture content.

If drained, this soil is suited to a few locally grown crops, chiefly corn and soybeans. The main tree species is loblolly pine. Surface and subsurface drainage is needed before the soil can be cultivated or pastured. Adequate drainage may be difficult to obtain because of slow permeability. Practices to improve the soil structure and tilth are needed to obtain good drainage and aeration.

Moderate shrink-swell potential, slow permeability, water ponding on the surface, and a seasonal high water table are the main limitations in the use and management of this soil. Capability unit IVw–2; woodland suitability group 2w9.

Lenoir Series

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

In a representative profile the surface layer is dark-gray loam about 8 inches thick. The subsurface layer is light brownish-gray loam about 3 inches thick. The subsoil is 51 inches thick. The upper part is pale-brown clay that is mottled with yellow and gray, and the lower part is gray clay that is mottled with yellow and red. Below the subsoil, to a depth of 75 inches, is gray clay loam that is mottled with yellow and brown.

Lenoir soils are medium in natural fertility and low in content of organic matter. Permeability is slow, and available water capacity is high. Shrink-swell potential is moderate. The seasonal high water table is at a depth of about 18 inches.

Most of the acreage is wooded. The rest is cultivated or pastured.

Representative profile of Lenoir loam in a cultivated field 8 miles east of Kinston and 50 feet southwest of the intersection of State Roads 1806 and 1807:

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

A2—8 to 11 inches, light brownish-gray (10YR 6/2) loam, weak, fine, subangular blocky structure; friable; common fine roots; few pores filled with dark gray; strongly acid; clear, smooth boundary.

B21t—11 to 21 inches, pale-brown (10YR 6/3) clay; common, fine, distinct, brownish-yellow mottles and common, fine, faint, light brownish-gray mottles; moderate, fine, angular blocky structure; very firm,

sticky and very plastic; few fine roots; thin clay films on faces of peds; very strongly acid; clear, wavy boundary.

B22tg—21 to 48 inches, gray (10YR 6/1) clay; many, medium, distinct, brownish-yellow (10YR 6/8) mottles and common, medium, prominent, red (2.5YR 4/8) mottles; moderate, fine, angular blocky structure; very firm, sticky and very plastic; thin clay films on faces of peds and in pores; very strongly acid; gradual, wavy boundary.

B3g—48 to 62 inches, gray (10YR 6/1) clay; many, medium, distinct, brownish-yellow (10YR 6/6) mottles and few, medium, prominent, red (2.5YR 4/8) mottles; moderate, fine, angular blocky structure; very firm, sticky and very plastic; thin clay films in pores; very strongly acid; gradual, wavy boundary.

Cg—62 to 75 inches, gray (10YR 5/1) clay loam that has thin lenses of sandy clay loam; few, medium, distinct to prominent, brownish-yellow (10YR 6/6) and strong-brown (7.5YR 5/8) mottles; massive; firm, sticky and very plastic; very strongly acid.

The solum is more than 60 inches thick. Reaction is very strongly acid or strongly acid unless the soils are limed. The A1 or Ap horizon is dark gray or dark grayish brown. The B1 horizon is pale brown, light yellowish brown, or brownish yellow and mottled with yellow and gray in the upper part. Below a depth of about 21 inches, it is gray and mottled with yellow, brown, and red. The B horizon is clay to clay loam. The C horizon is clay loam or sandy clay loam.

The A horizon and the B1 horizon, if present, are slightly thicker than the defined range for the series. The contrast in texture between the surface layer and the subsoil is also greater. These differences do not alter the usefulness or behavior of the soils.

Lenoir loam (Ln).—This soil is on broad, smooth divides near shallow drainageways. Slopes are 0 to 2 percent. The areas are nearly as broad as they are long and range from 10 to 40 acres in size.

Included with this soil in mapping are a few areas of soils that have a surface layer of sandy loam. Also included are small areas of Leaf and Craven soils.

Infiltration and runoff are slow. The soil is difficult to keep in good tilth and can be worked only over a narrow range of moisture content.

The main tree species is loblolly pine. If drained, this soil is suited to a few locally grown crops, mainly corn and soybeans. Surface and subsurface drainage is needed for most crops. Adequate drainage is difficult to obtain because of the slow permeability. Practices to improve the soil structure and tilth are needed to obtain good drainage and aeration.

Slow permeability, moderate shrink-swell potential, water ponding on the surface, and a seasonal high water table are the main limitations in the use and management of this soil. Capability unit IIIw–4; woodland suitability group 2w8.

Leon Series

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

In a representative profile the surface layer is dark-gray sand about 4 inches thick. The subsurface layer is light-gray sand about 10 inches thick. The subsoil is sand 17 inches thick. The upper part is black and the lower part is dark brown. The underlying layer, to a depth of about 72 inches, is light brownish-gray loamy sand in the upper part and dark reddish-brown and grayish-brown sand in the lower part.

Leon soils are very low in natural fertility and content of organic matter. Permeability is rapid to moderately rapid, and available water capacity is low. Shrink-swell potential is very low. The seasonal high water table is at a depth of about 18 inches.

Most of the acreage is wooded.

Representative profile of Leon sand in an idle field 5 miles east of Pink Hill, 0.6 mile east of the intersection of State Roads 1105 and 1118, and 25 feet south of State Road 1105:

A1—0 to 4 inches, dark-gray (10YR 4/1) sand; single grained; loose; about 20 percent of grains coated with organic matter; also few fine particles of organic matter; common large roots; very strongly acid; clear, wavy boundary.

A2—4 to 14 inches, light-gray (10YR 7/1) sand; single grained; loose; common roots; very strongly acid; abrupt, wavy boundary.

B2h—14 to 19 inches, black (5YR 2/1) sand; massive; friable; weakly cemented; thin humus coating on grains; very strongly acid; clear, wavy boundary.

B3h—19 to 31 inches, dark-brown (7.5YR 3/2) sand; massive; friable; weakly cemented fragments of dark reddish brown; thin humus coatings on grains; very strongly acid; clear, wavy boundary.

C1—31 to 37 inches, light brownish-gray (10YR 6/2) loamy sand; single grained; loose; very strongly acid; clear, wavy boundary.

C2—37 to 58 inches, dark reddish-brown (5YR 3/2) sand; massive; friable; weakly cemented; thin humus coatings on grains; very strongly acid; clear, wavy boundary.

C3—58 to 72 inches, grayish-brown (10YR 5/2) sand; single grained; very friable; very strongly acid.

These soils are sand or fine sand to a depth of 72 inches or more. Reaction is very strongly acid or extremely acid unless the soils are limed. The A1 horizon is dark gray or very dark gray. The A2 horizon is light gray or white. The Bh horizon is black, dark reddish-brown, or dark-brown sand or loamy sand. The C horizon is loamy sand to sand.

Leon sand (Lo).—This soil is on the outer rims of large depressions and on broad, smooth interstream divides. Slopes are 0 to 2 percent. The areas are irregularly shaped and range from 5 to 25 acres in size.

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

Infiltration is rapid, and runoff is very slow.

This soil is poorly suited to most locally grown crops. The main tree species are longleaf pine and turkey oak. Because of the coarse texture and the humus hardpan subsoil within 30 inches of the surface, this soil is very poorly suited to cultivation except for specialized crops, such as blueberries.

Leaching of plant nutrients, hardpan subsoil, and a seasonal high water table are the main limitations in the use and management of this soil. Capability unit IVw–1; woodland suitability 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 7 inches thick. The subsurface layer is light brownish-gray sandy loam about 5 inches thick. The subsoil is 26 inches thick. The upper part is light brownish-gray and gray sandy clay loam that is

mottled with brown and yellow, and the lower part is gray sandy loam that is mottled with brown. Below the subsoil, to a depth of about 65 inches, is light brownish-gray sand.

Lumbee soils are low in natural fertility and content of organic matter. Permeability is moderate, and available water capacity is medium. Shrink-swell potential is low. The seasonal high water table is at the surface.

Most of the acreage is wooded. The rest is cultivated and pastured.

Representative profile of Lumbee sandy loam in a cultivated field 2.5 miles southeast of Jenny Lind, 0.7 mile north of intersection of State Roads 1333 and 1324, and 50 feet west of State Road 1333:

Ap—0 to 7 inches, dark-gray (10YR 4/1) sandy loam; weak, medium, granular structure; very friable; common fine roots; medium acid; abrupt, smooth boundary.

A2—7 to 12 inches, light brownish-gray (10YR 6/2) sandy loam; weak, medium, granular structure; very friable; common fine roots; common pores filled with dark-gray material from layer surface; strongly acid; gradual, wavy boundary.

B1g—12 to 14 inches, light brownish-gray (10YR 6/2) sandy clay loam; few, medium, faint, light yellowish-brown (10YR 6/4) mottles; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; few pores filled with dark-gray surface soil; very strongly acid; gradual, wavy boundary.

B2tg—14 to 34 inches, gray (10YR 6/1) sandy clay loam; few, fine, distinct, brownish-yellow and strong-brown mottles; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; thin, discontinuous clay films on faces of peds; few fine flakes of mica; very strongly acid; gradual, wavy boundary.

B3g—34 to 38 inches, gray (10YR 6/1) sandy loam; common, medium, faint, pale-brown (10YR 6/3) mottles; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; thin, discontinuous clay films on faces of peds; few fine flakes of mica; very strongly acid; gradual, wavy boundary.

Cg—38 to 65 inches, light brownish-gray (10YR 6/2) sand that has few thin lenses of loamy sand; single grained; loose; few fine flakes of mica; strongly acid.

The solum is about 38 inches thick but ranges from 26 to 40 inches. Reaction is very strongly acid or strongly acid unless the soils are limed. The Ap or A1 horizon is dark gray or dark grayish brown. The B horizon is gray, light brownish-gray, or light-gray sandy clay loam or sandy loam that is mottled with yellow and brown. The C horizon is sand or loamy sand.

Lumbee sandy loam (Lu).—This soil is in shallow drainageways separated by low, broad ridges. Slopes are 0 to 1 percent. The areas are long and variable in width and range from about 10 to 100 acres in size.

Included with this soil in mapping are a few areas of soils that have a surface layer of very fine sandy loam and loamy sand. Also included are a few small areas of Coxville, Portsmouth, Woodington, and Johns soils and areas of soils that have a thicker subsoil.

Infiltration is moderate, and runoff is slow.

If drained, the soil is suited to a few locally grown crops, chiefly corn and soybeans. Surface and subsurface drainage is needed before this soil can be cultivated or pastured. The sandy substratum is unstable in ditchbanks and is a limitation to installation and maintenance of drainage systems.

Water ponding on the surface and a seasonal high water table are the main limitations in the use and management of this soil. Capability unit IIIw–3; woodland suitability 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 8 inches thick. The subsurface layer is light brownish-gray sandy loam about 4 inches thick. The subsoil is 54 inches thick. The upper part is pale-brown sandy clay loam that is mottled with gray and yellow. The lower part is gray sandy clay loam that is mottled with yellow and red.

Lynchburg soils are low in natural fertility and content of organic matter. Permeability is moderate, and available water capacity is medium. Shrink-swell potential is low. The seasonal high water table is at a depth of about 18 inches.

About half the acreage is cultivated or pastured. The rest is wooded.

Representative profile of Lynchburg sandy loam in a cultivated field 0.1 mile north of Savannah School, 0.1 mile northwest of intersection of State Roads 1723 and 1727, and 50 feet west of State Road 1723:

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

A2—8 to 12 inches, light brownish-gray (10YR 6/2) sandy loam; weak, medium, granular structure; very friable; common fine roots; many pores filled with dark-gray material from the surface layer; strongly acid; clear, wavy boundary.

B1—12 to 15 inches, pale-brown (10YR 6/3) sandy clay loam; few, fine, faint, light brownish-gray mottles; weak, fine, subangular blocky structure; friable; common fine roots; few pores filled with dark-gray material from the surface layer; very strongly acid; clear, wavy boundary.

B21t—15 to 21 inches, pale-brown (10YR 6/3) sandy clay loam; few, medium, faint, light brownish-gray (10YR 6/2) mottles and few, medium, distinct, brownish-yellow (10YR 6/6) mottles; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; thin, discontinuous clay films on faces of peds; very strongly acid; clear, wavy boundary.

B22tg—21 to 48 inches, gray (10YR 6/1) sandy clay loam; common, medium, distinct, brownish-yellow (10YR 6/6) mottles; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; thin, discontinuous clay films on faces of peds; very strongly acid; gradual, wavy boundary.

B3g—48 to 66 inches, gray (10YR 6/1) sandy clay loam; common, medium, distinct and prominent, red (2.5YR 4/8) mottles; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; very strongly acid; gradual, wavy boundary.

Cg—66 to 85 inches, light-gray (10YR 7/1) sandy clay loam; few, medium, distinct, strong-brown (7.5YR 5/6) mottles and few, medium, faint, light brownish-gray (10YR 6/2) mottles; massive; friable, slightly sticky and slightly plastic; extremely acid.

The solum is more than 60 inches thick. Reaction is strongly acid to extremely acid unless the soils are limed. The A1 or Ap horizon is dark gray or dark grayish brown. The B horizon is pale brown or light yellowish brown and mottled with gray and yellow in the upper part. This horizon is sandy clay loam and to a lesser extent sandy loam.

Below a depth of about 21 inches it is gray and mottled with yellow and red. The C horizon is sandy loam or sandy clay loam.

Lynchburg sandy loam (Ly).—This soil is on broad, smooth flats of interstream divides. Slopes are 0 to 2 percent. The areas are long and broad and range from 5 to about 100 acres in size.

Included with this soil in mapping are areas of soils that have a surface layer of very fine sandy loam and loamy sand and some that have a siltier subsoil than this soil. Also included are a few small areas of Goldsboro, Rains, and Stallings soils.

Infiltration is moderate, and runoff is slow.

If drained, this soil is well suited to most locally grown crops, chiefly corn and soybeans. The principal tree species is loblolly pine. Surface and subsurface drainage is needed for most uses.

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

Meggett Series

The Meggett series consists of nearly level, poorly drained soil on uplands and stream terraces.

In a representative profile the surface layer is dark-gray fine sandy loam about 8 inches thick. The subsurface layer is light brownish-gray sandy loam about 4 inches thick. The subsoil is 33 inches thick. The upper part is gray sandy clay loam that is mottled with yellow. The lower part is gray clay or sandy clay that is mottled with brown and yellow. Below the subsoil, to a depth of about 85 inches, is gray sandy clay loam that is mottled with yellow and gray.

Meggett soils are medium in natural fertility and low in content of organic matter. Permeability is slow, and available water capacity is high. Shrink-swell potential is high. The seasonal high water table is at the surface.

Most of the acreage is wooded. The rest is cultivated or pastured.

Representative profile of Meggett fine sandy loam in a cultivated field 8 miles east of Kinston, 0.1 mile south of the intersection of North Carolina Highway 55 and State Road 1806, 0.3 mile southwest of bridge on ditch road, and 50 feet west of ditch road:

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

A2—8 to 12 inches, light brownish-gray (10YR 6/2) sandy loam; weak, medium, granular structure; very friable; common fine roots; common pores filled with dark gray; medium acid; clear, wavy boundary.

B21tg—12 to 17 inches, gray (10YR 6/1) sandy clay loam; common, fine, distinct, brownish-yellow mottles; weak, medium, angular blocky structure; friable, sticky and plastic; common fine roots; common pores filled with dark-gray sandy loam; slightly acid; gradual, wavy boundary.

B22tg—17 to 30 inches, gray (10YR 5/1) clay; common, fine, distinct, strong-brown and yellowish-brown mottles; weak, coarse, angular blocky structure; firm, sticky and plastic; thin, discontinuous clay films on faces of peds and pores; few fine flakes of mica; moderately alkaline; gradual, wavy boundary.

B3g—30 to 45 inches, gray (10YR 5/1) sandy clay; thin lenses of sandy loam and clay; common, medium, distinct, brownish-yellow (10YR 6/6) and yellowish-brown (10YR 5/6) mottles; weak, medium, angular blocky structure; firm, sticky and plastic; few small fragments of marl; few fine flakes of mica; moderately alkaline; gradual, wavy boundary.

Cg—45 to 85 inches, gray (10YR 5/1) sandy clay loam; thin lenses of sandy loam and sandy clay; common, medium, distinct, brownish-yellow (10YR 6/8) and greenish-gray (5G 5/1) mottles; massive; friable; few small fragments of marl; moderately alkaline.

The solum is 40 to 60 inches thick. Reaction is medium acid in the A horizon and the upper part of the B horizon to moderately alkaline in the lower part of the B horizon and the C horizon. The A horizon is very dark gray, dark gray, or grayish brown. Where the surface layer is very dark gray, it is less than 8 inches thick. The B horizon is gray or light-gray clay, sandy clay, or sandy clay loam that is mottled with brown and yellow. The C horizon is sandy loam, sandy clay loam, clay loam, or clay and in places contains fragments of friable to hard marl.

Meggett fine sandy loam (Me).—This soil is in shallow depressions on broad interstream areas and in drainageways. Slopes are 0 to 1 percent. The areas are long and narrow and range from 5 to about 50 acres in size.

Included with this soil in mapping are a few areas of soils that have a surface layer of loam. Also included are a few small areas of Grifton, Lumbee, and Woodington soils.

Infiltration and runoff are slow, and in places the surface becomes ponded. The soil is difficult to keep in good tilth, and, because of the moderately high clay content, it can be worked only over a narrow range of moisture content.

If drained, this soil is well suited to a few locally grown crops, chiefly corn and soybeans. The trees are chiefly hardwoods and loblolly pine. Surface and subsurface drainage is needed before this soil can be cultivated or pastured. In places, this soil is underlain by marl which, if hard, is a limitation in the construction of drainage ditches (fig. 6).

Figure 6.—**The Megget soils are underlain by marl in many places. The marl shown above the waterline in this ditch is a limitation to the installation of drainage systems.**

High shrink-swell potential, water ponding on the surface, and a seasonal high water table are the main limitations in the use and management of this soil. Capability unit IIIw–2; woodland suitability group 1w9.

Murville Series

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

In a representative profile the surface layer is black fine sand about 7 inches thick. The subsoil is 51 inches thick. The upper part is very dark gray fine sand, the middle part is black fine sand, and the lower part is mottled, very dark gray and black fine sand. Below the subsoil, to a depth of about 87 inches, is gray loamy fine sand that is mottled with brown and black.

The Murville soils are very low in natural fertility and medium in content of organic matter. Permeability is moderately rapid, and available water capacity is low. Shrink-swell potential is low. The seasonal high water table is at the surface.

Most of the acreage is wooded.

Representative profile of Murville fine sand in a wooded area 1½ miles south of Pink Hill and 450 feet east of the intersection of State Roads 1103 and 1105:

A1—0 to 7 inches, black (10YR 2/1) fine sand; weak, fine, granular structure; very friable; many large roots; high in content of organic matter; common clean grains of sand; extremely acid; clear, wavy boundary.

B1h—7 to 20 inches, very dark gray (10YR 3/1) fine sand; massive; friable; many medium and large roots; many grains of clean sand; some slightly darker, slightly firm nodular bodies; extremely acid; clear, wavy boundary.

B2h—20 to 30 inches, black (5YR 2/1) fine sand; massive; friable; few fine and medium roots; few grains of clean sand; some slightly darker, slightly firm nodular bodies; extremely acid; clear, wavy boundary.

B3h—30 to 58 inches, mottled very dark gray (5YR 3/1) and black (5YR 2/1) fine sand that has common grains of clean sand; massive; friable; few medium and fine roots; some slightly darker, slightly firm nodular bodies; extremely acid; clear, wavy boundary.

Cg—58 to 87 inches, gray (10YR 6/1) loamy fine sand; common, coarse, distinct, very dark brown (10YR 2/2), dark reddish-brown (5YR 2/2), and black (5YR 2/1) mottles; massive; friable; extremely acid.

The solum is about 40 to 50 inches thick. Reaction is extremely acid or very strongly acid unless the soils are limed. The grains are coated with an organic film, and the soil has an apparent loamy texture to a depth of about 40 inches or more. The Bh horizon is very dark gray or black fine sand or sand. In places pockets or layers of humus-coated grains of sand extended to a depth of more than 100 inches.

Murville fine sand (Mu).—This soil is in depressions on broad, flat interstream areas. Slopes are less than 1 percent. The areas are mostly large and round, but some are irregularly shaped and small.

Included with this soil in mapping are small areas of Johnston, Leon, Pactolus, and Torhunta soils.

Infiltration is rapid, but water ponds on the surface.

If drained, this soil is suited to a few locally grown crops. If cultivated, corn and soybeans are the chief crops. The most important tree species are loblolly pine, pond pine, loblolly bay, maple, sweet gum, and oak. Surface drainage and subsurface drainage are required if the soil is to be cultivated or pastured.

Water ponding on the surface and a seasonal high water table are the main limitations in the use and management of this soil. Capability subclass IVw, drained, and VIIw, undrained; woodland suitability group 2w9.

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 8 inches thick. The subsurface layer is pale-brown loamy sand about 4 inches thick. The subsoil is 60 inches thick. The upper part is light yellowish-brown sandy loam. The middle part is yellowish-brown sandy clay loam that is mottled below a depth of 45 inches with red and gray. The lower part is brownish-yellow sandy clay loam that is mottled with gray and red. Below the subsoil, to a depth of 85 inches, is gray sandy clay loam that is mottled with yellow and red.

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

Most of the acreage is cultivated. The rest is in nonfarm uses.

Representative profile of Norfolk loamy sand, 0 to 2 percent slopes, in a cultivated field 1.3 miles east of Mewborn Crossroads, 0.4 mile south of intersection of State Road 1703 and State Road 1729, and 25 feet east of State Road 1729:

Ap—0 to 8 inches, grayish-brown (10YR 5/2) loamy sand; weak, medium, granular structure; very friable; common fine roots; strongly acid; abrupt, smooth boundary.

A2—8 to 12 inches, pale-brown (10YR 6/3) loamy sand; weak, medium, granular structure; very friable; common fine roots; strongly acid; clear, wavy boundary.

B1—12 to 14 inches, light yellowish-brown (10YR 6/4) sandy loam; weak, fine, subangular blocky structure; friable; common fine roots; very strongly acid; clear, wavy boundary.

B21t—14 to 45 inches, yellowish-brown (10YR 5/8) sandy clay loam; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; thin, discontinuous clay films on faces of peds; very strongly acid; gradual, wavy boundary.

B22t—45 to 60 inches, yellowish-brown (10YR 5/8) sandy clay loam; few, medium, distinct, yellowish-red (5YR 5/8) mottles and few, fine, distinct, light brownish-gray mottles; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; thin, discontinuous clay films on faces of peds and pores; very strongly acid; gradual, wavy boundary.

B3—60 to 72 inches, brownish-yellow (10YR 6/6) sandy clay loam; common, medium, distinct, light brownish-gray (10YR 6/2) mottles and few, medium, prominent, red (2.5YR 4/8) mottles; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; very strongly acid; gradual, wavy boundary.

C—72 to 85 inches, gray (10YR 6/1) sandy clay loam that has thin strata of sandy clay; common, medium,

distinct, brownish-yellow (10YR 6/8) and red (2.5YR 4/8) mottles; massive; friable to firm in sandy clay strata; slightly sticky and plastic; very strongly acid.

The solum is more than 60 inches thick. Reaction is very strongly acid or strongly acid unless the soils are limed. The Ap or A1 horizon is grayish brown or light brownish gray. The B horizon is light yellowish brown, yellowish brown, brownish yellow, or strong brown. The texture centers on sandy clay loam, but in places the upper few inches is sandy loam. The lower part of the B horizon is mottled with gray and red. The C horizon is sandy loam or sandy clay loam that has thin strata of sandy clay in places.

Norfolk loamy sand, 0 to 2 percent slopes (Na).—This soil is on smooth, broad, slightly convex divides. The areas are irregularly shaped and range from 5 to about 200 acres in size. This soil has the profile described as representative for the series.

Included with this soil in mapping are a few areas of soils that have a surface layer of sandy loam and very fine sandy loam and some that have a siltier subsoil. Also included are a few small areas of Goldsboro and Wagram soils and a few soils that have sandy clay subsoils, 40 to 60 inches below the surface. Some delineations have a sand spot or one or more spots of wet soils in depressions. These spots of other kinds of soils are shown in mapping by special spot symbols.

Infiltration is moderate, and runoff is slow.

This soil is well suited to most locally grown crops and is used chiefly for tobacco, corn, soybeans, truck crops, fruit crops, and small grain. It is especially well suited to tobacco.

There are no major limitations in the use of this soil. Capability unit I–1; woodland group 2o1.

Norfolk loamy sand, 2 to 6 percent slopes (Nb).—This soil (fig. 7) is on convex divides. The areas are long and narrow and range from 5 to 30 acres in size.

Included with this soil in mapping are a few areas of soils that have a surface layer of yellowish-brown sandy loam and very fine sandy loam that is 4 to 8 inches thick and some that have a silty subsoil. Also included are a few small areas of Goldsboro and Wagram soils and a few areas of soils that have sandy clay 40 to 60 inches below the surface. In places, mapped areas include short strips of Bibb soils in drainageways, a few small spots of a soil that is sandy throughout, and spots of wet soil in depressions. Special symbols are used to show these spots.

Infiltration is moderate, and runoff is medium.

This soil is well suited to most locally grown crops. It is used chiefly for corn, tobacco, soybeans, truck crops, and small grain and is especially well suited to tobacco.

Runoff is the main limitation in the use and management of this soil. Capability unit IIe–1; woodland group 2o1.

Norfolk loamy sand, 6 to 10 percent slopes (Nc).—This soil is on short side slopes next to drainageways. The areas are long and narrow and range from 5 to 20 acres in size.

Included with this soil in mapping are a few areas of soils that have a surface layer of sandy loam and very fine sandy loam that is 4 to 6 inches thick. Also included in mapping are a few small areas of Wagram and Craven soils. In places mapped areas include narrow strips of Bibb soils in drainageways.

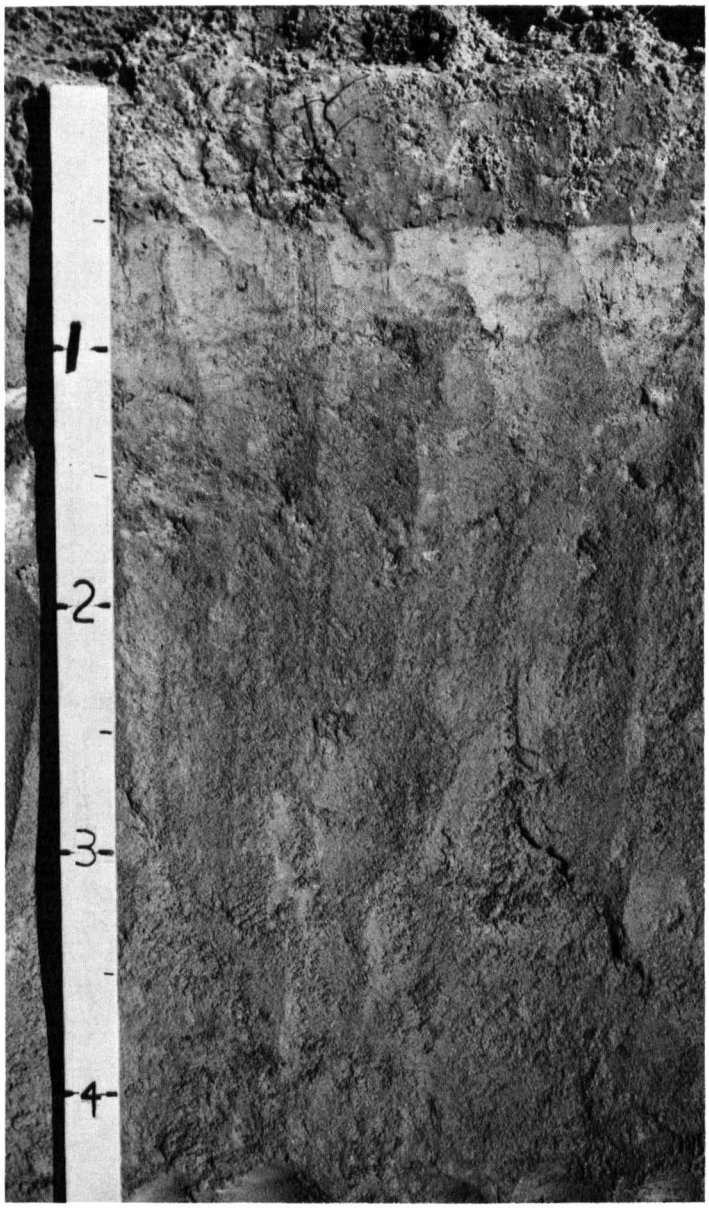

Figure 7.—**Profile of Norfolk loamy sand.**

Infiltration is moderate, and runoff is rapid.

This soil is well suited to most locally grown crops; however, the short length and strong gradient of the slopes limit the use of this soil for row crops.

Slope and runoff are the main limitations in the use and management of this soil. Capability unit IIIe–1; woodland group 2o1.

Pactolus Series

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

In a representative profile the surface layer is dark

grayish-brown loamy sand about 8 inches thick. The upper part of the underlying layer is pale-brown loamy sand that is mottled with brown; the middle part is very pale brown loamy sand that is mottled with yellow and gray; and the lower part, to a depth of 75 inches, is light-gray sand that is mottled with brown.

Pactolus soils are very low in natural fertility and low in content of organic matter. Permeability is rapid, and available water capacity is low. Shrink-swell potential is low. The seasonal high water table is at a depth of about 15 to 30 inches.

Most of the acreage is wooded. The rest is pastured and cultivated.

Representative profile of Pactolus loamy sand in a cultivated field 2:9 miles southeast of LaGrange, 0.1 mile south of intersection of State Roads 1320 and 1331, and 20 feet west of State Road 1331:

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

C1—8 to 14 inches, pale-brown (10YR 6/3) loamy sand; few, medium, faint, brown (10YR 5/3) mottles; very friable; weak, medium, granular structure; few fine roots; strongly acid; gradual, wavy boundary.

C2—14 to 38 inches, very pale brown (10YR 7/3) loamy sand; few, medium, faint, brownish-yellow (10YR 6/6) and light-gray (10YR 7/1) mottles in the lower part; single grained; loose; thin coatings on grains; strongly acid; gradual, wavy boundary.

C3g—38 to 75 inches, light-gray (10YR 7/1) sand that has few thin strata of loamy sand; few, coarse, faint, very pale brown (10YR 7/3) mottles; single grained; loose; strongly acid.

These soils range from loamy sand to sand to a depth of about 75 inches. Reaction is strongly acid or very strongly acid unless the soils are limed. The A1 or Ap horizon is dark grayish brown or grayish brown. The underlying layer is very pale brown, pale-brown, or brownish-yellow loamy sand or sand that is mottled with gray and yellow. The lower layers are generally light-gray uncoated sand.

Pactolus loamy sand (Pa).—This soil is on broad, smooth interstream areas. Slopes are 0 to 2 percent. The areas are longer than they are wide and range from 5 to about 50 acres in size.

Included with this soil in mapping are a few areas of soils that have a surface layer of sand. Also included are a few small areas of Lakeland, Stallings, and Woodington soils. Spots of a sandy soil that has a thin intermittent hardpan at a depth of about 4 to 6 inches are also included.

Infiltration is rapid, and runoff is slow.

This soil is fairly well suited to most locally grown crops, including corn and soybeans. The important tree species are longleaf and loblolly pine. Subsurface drainage is needed for most uses. The sandy underlying layers cave in when excavated and thus limit the installation and maintenance of drainage systems.

Leaching of plant nutrients, very low available water capacity, and a seasonal high water table are the main limitations in the use and management of this soil. Capability unit IIIs–1; woodland suitability group 3w2.

Pamlico Series

The Pamlico series consists of nearly level, very poorly drained soils on flood plains and stream terraces. These soils formed in recent alluvium and plant residues.

In a representative profile Pamlico soils consist of layers of black decomposed organic matter (muck) about 33 inches thick. Below the muck layers, to a depth of about 65 inches, is dark grayish-brown loamy sand and gray sand.

Pamlico soils are low in natural fertility and high in content of organic matter. Permeability is moderate in the organic layers and moderately rapid in the underlying layers. Available water capacity is high and shrink-swell potential is low. The seasonal high water table is at the surface. These soils are very frequently flooded for long periods.

Nearly all of the acreage is wooded. The rest is pastured.

Representative profile of Pamlico muck 1 mile west of LaGrange, 200 feet west of Bear Creek Bridge, and 150 feet north of U.S. Business Highway 70:

Oa1—0 to 6 inches, black (10YR 2/1) sapric material (muck), black (10YR 2/1) rubbed; about 20 percent fiber, less than 5 percent rubbed; weak, medium, granular structure; friable, slightly sticky and slightly plastic; few fine roots; estimated mineral content 60 percent; extremely acid; gradual, wavy boundary.

Oa2—6 to 33 inches, black (10YR 2/1) sapric material (muck), black (10YR 2/1) rubbed; about 20 percent fiber, less than 5 percent rubbed; massive; friable, slightly sticky and slightly plastic; estimated mineral content 50 to 65 percent; extremely acid; gradual, wavy boundary.

A1b—33 to 38 inches, dark grayish-brown (10YR 4/2) loamy sand that has lenses of sand; single grained; grained; loose; very strongly acid; gradual, wavy boundary.

Cg—38 to 65 inches, gray (5YR 6/1) sand; single grained; loose; strongly acid.

These soils have layers of muck 16 to 40 inches thick that overlie sandy mineral material. Reaction is extremely acid to very strongly acid unless the soils are limed. The organic matter is highly decomposed below a thin surface layer of live roots and leaves. Fiber content in undisturbed muck is less than 30 percent unrubbed and less than 10 percent rubbed. Color is black or very dark grayish brown and is unchanged when rubbed. If the saturated mucky soil is squeezed, the liquid is turbid and colored similar to the mucky mass. The underlying mineral layers are dark grayish-brown, grayish-brown, and light brownish-gray, or gray loamy sand or sand.

Pamlico muck (Pc).—This soil is in wide drainageways at the base of the uplands. Slopes are less than 1 percent. The areas are generally long and narrow and are 20 to 100 acres in size.

Included with this soil in mapping are areas near streambanks that have an overwash layer of mineral material. Also included are small areas of soils on stream terraces that have a surface layer of muck and a subsoil that is loamy. These included soils have better outlets for artificial drainage. Also included are a few small areas of Torhunta, Johnston, and Portsmouth soils.

Infiltration is moderate if the water table is below the surface. Runoff is very slow, or the surface is ponded.

The soil is generally unsuited to cultivation, unless drained. Subsurface drainage is difficult because of low elevation and the sandy underlying layers.

Very frequent flooding and a seasonal high water table are the main limitations in the use and management of this soil. If the areas are drained and excessively dry, subsidence and the hazard of organic material catching on fire limit use. Capability unit IVw–1, drained; capability subclass VIIw, undrained; woodland suitability group 4w3.

Pantego Series

Pantego soils are low in natural fertility and mepoorly drained soils on uplands.

In a representative profile the surface layer is about 14 inches thick. It is black loam in the upper part and very dark gray sandy loam in the lower part. The subsoil is sandy clay loam 50 inches thick. The upper part is grayish brown, and the lower part is gray and is mottled with brown. Below the subsoil, to a depth of 74 inches, is gray sandy clay loam that is mottled with brown.

Pantego soils are low in natural fertility and medium in content of organic matter. Permeability is moderate, and available water capacity is medium. Shrink-swell potential is low. The seasonal high water table is at the surface.

Most of the acreage is wooded. The rest is cultivated and pastured.

Representative profile of Pantego loam in a cultivated area 9.5 miles south of Kinston, 1.2 miles southwest of the intersection of State Roads 1922 and 1925, and 25 feet northwest of State Road 1922:

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

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

B1g—14 to 19 inches, grayish-brown (10YR 5/2) sandy clay loam; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; common fine roots; extremely acid; clear, wavy boundary.

B2tg—19 to 50 inches, gray (10YR 6/1) sandy clay loam; few, fine, distinct, yellowish-brown mottles; weak, fine, subangular blocky structure; friable, sticky and slightly plastic; thin, discontinuous clay films on faces of peds and on pore walls; extremely acid; gradual, wavy boundary.

B3g—50 to 64 inches, gray (10YR 6/1) sandy clay loam that has lenses of sandy loam; few, fine, distinct, yellowish-brown and grayish-brown mottles; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; thin clay films in pores; extremely acid; gradual, wavy boundary.

Cg—64 to 74 inches, gray (10YR 6/1) sandy clay loam that has lenses of loamy sand; few, medium, distinct, yellowish-brown (10YR 5/4) mottles; massive; friable; extremely acid.

The solum is more than 60 inches thick. Reaction is strongly acid to extremely acid unless the soils are limed. The A horizon is black or very dark gray. The B horizon is grayish-brown, light brownish-gray, or gray sandy clay loam and, to a lesser extent, sandy loam that is mottled with brown. The C horizon is sandy loam or sandy clay loam.

Pantego loam (Pe).—This soil is on broad, smooth flats in interstream areas. Slopes are less than 1 percent. The areas are wide and range from 20 to several hundred acres in size.

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

Infiltration is moderate, and runoff is ponded to very slow.

If drained, this soil is well suited to a few locally grown crops, chiefly corn and soybeans. The important tree species are loblolly and pond pine. Surface and subsurface drainage is needed before this soil can be cultivated or pastured.

Water ponding on the surface and a seasonal high water table are the main limitations in the use and management of this soil. Capability unit IIIw–3, drained; capability subclass VIw, undrained; woodland suitability group 1w9.

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 grayish-brown loamy sand about 8 inches thick. The subsurface layer is pale-brown sand about 14 inches thick. The subsoil is light yellowish-brown and yellowish-brown sandy loam 18 inches thick. Below this, to a depth of 80 inches, is a layer of very pale brown sand that is mottled with gray over a layer of light yellowish-brown sandy loam that is mottled with gray and brown.

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

Most of the acreage is cultivated. The rest is wooded and used for nonfarm purposes.

Representative profile of Pocalla loamy sand, 0 to 6 percent slopes, in a cultivated field 7 miles south of LaGrange, 0.6 mile east of intersection of North Carolina Highway 55 and State Road 1002, and 20 feet north of North Carolina Highway 55:

Ap—0 to 8 inches, grayish-brown (10YR 5/2) loamy sand; weak, medium, granular structure; very friable; common fine roots; medium acid; abrupt, smooth boundary.

A2—8 to 22 inches, pale-brown (10YR 6/3) sand; single grained; loose; few fine roots; strongly acid; clear, wavy boundary.

B21t—22 to 26 inches, light yellowish-brown (10YR 6/4) sandy loam; weak, fine, subangular blocky structure; very friable; slightly sticky; clay films on sand grains; strongly acid; clear, wavy boundary.

B22t—26 to 40 inches, yellowish-brown (10YR 5/8) sandy loam; weak, fine, subangular blocky structure; very friable, slightly sticky; sand grains coated and bridged with clay; very strongly acid; gradual, wavy boundary.

A'2—40 to 66 inches, very pale brown (10YR 7/3) sand; many, coarse, distinct, light-gray (10YR 7/1) mottles; single grained; light-gray uncoated sand; loose; very strongly acid; gradual, wavy boundary.

B't—66 to 80 inches, light yellowish-brown (10YR 6/4) sandy loam; few, medium, faint, light brownish-gray (10YR 6/2) mottles and common, medium, prominent, strong-brown (7.5YR 5/6) mottles; weak, medium, subangular blocky structure; very friable, slightly sticky; sand grains coated with clay; few fine pebbles; very strongly acid.

The solum is more than 72 inches thick. Reaction is very strongly acid or strongly acid unless the soils are limed. The Ap and A1 horizons are grayish brown or dark grayish brown, and the A2 horizon is pale-brown or very pale brown sand or loamy sand. The B horizon is light yellowish-brown, yellowish-brown, or strong-brown sandy loam or loamy sand. The A'2 horizon is very pale brown or light-gray sand or loamy sand. The B't horizon is yellowish-brown, pale-brown, or gray sandy loam or sandy clay loam.

Pocalla loamy sand, 0 to 6 percent slopes (Po).—This soil is on broad, smooth, slightly convex divides. The areas are wide and long and range from 5 acres to as large as 400 acres in size.

Included with this soil in mapping are a few areas of soils that have a surface layer of sand and a subsoil of loamy sand. Also included are small areas of Wagram, Blanton, Lakeland, and Stallings soils. Some narrow strips of Bibb soils in short drainageways and a few small spots of a wet soil in drepressions are also included. These wet soils are shown by spot symbols.

Infiltration is moderately rapid, and runoff is slow.

The soil is fairly well suited to most locally grown crops. The chief crops are corn, tobacco, soybeans, and small grain.

Leaching of plant nutrients, low available water capacity, and the hazard of soil blowing are the main limitations in the use and management of this soil. Capability unit IIs–1; woodland suitability group 3s2.

Portsmouth Series

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

In a representative profile the surface layer is black loam about 8 inches thick. The subsurface layer is very dark gray loam about 5 inches thick. The subsoil is 25 inches thick. The upper part is gray sandy loam, the middle part is gray sandy clay loam that is mottled with brown, and the lower part is grayish-brown sandy loam that is mottled with brown. Below the subsoil, to a depth of about 70 inches, is grayish-brown sand.

Portsmouth soils are low in natural fertility and medium in content of organic matter. Permeability is moderate, and available water capacity is medium. Shrink-swell potential is low. The seasonal high water table is at the surface.

Most of the acreage is wooded. The rest is cultivated and pastured.

Representative profile of Portsmouth loam in a wooded area 2 miles southeast of Jenny Lind, 300 feet northeast of the intersection of State Roads 1307 and 1324, 200 feet southeast of Hickory Grove Church, and 20 feet southwest of State Road 1324.

A1—0 to 8 inches, black (10YR 2/1) loam; moderate, medium, granular structure; friable; common large roots; extremely acid; gradual, wavy boundary.

A2—8 to 13 inches, very dark gray (10YR 3/1) loam; moderate, medium, granular structure; friable; common large roots; extremely acid; clear, wavy boundary.

B1g—13 to 16 inches, gray (10YR 5/1) sandy loam; weak, fine, subangular blocky structure; friable; common medium roots; very strongly acid; clear, wavy boundary.

B2tg—16 to 34 inches, gray (10YR 6/1) sandy clay loam; few, coarse, faint, pale-brown (10YR 6/3) mottles and few, medium, distinct, yellowish-brown (10YR 5/4) mottles; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; thin clay films on some faces of peds in pores; few fine flakes of mica; very strongly acid; gradual, wavy boundary.

B3g—34 to 38 inches, grayish-brown (10YR 5/2) sandy loam; common, medium, faint, brown (10YR 5/3) mottles; weak, fine, subangular blocky structure; very friable, slightly sticky and slightly plastic; few fine flakes of mica; very strongly acid; clear, wavy boundary.

IICg—38 to 70 inches, grayish-brown (10YR 5/2) sand; single grained; loose; strongly acid.

The solum is about 30 to 38 inches thick. Reaction is very strongly acid or strongly acid unless the soils are limed. The A horizon is black or very dark grayish brown. The B horizon is gray or grayish-brown sandy clay loam and, to a lesser extent, sandy loam that is mottled with brown. The C horizon is sand or loamy sand and in places contains gravel.

Portsmouth loam (Pr).—This soil is on broad, smooth flats and in depressions. Slopes are less than 1 percent. The soil areas are about as broad as they are long and range from 5 to 50 acres in size.

Included with this soil in mapping are a few areas of soils that have a surface layer of sandy loam and silt loam. Also included are small areas of Coxville, Leaf, Torhunta, and Lumbee soils and a few areas of soils that have a thicker subsoil than this soil.

Infiltration is moderate. Runoff is ponded to very slow, and in places the surface is ponded.

If drained, this soil is well suited to a few locally grown crops, chiefly corn and soybeans (fig. 8). The most important tree species are loblolly pine, maple, and sweetgum. Surface and subsurface drainage is needed before this soil can be cultivated or pastured. The sandy substratum causes instability of ditchbanks,

Figure 8.—**Soybeans growing on Portsmouth loam.**

a limitation to installation and maintenance of drainage systems.

Water ponding on the surface and a seasonal high water table are the main limitations in the use and management of this soil. Capability unit IIIw–3, drained; capability subclass Vw, undrained; woodland suitability group 1w9.

Rains Series

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

In a representative profile the surface layer is dark-gray sandy loam about 10 inches thick. The subsurface layer is light brownish-gray sandy loam about 3 inches thick. The subsoil is about 72 inches thick. The upper part is light brownish-gray sandy clay loam, and the lower part is gray sandy clay loam that is mottled with brown and yellow.

Rains soils are low in natural fertility and content of organic matter. Permeability is moderate, and available water capacity is medium. Shrink-swell potential is low. The seasonal high water table is at the surface.

Most of the acreage is wooded. The rest is cultivated and pastured.

Representative profile of Rains sandy loam, in a cultivated field 0.4 mile east of Stalling Airport, 1 mile south of the intersection of State Roads 1541 and 1581, and 20 feet south of State Road 1581:

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

A2—10 to 13 inches, light brownish-gray (10YR 6/2) sandy loam; weak, medium, granular structure; very friable; many medium roots; common pores filled with dark-gray material from Ap horizon; strongly acid; clear, wavy boundary.

B1g—13 to 16 inches, light brownish-gray (10YR 6/2) sandy clay loam; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; common pores filled with dark-gray material from Ap horizon; very strongly acid; clear, wavy boundary.

B21tg—16 to 34 inches, gray (10YR 6/1) sandy clay loam; common, medium, distinct, yellowish-brown (10YR 5/4) mottles; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; thin, discontinuous clay films on faces of peds; very strongly acid; gradual, wavy boundary.

B22tg—34 to 48 inches, gray (10YR 6/1) sandy clay loam; common, medium, distinct, yellowish-brown (10YR 5/4) and grayish-brown (10YR 5/2) mottles and few, fine, distinct, yellowish-red mottles; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; thin, discontinuous clay films on faces of peds; very strongly acid; gradual wavy boundary.

B23tg—48 to 63 inches, gray (10YR 5/1) sandy clay loam; few, medium, distinct, yellowish-brown (10YR 5/4) mottles and common, coarse, faint, grayish-brown (10YR 5/2) mottles; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; very strongly acid; gradual, wavy boundary.

B3g—63 to 85 inches, gray (10YR 6/1) sandy clay loam that has thin lenses of sandy clay and sandy loam; few, coarse, faint, grayish-brown (10YR 5/2) and reddish-yellow (7.5YR 6/8) mottles; massive; friable, slightly sticky and slightly plastic; very strongly acid.

The solum is more than 60 inches thick. Reaction is strongly acid or very strongly acid unless the soils are limed. The A1 or Ap horizon is dark gray or very dark gray. Where the surface layer is very dark gray, it is less than 8 inches thick. The B horizon is gray or light-gray sandy clay loam and, to a lesser extent, sandy loam that is mottled with brown, yellow, and red.

Rains sandy loam (Ra).—This soil is in depressions and on smooth flats in broad interstream areas. Slopes are less than 1 percent. The areas are generally long and wide and range from 5 to several hundred acres in size.

Included with this soil in mapping are a few areas of soils that have a surface layer of loam and very fine sandy loam and some that have a siltier subsoil. Also included are a few small areas of Coxville, Lynchburg, and Pantego soils.

Infiltration is moderate, and runoff is slow or the surface is ponded.

If drained, this soil is well suited to a few locally grown crops, chiefly corn and soybeans. The principal tree species is loblolly pine. Surface and subsurface drainage is needed before this soil can be cultivated or pastured.

Water ponding on the surface and a seasonal high water table are the main limitations in the use and management of this soil. Capability unit IIIw–3, drained; capability subclass Vw, undrained; woodland suitability group 2w3.

Stallings Series

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

In a representative profile the surface layer is dark-gray loamy sand about 8 inches thick. The subsurface layer is light brownish-gray loamy sand about 4 inches thick. The subsoil is 68 inches thick. The upper part is pale-brown sandy loam that is mottled with gray and brown, the middle part is light-gray sandy loam that is mottled with brown and yellow, and the lower part is light brownish-gray loamy sand that is mottled with gray and brown.

Stallings soils are low in natural fertility and content of organic matter. Permeability is moderately rapid, and available water capacity is medium. Shrink-swell potential is low. The seasonal high water table is within 15 inches of the surface.

About half the acreage is cultivated. A small acreage is in pasture, and the rest is wooded.

Representative profile of Stallings loamy sand in a cultivated field 8 miles south of Kinston, 0.5 mile south of Woodington on U.S. Highway 258, and 300 feet east of U.S. Highway 258:

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

A2—8 to 12 inches, light brownish-gray (10YR 6/2) loamy sand; weak, medium, granular structure; very friable; many fine roots; strongly acid; clear, wavy boundary.

B21t—12 to 24 inches, pale-brown (10YR 6/3) sandy loam; common, medium, faint, light brownish-gray (10YR 6/2) and brown (10YR 5/3) mottles; weak, medium, subangular blocky structure; very friable; many fine roots; sand grains coated and bridged with clay; very strongly acid; clear, wavy boundary.

B22tg—24 to 42 inches, light-gray (10YR 6/1) sandy loam; common, medium, distinct, light yellowish-brown (10YR 6/4) and brownish-yellow (10YR 6/6) mottles; weak, medium, subangular blocky structure; friable, slightly sticky and slightly plastic; many fine roots; common fine pores; sand grains coated and bridged with clay; very strongly acid; gradual, wavy boundary.

B3g—42 to 80 inches, light brownish-gray (10YR 6/2) loamy sand; common, medium, faint, light-gray (10YR 7/1) and light yellowish-brown (10YR 6/4) mottles; weak, medium, granular structure; friable, slightly sticky; common small bodies of clean sand; very strongly acid.

The solum is more than 60 inches thick. Reaction is very strongly acid to strongly acid unless the soils are limed. The A1 or Ap horizon is dark gray or dark grayish brown. The A2 horizon is light brownish gray or very pale brown. The B21 horizon is pale brown, brownish yellow, or light yellowish brown. The B22 and B3 horizons are light-gray, light brownish-gray, or grayish-brown loamy sand or sandy loam that is mottled with gray, brown, and yellow.

Stallings loamy sand (St).—This soil is on broad, smooth interstream divides. Slopes are 0 to 2 percent. The areas are long and wide and range from about 20 to 50 acres in size.

Included with this soil in mapping are a few areas of soils that have a surface layer of sandy loam. Also included are a few small areas of Johns, Leon, Lumbee, Lynchburg, Pactolus, Rains, and Woodington soils and soils that have a thin, brownish, slightly hard layer near the surface.

Infiltration is moderate, and runoff is slow.

If drained, this soil is well suited to most locally grown crops. Corn and soybeans are the chief crops, but tobacco, small grain, truck crops, and pasture plants are important. The dominant tree species is loblolly pine. Some drainage is needed for most uses. The sandy lower part of the subsoil is unstable in ditchbanks. This is a limitation to installation and maintenance of drainage systems.

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

Torhunta Series

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

In a representative profile the surface layer is loam about 14 inches thick. The upper part is black, and the lower part is very dark grayish brown. The subsoil is grayish-brown sandy loam 22 inches thick. It is mottled with brown. Below the subsoil, to a depth of 65 inches, is grayish-brown loamy sand and light-gray sand that is mottled with brown or gray.

Torhunta soils are low in natural fertility and medium in content of organic matter. Permeability is moderately rapid, and available water capacity is medium. Shrink-swell potential is low. The seasonal high water table is at the surface.

Most of the acreage is wooded. The rest is cultivated and pastured.

Representative profile of Torhunta loam in a cultivated field 0.6 mile north of LaGrange, 150 feet east of State Road 1503, and 15 feet northeast of farm road:

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

A12—7 to 14 inches, very dark grayish-brown (10YR 3/2) loam; weak, medium, granular structure; friable; common fine roots; strongly acid; gradual, wavy boundary.

B2g—14 to 36 inches, grayish-brown (10YR 5/2) sandy loam; common medium-sized pores filled with black loam from surface layer; common, medium, faint, dark grayish-brown (10YR 4/2) mottles; weak, fine, subangular blocky structure; very friable, slightly sticky and slightly plastic; very strongly acid; gradual, wavy boundary.

C1g—36 to 45 inches, grayish-brown (10YR 5/2) loamy sand; few, medium, distinct, dark grayish-brown (10YR 4/2) mottles and common, medium, distinct, light-gray (10YR 7/1) mottles; massive; very friable; strongly acid; gradual, wavy boundary.

C2g—45 to 65 inches, light-gray (10YR 6/1) sand; single grained; loose; extremely acid.

The solum is 30 to 50 inches thick. Reaction is extremely acid to strongly acid unless the soils are limed. The A horizon is black or very dark grayish brown. The B horizon is grayish-brown, dark grayish-brown, or gray sandy loam or loamy sand that is mottled with brown and gray. The C horizon is sand to loamy sand.

Torhunta loam (To).—This soil is on smooth, flat interstream areas and in depressions. Slopes are less than 1 percent. The areas are generally as wide as they are long and range from 25 to 100 acres in size.

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

Infiltration is moderate, and runoff is slow to ponded.

If drained, the soil is well suited to a few locally grown crops, chiefly corn and soybeans. The most important tree species are loblolly pine, pond pine, maple, gum, and oak. Surface and subsurface drainage is needed before this soil can be cultivated or pastured. The sandy substratum causes ditchbanks to be unstable. This is a limitation to the installation and maintenance of drainage systems.

Water ponding on the surface and a seasonal high water table are the main limitations in the use and management of this soil. Capability unit IIIw–3, drained; capability subclass VIw, undrained; woodland suitability group 2w9.

Umbric Ochraqualfs

The Umbric Ochraqualfs consist of nearly level, very poorly drained soils on uplands.

In a representative profile the surface layer is black loam 11 inches thick. The subsurface layer is very dark gray loam about 3 inches thick. The subsoil is 56 inches thick. The upper part is grayish-brown sandy clay loam that is mottled with brown, and the lower part is gray sandy clay or sandy clay loam that is mottled with brown.

Umbric Ochraqualfs are low in natural fertility and medium in content of organic matter. Permeability is moderate, and available water capacity is medium. Shrink-swell potential is moderate. The seasonal high water table is at the surface.

Most of the acreage is wooded. The rest is cultivated and pastured.

Representative profile of Umbric Ochraqualfs, 0.3 mile south of Loftin's Crossroad, 0.3 mile east of the intersection of North Carolina Highway 58 and State Road 1914, and 100 feet south of State Road 1914:

Ap—0 to 11 inches, black (10YR 2/1) loam; weak, medium, granular structure; friable; common medium roots; strongly acid; gradual, wavy boundary.

A2—11 to 14 inches, very dark gray (10YR 3/1) loam; weak, medium, granular structure; friable; common medium roots; common pores filled with black surface soil; strongly acid; gradual, wavy boundary.

B1g—14 to 18 inches, grayish-brown (10YR 5/2) sandy clay loam; weak, fine, subangular blocky structure; friable; common fine roots; few pores filled with black loam; strongly acid; gradual, wavy boundary.

B21tg—18 to 34 inches, grayish-brown (10YR 5/2) sandy clay loam; common, medium, distinct, yellowish-brown (10YR 5/6) mottles; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; thin, discontinuous clay films on faces of peds and pores; medium acid; gradual, wavy boundary.

B22tg—34 to 42 inches, gray (10YR 6/1) sandy clay that has thin strata of sandy loam; few, medium, distinct, yellowish-brown (10YR 5/6) mottles; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; thin, discontinuous clay films on faces of peds and pores; neutral; gradual, wavy boundary.

B3g—42 to 70 inches, gray (10YR 6/1) sandy clay loam that has thin strata of sand and greenish-gray clay; massive; friable, slightly sticky and slightly plastic; mildly alkaline.

The solum is more than 60 inches thick. Reaction is strongly acid in the A horizon and B1 horizon unless the soils are limed and medium acid to mildly alkaline in the lower part of the B horizon. The A horizon is black or very dark gray. The B horizon is grayish-brown or gray sandy clay loam or sandy clay that is mottled with brown and gray. The underlying horizons are soft marl mixed with loamy sand, sandy clay loam, or clay.

Umbric Ochraqualfs (Uo).—This soil is on broad, smooth flats on interstream areas. Slopes are less than 1 percent. The areas are wide and long and range from 20 to about 150 acres in size.

Included with this soil in mapping are a few small areas of Grifton, Meggett, Portsmouth, and Torhunta soils.

Infiltration is moderate. Runoff is very slow or the surface is ponded.

If drained, this soil is well suited to a few locally grown crops, chiefly corn and soybeans. The important tree species are loblolly and pond pine. Surface and subsurface drainage is needed before this soil can be cultivated or pastured. In places this soil is underlain by marl, which may present a problem to construction of ditches.

Water ponding on the surface and a seasonal high water table are the main limitations in the use and management of these soils. Capability unit IIIw-3; woodland suitability group 1w9.

Wagram Series

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

In a representative profile the surface layer is grayish-brown loamy sand about 8 inches thick. The subsurface layer is pale-brown loamy sand about 22 inches thick. The subsoil is sandy clay loam 51 inches thick. The upper part is yellowish brown, the middle part is brownish yellow mottled with red and gray, and the lower part is light yellowish brown mottled with brown and gray. Below the subsoil, to a depth of 90 inches, is brownish-yellow sandy clay loam that is mottled with brown and red.

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

Most of the acreage is cultivated. The rest is used for nonfarm purposes.

Representative profile of Wagram loamy sand, 0 to 6 percent slopes, in a cultivated field 2.4 miles southeast of LaGrange, 0.4 mile southeast of intersection of U.S. Highway 70 and State Road 1520, and 20 feet east of farm road:

Ap—0 to 8 inches, grayish-brown (10YR 5/2) loamy sand; weak, medium, granular structure; very friable; common fine roots; medium acid; abrupt, smooth boundary.

A2—8 to 30 inches, pale-brown (10YR 6/3) loamy sand; common, medium, faint mottles of uncoated sand; weak, medium, granular structure; very friable; few fine roots; very strongly acid; gradual, wavy boundary.

B21t—30 to 58 inches, yellowish-brown (10YR 5/8) sandy clay loam; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; thin, discontinuous clay films on faces of peds; very strongly acid; gradual, wavy boundary.

B22t—58 to 71 inches, brownish-yellow (10YR 6/8) sandy clay loam; common, medium, prominent, red (2.5YR 4/8) mottles and few, medium, distinct, gray (10YR 6/1) mottles; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; thin, discontinuous clay films on faces of peds; very strongly acid; gradual, wavy boundary.

B3—71 to 81 inches, light yellowish-brown (10YR 6/4) sandy clay loam; common, medium, distinct, strong-brown (7.5YR 5/8) and gray (10YR 6/1) mottles; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; very strongly acid; gradual, wavy boundary.

C—81 to 90 inches, brownish-yellow (10YR 6/6) sandy clay loam; common, coarse, distinct, gray (10YR 6/1) mottles and common, fine, distinct, strong-brown mottles and common, fine, prominent, red mottles; massive; very friable, slightly sticky and slightly plastic; very strongly acid.

The solum is more than 60 inches thick. Reaction is strongly acid or very strongly acid unless the soils are limed. The Ap or A1 horizon is grayish brown or light grayish brown. The B horizon is light yellowish-brown, yellowish-brown, brownish-yellow, or strong-brown sandy clay loam or sandy loam that is mottled with red, brown, and gray in the lower part. The C horizon is sandy clay loam, sandy loam, or loamy sand.

Wagram loamy sand, 0 to 6 percent slopes (Wb).—This soil is on slightly convex divides. The areas are irregularly shaped and range from 10 to about 50

acres in size. This soil has the profile described as representative for the series.

Included with this soil in mapping are a few areas of soils that have a surface layer of sand. Also included are a few small areas of Blanton, Goldsboro, Norfolk, and Pocalla soils. Short, narrow strips of Bibb soils in drainageways and a few small depressions of wet soils are also included. Those wet soils are shown by wet spot symbols.

Infiltration is moderate, and runoff is slow.

This soil is suited to most locally grown crops and is used chiefly for tobacco, corn, soybeans, and small grain.

Leaching of plant nutrients, low available water capacity, and the hazard of soil blowing are the main limitations in the use and management of this soil. Capability unit IIs–1; woodland suitability group 3s2.

Wagram loamy sand, 6 to 10 percent slopes (Wc).—This soil (fig. 9) is next to drainageways where side slopes are short. The areas are long and narrow and range from 5 to 100 acres in size.

Included with this soil in mapping are a few areas of soils that have a surface layer of sand. Also included are a few small areas of Blanton, Craven, and Norfolk soils. Narrow strips of Bibb soils in drainageways are also included.

Figure 9.—**Profile of Wagram loamy sand.**

Infiltration is moderate, and runoff is medium.

This soil is fairly well suited to most locally grown crops, but the short length and gradient of the slopes limit the use of this soil for row crop cultivation. Runoff causes a hazard of erosion if this soil is cultivated.

Leaching of plant nutrients, low available water capacity, runoff, and slope are the main limitations in the use and management of this soil. Capability subclass IIIs; woodland suitability group 3s2.

Wagram loamy sand, 10 to 15 percent slopes (Wd).—This soil is between gently sloping uplands and flood plains or stream terraces. The areas are long and narrow and range from 5 to 75 acres in size.

Included with this soil in mapping are a few small areas of soil that has steeper slopes and areas of soil that has a surface layer of sandy loam. Also included are a few small areas of Bibb, Blanton, Craven, and Lakeland soils.

Infiltration is moderate, and runoff is rapid.

This soil is fairly well suited to most locally grown crops, but the short length and gradient of the slopes limit the use of this soil for row-crop cultivation. Runoff causes a hazard of erosion if this soil is cultivated. Practices are needed to control runoff and erosion.

Leaching of plant nutrients, low available water capacity, runoff, and slope are the main limitations in the use and management of this soil. Capability subclass IVs; woodland suitability group 3s2.

Wickham Series

The Wickham series consists of nearly level to gently sloping, well-drained soils on stream terraces.

In a representative profile the surface layer is brown loamy sand about 8 inches thick. The subsurface layer is light yellowish-brown loamy sand about 7 inches thick. The subsoil is 28 inches thick. The upper part is strong-brown sandy clay loam, the middle part is yellowish-red sandy clay loam that is mottled with brown, and the lower part is strong-brown sandy loam. Below the subsoil, to a depth of 65 inches, is brownish-yellow loamy sand.

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

Most of the acreage is cultivated. The rest is pastured.

Representative profile of Wickham loamy sand, 1 to 6 percent slopes, in a cultivated field 5.7 miles south of LaGrange, 0.3 mile west of intersection of State Roads 1002 and 1313, and 25 feet north of State Road 1313:

Ap—0 to 8 inches, brown (10YR 5/3) loamy sand; weak, medium, granular structure; very friable; common fine roots; medium acid; abrupt, smooth boundary.

A2—8 to 15 inches, light yellowish-brown (10YR 6/4) loamy sand; weak, medium, granular structure; very friable; common fine roots; strongly acid; abrupt, wavy boundary.

B1—15 to 19 inches, strong-brown (7.5YR 5/6) sandy clay loam; weak, fine, subangular blocky structure; friable; common fine roots; strongly acid; clear, wavy boundary.

B21t—19 to 25 inches, yellowish-red (5YR 4/8) sandy clay loam; moderate, fine, subangular blocky structure; friable, sticky and plastic; clay films on faces of peds; few flakes of mica and feldspar grains; strongly acid; gradual, wavy boundary.

B22t—25 to 38 inches, yellowish-red (5YR 5/8) sandy clay loam; few, medium, faint, yellowish-brown (10YR 5/4) mottles; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; common small flakes of mica and few feldspar grains; strongly acid; gradual, wavy boundary.

B3—38 to 43 inches, strong-brown (7.5YR 5/8) sandy loam; weak, fine, subangular blocky structure; very friable; common small flakes of mica; strongly acid; gradual, wavy boundary.

IIC—43 to 65 inches, brownish-yellow (10YR 6/6) loamy sand; single grained; very friable; common small flakes of mica and few feldspar grains; few pebbles; strongly acid.

The solum is about 40 to 55 inches thick. Reaction is strongly acid to slightly acid unless the soils are limed. The Ap and A1 horizons are brown or grayish brown, and the A2 horizon is light yellowish brown or pale brown. The B horizon is yellowish-red or strong-brown clay loam, sandy clay loam, or sandy loam that is mottled with brown in the lower part. The C horizon is loamy sand or sand and generally contains gravel.

Wickham loamy sand, 1 to 6 percent slopes (Wk).—This soil is on smooth, low ridges. The areas are longer than they are wide and range from 5 to 25 acres in size.

Included with this soil in mapping are a few areas of eroded soils that have a surface layer of yellowish-brown sandy loam and loam. Also included are a few small areas of Kalmia and Kenansville soils. Strips of Bibb soils in drainageways and a few small spots of deep sand or wet spots are also included. These wet spots are shown in mapping by special spot symbols.

Infiltration is moderate, and runoff is medium.

This soil is well suited to most locally grown crops. It is used chiefly for corn, tobacco, soybeans, and small grain.

Runoff is the main limitation in the use and management of this soil. Capability unit IIe–1; woodland suitability group 2o7.

Woodington Series

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

In a representative profile the surface layer is very dark gray loamy sand about 4 inches thick. The subsurface layer is grayish-brown loamy sand about 8 inches thick. The subsoil is 73 inches thick. The upper part is light brownish-gray sandy loam that is mottled with brown, the middle part is gray sandy loam that is mottled with brown and gray, and the lower part is light-gray loamy sand that is mottled with yellow.

Woodington soils are low in natural fertility and content of organic matter. Permeability is moderately rapid, and available water capacity is medium. Shrink-swell potential is low. The seasonal high water table is within 12 inches of the surface.

Most of the acreage is wooded. The rest is cultivated and pastured.

Representative profile of Woodington loamy sand in a wooded area 5 miles south of Kinston, 0.5 mile north of the intersection of State Roads 1161 and 1149, and 10 feet north of State Road 1149:

A1—0 to 4 inches, very dark gray (10YR 3/1) loamy sand; weak, medium, granular structure; very friable; many fine roots; very strongly acid; gradual, wavy boundary.

A2—4 to 12 inches, grayish-brown (10YR 5/2) loamy sand; weak, medium, granular structure; very friable; many fine roots; few medium pores filled with dark-gray material from the surface layer; very strongly acid; clear, wavy boundary.

B21tg—12 to 16 inches, light brownish-gray (10YR 6/2) sandy loam; few, medium, distinct, light yellowish-brown (10YR 6/4) mottles; weak, fine, subangular blocky structure; very friable; slightly sticky; sand coated and bridged with clay; few medium pores filled with dark-gray material from the surface layer; very strongly acid; gradual, wavy boundary.

B22tg—16 to 32 inches, gray (10YR 6/1) sandy loam; few, medium, distinct, light yellowish-brown (10YR 6/4) and strong-brown (7.5YR 5/6) mottles; weak, fine, subangular blocky structure; friable; slightly sticky; sand coated and bridged with clay; very strongly acid; gradual, wavy boundary.

B23tg—32 to 47 inches, gray (10YR 6/1) sandy loam; common pockets of light-gray (10YR 7/1) and yellowish-brown (10YR 5/4) sand; weak, fine, subangular blocky structure; very friable; very strongly acid; gradual, wavy boundary.

B3g—47 to 85 inches, light-gray (10YR 7/1) loamy sand; few, medium, distinct, brownish-yellow (10YR 6/6) mottles; weak, fine, granular structure; loose; common small bodies of clean sand; very strongly acid.

The solum is more than 60 inches thick. Reaction is very strongly acid or strongly acid unless the soils are limed. The Ap or A1 horizon is dark gray or very dark gray. The very dark gray surface layer is less than 8 inches thick. The B horizon is gray or light brownish gray and is mottled with yellow and brown. The upper part is sandy loam, and the lower part is loamy sand or sandy loam. The C horizon is sandy loam or loamy sand.

Woodington loamy sand (Wn).—This soil is on broad, smooth flats on interstream areas and in depressions. Slopes are less than 1 percent. The areas are about as wide as they are long and range from 10 to 50 acres in size.

Included with this soil in mapping are a few areas of soils that have a surface layer of fine sandy loam. Also included are a few small areas of Lumbee, Rains, Stallings, and Torhunta soils and small areas of soils that have an intermittent, thin layer of hardpan and concretions at a depth of 4 to 6 inches.

Infiltration is moderate, and runoff is slow to ponded.

If drained, this soil is well suited to a few locally grown crops, chiefly corn and soybeans. The important tree species is loblolly pine. Surface and subsurface drainage is needed if this soil is cultivated or pastured. Where the lower part of the subsoil is sandy, there is instability in ditchbanks. This is a limitation in drainage installation and maintenance.

Runoff and a seasonal high water table are the main limitations in the use and management of this soil. Capability unit IIIw–3, drained; capability subclass VIw, undrained; woodland suitability group 2w9.

Use and Management of the Soils

The first part of this section presents general guidelines for managing soils for crops and pasture. Then, the capability classification used by the Soil Conservation Service is explained and outlined. Next, the estimated yields of crops are listed. To determine the capability classification of a soil, refer to the "Guide to Mapping Units" at the end of this survey. Detailed information about the management of soils can be found in the section "Descriptions of the Soils." The last part of this section discusses use of the soils for woodland, for wildlife, for engineering purposes, and for town and country planning.

Management of Soils for Crops and Pasture

Land use is fairly consistent throughout the county. Soil differences such as erodibility, wetness, and droughtiness are the major concerns of management. These concerns are mainly responsible for land-use patterns on most farms. The differences are also the basis of the capability classification system.

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

Such soils as Coxville, Grifton, Lenoir, and Torhunta need drainage for optimum production of crops. Wet soils are slower to warm in spring than better drained soils. On such 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 range, 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.

The placement of any mapping unit in the grouping can be learned by turning to the "Guide to Mapping Units" at the back of this survey.

Capability Classes are the broadest grouping 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 some parts of the United States but not in Lenoir county, 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, 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 descriptive outline of the system as it applies in Lenoir County.

Class I. Soils that have few limitations that restrict their use.
  (No subclass)
    Unit I–1. Well-drained, nearly level soils that have a surface layer of loamy sand and a subsoil of sandy loam to sandy clay loam.

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 protected.
Unit IIe–1. Well-drained, gently sloping soils that have a surface layer of loamy sand and a subsoil of sandy loam to clay loam.
Subclass IIw. Soils that have a moderate limitation because of excess water.
Unit IIw–1. Moderately well drained, nearly level soils that have a surface layer of loamy sand and a subsoil of sandy loam to sandy clay loam.
Unit IIw–2. Moderately well drained to somewhat poorly drained, nearly level soils that have a surface layer of sandy loam and a subsoil of sandy loam to clay loam.
Subclass IIs. Soils that have a moderate limitation because of low available water capacity.
Unit IIs–1. Nearly level and gently sloping soils that have a surface layer of loamy sand and a subsoil of sandy clay loam to sandy loam.

Class III. Soils that have severe limitations that reduce the choice of plants, require special conservation measures, or both.
Subclass IIIe. Soils that have a severe hazard of erosion if cultivated and not protected.
Unit IIIe–1. Well-drained, sloping soils that have a surface layer of loamy sand and a subsoil of sandy clay loam to sandy loam.
Unit IIIe–2. Moderately well drained, gently sloping soils that have a surface layer of fine sandy loam and a subsoil of clay or clay loam.
Subclass IIIw. Soils that have a severe limitation because of excess water.
Unit IIIw–1. Somewhat poorly drained, nearly level soils that have a surface layer of loamy sand and a subsoil of sandy loam.
Unit IIIw–2. Poorly drained, nearly level soils that have a surface layer of loam or fine sandy loam and a subsoil of sandy clay, clay loam, or clay.
Unit IIIw–3. Poorly drained or very poorly drained, nearly level soils that have a surface layer of loam to fine sand and a subsoil of fine sand to sandy clay loam.
Unit IIIw–4. Somewhat poorly drained, nearly level soils that have a surface layer of loam and a subsoil of clay to clay loam.
Subclass IIIs. Soils that have severe limitations because of low available water capacity.
Unit IIIs–1. Well-drained and somewhat poorly drained, nearly level to gently sloping soils that have a surface layer of sand and loamy sand and a subsoil of sandy loam to sandy clay loam.
Unit IIIs–2. Well-drained, sloping soils that have a surface layer of loamy sand and a subsoil of sandy clay loam to sandy loam.

Class IV. Soils that have very severe limitations that reduce the choice of plants, require very careful management, or both.
Subclass IVe. Soils subjected to very severe erosion if they are cultivated and not protected.
Unit IVe–1. Moderately well drained, sloping soils that have a surface layer of fine sandy loam and a subsoil of clay loam to clay.
Subclass IVw. Soils that have very severe limitations because of excess water.
Unit IVw–1. Somewhat poorly drained, nearly level soils that have a surface layer of sand and a subsoil of sand or loamy sand.
Unit IVw–2. Poorly drained, nearly level soils that have a surface layer of loam and a subsoil of clay to clay loam.
Unit IVw–4. Very poorly drained and poorly drained, nearly level soils that have a surface layer of loam or loamy sand and a subsoil of sandy loam to clay 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 are sandy throughout.
Unit IVs–2. Well-drained, strongly sloping soils that have a surface layer of loamy sand and a subsoil of sandy clay loam to sandy loam.

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 generally not feasible.
Unit Vw–1. Very frequently flooded, very poorly drained to somewhat poorly drained soils that are sandy to loamy throughout.

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

Class VII. Soils that have very severe limitations that make them unsuited to cultivation and that restrict their use largely to grazing, woodland, or wildlife habitat.
Subclass VIIw. Soils that have very severe limitations because of excess water.
Unit VIIw. Very frequently flooded, very poorly drained, nearly level soils that have a surface layer of muck and a subsoil of sand.

Estimated Yields

Table 2 lists estimated yields of the principal crops (fig. 10) grown in the county. The estimates are based on observations made by farmers, soil scientists, and others who have knowledge of yields in the county and on information taken from research data. The estimated yields are average yields per acre that can be expected by good commercial farmers at the level of

Figure 10.—Young tobacco plants on Norfolk loamy sand. This soil is used extensively for growing tobacco.

Figure 11.—Sweetgums growing in flood plain on Bibb soils.

management which tends to produce the highest economic returns.

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

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

1. Rainfall is effectively used and conserved.
2. Surface and subsurface drainage systems are installed.
3. Crop residue is managed to maintain tilth.
4. Minimum but timely tillage is used.
5. Insect, plant disease, and weed-control measures are consistently used.
6. Fertilizer is applied according to soil test and crop needs.
7. Suited crop varieties are used at recommended seeding rates.

Use of Soils as Woodland

Originally Lenoir County was mainly wooded. Now commercial forests cover about 48 percent of the county, or 122,914 acres.[2]

Good stands of commercial trees are produced in the woodlands of the county. Needleleaf forest types occur commonly on uplands and terraces, and broadleaf types generally predominate on the bottoms along the rivers and creeks (fig. 11).

The value of the wood products is substantial, though it is below its potential. Other values are grazing, wildlife, recreation, natural beauty, and conservation of soil and water. This section explains how soils affect tree growth and management in the county. Table 3 lists potential productivity and management problems of the soils in Lenoir County and preferred tree species for planting and management.

The first column gives the woodland suitability group. Each group is made up of soils that are suited to the same kinds of trees, that need about the same kind of management to produce these trees, and that have about the same potential productivity.

Each woodland suitability group is identified by a three-part symbol. The first part of the symbol indicates the relative productivity of the soils: 1 = very high; 2 = high; 3 = moderately high; 4 = moderate; and 5 = low. The second part of the symbol, a letter, indicates the important soil property that imposes a moderate or severe hazard or limitation in managing the soils for wood production. The letter *w* shows that excessive water in or on the soil is the chief limitation; *s* shows the soils are sandy; and *o* shows the soils have

[2] Personal communication, December 28, 1973, from ROBERT CATHEY, Association Mensurationist, Southeastern Forest Experiment Station, Asheville, North Carolina, to JOHN E. WIGGINS, JR., State Staff Forester, Soil Conservation Service, Raleigh, N.C., 1973 Forest Survey Report.

TABLE 2.—*Estimated average acre yields of crops under intensive management*

[Absence of yield means that the crop is not commonly grown on the soil or that yield estimates are not available]

Soil	Corn	Soybeans	Tobacco	Cucumbers	Sweetpotatoes	Wheat	Coastal bermuda hay	Pasture	
								Fescue and clover	Coastal bermuda
	Bu	*Bu*	*Lb*	*Bu*	*Bu*	*Bu*	*Tons*	*AUM*[1]	*AUM*[1]
Bibb soils, frequently flooded	110	35	---	---	---	---	---	8.0	---
Blanton sand, 0 to 6 percent slopes	60	25	1,600	---	---	55	3.5	---	7.5
Chewacla loam, frequently flooded	90	---	---	---	---	---	---	7.0	---
Coxville loam	85	40	---	---	---	45	---	7.0	---
Craven fine sandy loam, 1 to 4 percent slopes	105	40	2,500	---	---	50	6.0	7.0	---
Craven fine sandy loam, 4 to 8 percent slopes	---	---	---	---	---	---	5.0	6.5	---
Goldsboro loamy sand, 0 to 2 percent slopes	125	45	3,000	290	350	60	6.0	8.0	11.5
Grifton sandy loam	110	40	---	---	---	---	---	9.0	---
Johns sandy loam	120	45	2,700	270	---	50	5.0	8.0	11.0
Johnston soils	80	40	---	---	---	---	---	6.0	---
Kalmia loamy sand, 0 to 2 percent slopes	110	45	2,900	225	300	60	5.5	---	10.5
Kalmia loamy sand, 2 to 6 percent slopes	100	40	2,800	220	---	55	5.0	---	---
Kenansville loamy sand, 0 to 6 percent slopes	70	30	2,000	---	300	45	4.5	---	9.0
Kinston loam, frequently flooded	---	---	---	---	---	---	---	6.5	---
Lakeland sand, 0 to 6 percent slopes	55	20	---	---	---	---	3.0	---	6.0
Leaf loam	100	35	---	---	---	---	---	8.0	---
Lenoir loam	95	45	2,200	---	---	---	---	8.0	---
Leon sand	---	---	---	---	---	---	3.0	---	7.0
Lumbee sandy loam	110	45	---	---	---	---	---	8.6	---
Lynchburg sandy loam	110	45	2,600	---	---	---	5.5	7.0	11.0
Meggett fine sandy loam	110	40	---	---	---	---	---	8.0	---
Murville fine sand	---	---	---	---	---	---	---	---	---
Norfolk loamy sand, 0 to 2 percent slopes	120	40	3,000	290	370	60	6.0	---	10.5
Norfolk loamy sand, 2 to 6 percent slopes	115	35	2,900	280	350	55	6.0	7.5	10.5
Norfolk loamy sand, 6 to 10 percent slopes	---	---	---	---	---	50	5.5	7.0	10.0
Pactolus loamy sand	70	30	1,800	---	---	---	3.4	---	7.5
Pamlico muck	90	40	---	---	---	---	---	---	---
Pantego loam	110	50	---	---	---	---	---	9.0	---
Pocalla loamy sand, 0 to 6 percent slopes	80	30	2,000	---	300	40	5.0	9.0	7.5
Portsmouth loam	110	40	---	---	---	---	---	9.0	---
Rains sandy loam	110	40	2,200	---	---	---	---	8.0	---
Stallings loamy sand	105	40	2,500	---	---	---	4.8	8.0	11.5
Torhunta loam	90	30	---	---	---	---	---	8.0	---
Umbric Ochraqualfs	100	30	---	---	---	---	---	9.0	---
Wagram loamy sand, 0 to 6 percent slopes	80	30	2,400	---	300	40	5.0	9.0	8.5
Wagram loamy sand, 6 to 10 percent slopes	70	20	2,100	---	---	---	4.6	---	7.5
Wagram loamy sand, 10 to 15 percent slopes	---	---	---	---	---	---	6.0	---	6.5
Wickham loamy sand, 1 to 6 percent slopes	105	40	2,000	225	350	---	6.0	6.5	10.5
Woodington loamy sand	110	40	---	---	---	---	---	9.0	---

[1] AUM stands for animal-unit-month. This is a term used to express the carrying capacity of a pasture. It is the number of months 1 acre will support one animal unit, such as one cow, one steer, one horse, five hogs, or seven sheep or goats without damage to the sod.

no significant restrictions or limitations for woodland use or management. The third element in the symbol indicates the degree of management problems and the general suitability of the soils for certain kinds of trees.

In the second column is a brief description of the soils in the woodland suitability group.

In the third column is a list of some of the commercially important trees that are suited to the soils in the group. These are the trees that woodland managers will generally favor in intermediate or improvement cuttings. In column 4 the potential productivity of these trees is given in terms of site index. The site index is the average height of dominant trees, in feet, at age 30 for cottonwood; at age 35 for sycamore; and at age 50 for all other species or types.

Listed in columns 5 and 6 are commercial broadleaved and needle-leaved trees suitable for planting in soils of each group.

The management problems evaluated in the three columns at the far right of table 3 are erosion hazard, equipment limitations, and seedling mortality. Erosion hazard measures the risk of soil losses in well-managed woodland. Erosion hazard is *slight* if expected soil loss is small, *moderate* if some measures to control erosion are needed in logging and construction, and *severe* if intensive treatment or special equipment and methods are needed to prevent excessive soil losses.

Equipment limitation ratings reflect the soil conditions that restrict the use of equipment normally used in woodland management or harvesting. *Slight* ratings indicate equipment use is not limited to kind or time of year. A rating of *moderate* indicates a seasonal limitation or need for modification in methods or equipment. *Severe* limitations indicate the need for specialized equipment or operations.

Seedling mortality ratings indicate the degree of expected mortality of planted seedlings where plant com-

petition is not a limiting factor. Normal rainfall, good planting stock, and proper planting are assumed. A *slight* rating indicates expected mortality is less than 25 percent, a *moderate* rating indicates a loss of 25 to 50 percent, and a *severe* rating indicates a loss of more than 50 percent of the seedlings.

TABLE 3.—*Potential productivity, preferred species of trees, and hazards to management, by woodland suitability groups of soils*

Woodland suitability groups, soil series, and map symbols	Description of soils in group	Potential productivity		Trees preferred for management and planting		Erosion hazard	Equipment limitations	Seedling mortality
		Trees	Site class [1]	Broad-leaved species	Needle-leaved species			
Group 1w8: Chewacla: Ch.	Nearly level, somewhat poorly drained soils that have a loamy subsoil; on flood plains; subject to frequent flooding; very high potential productivity; suitable for broad-leaved and needle-leaved trees.	Loblolly pine Slash pine Sweetgum Yellow-poplar Water oak Willow oak Cherrybark oak. Cottonwood Green ash Sycamore	100 100 100 100 90 90 90 100 100 90	Eastern cottonwood, sweetgum, green ash, shumard oak, cherrybark oak, sycamore, yellow-poplar, swamp tupelo.	Loblolly pine, slash pine, bald-cypress.	Slight	Moderate	Moderate.
Group 1w9: Johnston: JS. Kinston: Kn. Meggett: Me. Pantego: Pe. Portsmouth: Pr. Umbric Ochraqualfs: Uo.	Nearly level, poorly drained or very poorly drained soils that have a loamy or clayey subsoil; on flood plains, stream terraces, and uplands; subject to very frequent flooding; very high potential productivity; suitable for needle-leaved trees, broad-leaved trees, or a combination of both.	Sweetgum [2] Water oak [2] Willow oak [2] Loblolly pine [2] Slash pine [2] Cottonwood [2]	110 90 90 100 100 100	Sweetgum [3], green ash [3], yellow-poplar [3], willow oak [3], water oak [3], white oak [3], swamp chestnut oak [3], sycamore [3], swamp tupelo.	Loblolly pine [3], slash pine [3], pond pine [3], bald-cypress.	Slight	Severe [4]	Severe. [4]
Group 2o1: Norfolk: Na, Nb, Nc.	Nearly level to sloping, well-drained soils that have a loamy subsoil; on uplands; high potential productivity; no serious management problems; best suited to needle-leaved trees.	Loblolly pine Slash pine Longleaf pine	90 90 70	Soils not suitable.	Loblolly pine, slash pine, longleaf pine.	Slight	Slight	Slight.
Group 2o7: Kalmia: Ka, Kb. Wickham: Wk.	Nearly level and gently sloping, well-drained soils that have a loamy subsoil; on stream terraces; high potential productivity; no serious management problems; suited to needle-leaved trees, broad-leaved trees, or a combination of both.	Loblolly pine Slash pine Longleaf pine Yellow-poplar Sweetgum	90 90 70 100 90	Yellow-poplar, sweetgum, cherrybark oak, shumard oak, southern red oak, white oak, black walnut, white ash.	Loblolly pine, slash pine.	Slight	Slight	Slight.

TABLE 3.—*Potential productivity, preferred species of trees, and hazards to management, by woodland suitability groups of soils*—Continued

Woodland suitability groups, soil series, and map symbols	Description of soils in group	Potential productivity		Trees preferred for management and planting		Erosion hazard	Equipment limitations	Seedling mortality
		Trees	Site class [1]	Broad-leaved species	Needle-leaved species			
Group 2w2: Johns: Jo.	Nearly level, moderately well drained or somewhat poorly drained soils that have a loamy subsoil; high potential productivity; best suited to needle-leaved trees.	Loblolly pine Slash pine Longleaf pine	90 90 70	None recommended.	Loblolly pine, slash pine, longleaf pine.	Slight	Moderate	Moderate.
Group 2w3: Rains: Ra.	Nearly level, poorly drained soils that have a loamy subsoil; on uplands; high potential productivity; best suited to needle-leaved trees.	Loblolly pine [2] Slash pine [2] Longleaf pine [2] Sweetgum [2]	90 90 70 90	None recommended.	Loblolly pine [4], slash pine [4].	Slight	Severe [3]	Severe [3].
Group 2w8: Goldsboro: Go. Lenoir: Ln. Lynchburg: Ly. Stallings: St.	Nearly level, moderately well drained or somewhat poorly drained soils that have a loamy, clayey or sandy subsoil; on uplands and stream terraces; high potential productivity; suited to needleleaved trees, broadleaved trees, or a combination of both.	Loblolly pine Slash pine Longleaf pine Sweetgum Water oak Yellow-poplar	90 90 70 90 90 100	Sweetgum, yellow-poplar, water oak, willow oak, white oak, swamp chestnut oak, cherrybark oak.	Longleaf pine, slash pine, longleaf pine.	Slight	Moderate	Slight to moderate.
Group 2w9: Bibb: BB. Coxville: Co. Grifton: Gr. Leaf: Le. Lumbee: Lu. Murville: Mu. Torhunta: To. Woodington: Wn.	Nearly level, poorly drained or very poorly drained soils that have a loamy, sandy or clayey subsoil; on flood plains, uplands and stream terraces; high potential productivity; suited to broad-leaved trees, needle-leaved trees, or a combination of both.	Loblolly pine [2] Slash pine [2] Sweetgum [2] Water oak [2] Willow oak [2] Green ash [2] Cottonwood	90 90 90 90 90 90 100	Sweetgum [4], yellow-poplar [4], willow oak [4], water oak [4], cherrybark oak [4], shumard oak [4], green ash [4], sycamore [4], swamp tupelo.	Loblolly pine [4], slash pine [4], longleaf pine [4], baldcypress.	Slight	Severe [3]	Severe [3].
Group 3s2: Blanton: Bn. Kenansville: Ke. Pocalla: Po. Wagram: Wb, Wc, Wd.	Nearly level to strongly sloping, well drained or somewhat excessively drained soils that have a loamy or sandy subsoil; on uplands and stream terraces; moderately high potential productivity; best suited to needle-leaved trees.	Loblolly pine Slash pine Longleaf pine	80 80 70	None recommended.	Slash pine, loblolly pine, longleaf pine.	Slight	Moderate	Moderate.

TABLE 3.—*Potential productivity, preferred species of trees, and hazards to management, by woodland suitability groups of soils*—Continued

Woodland suitability groups, soil series, and map symbols	Description of soils in group	Potential productivity		Trees preferred for management and planting		Erosion hazard	Equipment limitations	Seedling mortality
		Trees	Site class [1]	Broad-leaved species	Needle-leaved species			
Group 3w2: Craven: Cr, Cv. Pactolus: Pa.	Nearly level to sloping, mainly moderately well drained soils that have a loamy or clayey subsoil; on uplands and stream terraces; moderately high potential productivity; best suited to needle-leaved trees.	Slash pine Loblolly pine Longleaf pine	80 80 70	None recommended.	Slash pine, loblolly pine, longleaf pine.	Slight	Moderate	Slight.
Group 4s2: Lakeland: La.	Nearly level to gently sloping, excessively drained soils that have a sandy underlying layer; on uplands and stream terraces; moderate potential productivity; best suited to needle-leaved trees.	Slash pine Loblolly pine Longleaf pine	70 60 70	None recommended.	Slash pine, longleaf pine.	Slight	Moderate	Moderate.
Group 4w2: Leon: Lo.	Nearly level, somewhat poorly drained soils that have a sandy subsoil; on uplands and stream terraces; moderate potential productivity; best suited to needle-leave trees.	Slash pine Loblolly pine Longleaf pine	70 70 60	None recommended.	Slash pine, loblolly pine.	Slight	Moderate	Moderate.
Group 4w3: Pamlico: Pc.	Nearly level, very poorly drained soils that have sandy underlying layers; on flood plains and stream terraces; subject to very frequent flooding; moderate potential productivity; suited to needle-leaved trees.	Slash pine [2] Loblolly pine [2] Pond pine [2]	70 70 60	Swamp tupelo, sweetgum [4].	Slash pine [4], loblolly pine [4], pond pine [4], baldcypress, atlantic white cedar.	Slight	Severe [3]	Severe [3].

[1] Site class is the numerical designation of the relative potential productivity of 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 co-dominant 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 broad-leaved species, site class is based on the comparative site class of other species on the same soil.

[2] Potential productivity can be attained only where soils have adequate surface drainage.

[3] Tree planting is feasible only on areas where surface drainage is adequate.

[4] Moderate on soils where drainage is adequate.

Use of Soils for Wildlife [3]

Wildlife is related to soils through an indirect relationship with plants. Wildlife species are associated with given types of plant communities which, in turn, are directly related to particular kinds of soils. Proper manipulation of soil, water, and plants to produce suitable habitat is the most effective way to maintain and improve wildlife population. It is through the three-way relationship of wildlife to plants to soils that interpretations for wildlife are prepared.

[3] By JOHN P. EDWARDS, biologist, Soil Conservation Service.

The soils of Lenoir County produce a wide variety of plants that provide food, cover, and protection for many species of wildlife. Such upland game species as squirrel, rabbits, quail, mourning doves, foxes, and songbirds are abundant throughout the county. Populations of such furbearers as raccoon, mink, muskrat, and opposum are also abundant. Several species of such waterfowl as mallards, black ducks, and wood ducks are abundant along the Neuse River and Contentea Creek and their tributaries.

In table 4 the soils in the county have been rated for seven elements of wildlife habitat. Summary ratings have been made for the three kinds of wildlife for which one might expect to manage. It should be emphasized that the ratings were made using criteria applicable to the individual element. Following is a brief explanation of each element:

Grain and seed crops are domestic grains or other seed-producing annuals planted to produce wildlife food. Examples of these are corn, sorghum, wheat, oats barley, millet, buckwheat, soybeans, cowpeas, 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 crownvetch.

Wild herbaceous plants are native or naturally established herbaceous grasses and forbs (including weeds) that provide food and cover. Examples are goldenrod, beggarweed, partridge pea, pokeweed, and fescue.

Hardwood trees are nonconiferous trees and associated woody understory plants that provide food and cover for wildlife species. Examples are oaks, hickory, autumn-olive, 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 of moist to wet sites, exclusive of submerged or floating aquatics, that produce food and cover principally for wetland forms of wildlife. Examples are smartweed, wild millet, rushes, sedges, reeds, wildrice, cutgrass, and cattail.

Shallow-water areas rate the suitability of the soil for the creation of shallow-water areas. Surface waters generally have an average depth of less than 5 feet. They may be naturally wet areas or areas created by dams or levees or by water-control devices in marshes or streams. Examples of such areas are muskrat marshes, beaver ponds, waterfowl feeding areas, and wildlife ponds.

The last habitat element deviates somewhat from the direct relationship of soils to plants to wildlife. It is listed, however, because of its primary importance to many species of wildlife.

The summary ratings for the different kinds of wildlife one might expect to find or manage for on a given soil are defined as follows:

Open-land wildlife.—Birds and mammals that are generally associated with open areas or the edges of these areas. These species are found in cultivated areas, pastures, lawns, and idle areas overgrown with grasses, herbs, shrubs, and vines. Mourning doves, quail, red foxes, cottontail rabbits, and many species of songbirds are typical examples of wildlife one might expect to find in this group.

Woodland wildlife.—Birds and mammals of wooded areas containing hardwoods or coniferous trees and shrubs, or both. Examples are squirrels, woodpeckers, and gray foxes.

Wetland wildlife.—Birds and mammals that are found mainly in such wetland communities as swamps, marshes, or ponds. Examples are muskrat, raccoon, redwing blackbird, and various species of ducks.

The soils are rated for the three kinds of wildlife using four levels of suitability. This suitability is expressed by an adjective rating that can be defined as follows:

Good.—Habitats are easily improved, maintained, or created. Few or no soil limitations in habitat management exist, and satisfactory results can be expected.

Fair.—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 assure satisfactory results.

Poor.—Habitats can be improved, maintained, or created, but the limitations are severe. Habitat management may be difficult and expensive and require intensive effort. Results are of questionable value.

Very poor.—Under the prevailing soil conditions, it is impractical to attempt to improve, maintain, or create habitats. Unsatisfactory results are probable.

Such properties as solum thickness, flood hazard, drainage, available water capacity, and slope are considered in making ratings.

When rating soil suitability for wildlife, a two-step procedure is followed. First, the soils are rated for their suitability for producing the seven habitat elements. Then, combinations of habitat elements are selected and weighed for their contribution to producing a given kind of wildlife habitat.

It should be noted that the ratings given in table 4 are to be used as guidelines and do not provide specific site analysis. Further onsite information and analysis will be required when developing individual management plans.

Use of Soils for Recreational Development

Knowledge of soils is necessary in planning, developing, and maintaining areas used for recreation. In table 5 the soils of Lenoir County are rated according to limitations that affect their suitability for camp areas, playgrounds, picnic areas, and paths and trails.

In table 5 the soils are rated as having slight, moderate, or severe limitations for the specified uses. For all of these ratings, it is assumed that a good cover of vegetation can be established and maintained. A limitation of *slight* means that soil properties are generally favorable and limitations are so minor that they can be overcome easily. A *moderate* limitation can be over-

TABLE 4.—*Suitability of soils for elements of wildlife habitat and kinds of wildlife*

Soil series and map symbols [1]	Elements of wildlife habitat						Kinds of wildlife			
	Grain and seed crops	Domestic grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow-water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Bibb: BB	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Blanton: Bn	Poor	Fair	Good	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
Chewacla: Ch	Very poor.	Poor	Poor	Good	Good	Fair	Fair	Poor	Fair	Fair.
Coxville: Co	Poor	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
Craven: Cr, Cv	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Goldsboro: Go	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Grifton: Gr	Poor	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
Johns: Jo	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Johnston: JS	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Kalmia: Ka, Kb	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Kenansville: Ke	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Kinston: Kn	Very poor.	Poor	Poor	Poor	Poor	Good	Fair	Poor	Poor	Fair.
Lakeland: La	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
Leaf: Le	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
Lenoir: Ln	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Leon: Lo	Poor	Poor	Fair	Poor	Poor	Poor	Very poor.	Poor	Poor	Very poor.
Lumbee: Lu	Poor	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
Lynchburg: Ly	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
Meggett: Me	Poor	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
Murville: Mu	Very poor.	Poor	Poor	Poor	Poor	Good	Fair	Poor	Poor	Fair.
Norfolk:										
Na, Nb	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Nc	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Pactolus: Pa	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Pamlico: Pc	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Pantego: Pe	Very poor.	Poor	Poor	Poor	Poor	Good	Fair	Poor	Poor	Fair.
Pocalla: Po	Poor	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Portsmouth: Pr	Very poor.	Poor	Poor	Poor	Poor	Good	Fair	Poor	Poor	Fair.
Rains: Ra	Poor	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
Stallings: St	Fair	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
Torhunta: To	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Umbric Ochraqualfs: Uo	Poor	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
Wagram: Wb	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Wagram: Wc, Wd	Fair	Good	Good	Good	Good	Very poor.	Very poor	Good	Good	Very poor.
Wickham: Wk	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Woodington: Wn	Poor	Fair	Fair	Fair	Fair	Good	Poor	Fair	Fair	Fair.

[1] All soils are rated for natural conditions.

come or modified by planning, by design, or by special 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 for tents and small camp trailers and 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 have gentle slopes, good drainage, and a surface free of rocks and coarse fragments. The surface is firm after rains but

TABLE 5.—*Degree of soil limitations and major features affecting use of soils for recreational development*

Soil series and map symbols	Camp areas	Picnic areas	Playgrounds	Paths and trails
Bibb: BB	Severe: flooding; wetness.	Severe: flooding: wetness.	Severe: flooding; wetness.	Severe: flooding; wetness.
Blanton: Bn	Severe: sand surface layer.	Severe: sand surface layer.	Severe: sand surface layer.	Severe: loose sand surface layer.
Chewacla: Ch	Severe: flooding; wetness.	Severe: flooding; wetness.	Severe: flooding; wetness.	Moderate: flooding; wetness.
Coxville: Co	Severe: wetness; surface ponding where undrained.	Severe: wetness; surface ponding where undrained.	Severe: wetness; surface ponding where undrained.	Severe: wetness; surface ponding where undrained.
Craven: Cr, Cv	Moderate: slow permeability.	Slight	Moderate if slopes are 0 to 6 percent; permeability. Severe if slopes are 6 to 8 percent.	Slight.
Goldsboro: Go	Slight	Slight	Slight	Slight.
Grifton: Gr	Severe: wetness; surface ponding where undrained.	Severe: wetness; surface ponding where undrained.	Severe: wetness; surface ponding where undrained.	Severe: wetness; surface ponding where undrained.
Johns: Jo	Moderate: wetness	Moderate: wetness	Moderate: wetness	Moderate: wetness.
Johnston: JS	Severe: flooding; wetness.	Severe: flooding; wetness.	Severe: flooding; wetness.	Severe: flooding; wetness.
Kalmia: Ka, Kb	Slight	Slight	Slight if slopes are 0 to 2 percent. Moderate if slopes are 2 to 6 percent.	Slight.
Kenansville: Ke	Moderate: sandy surface layer; subject to blowing.	Moderate: sandy surface layer; subject to blowing.	Moderate: sandy surface layer; subject to blowing.	Moderate: sandy surface layer.
Kinston: Kn	Severe: flooding; wetness.	Severe: flooding; wetness.	Severe: flooding; wetness.	Severe: flooding; wetness.
Lakeland: La	Severe: sand surface layer; subject to blowing.	Severe: sand surface layer; subject to blowing.	Severe: sand surface layer; subject to blowing.	Severe: loose sand surface layer.
Leaf: Le	Severe: wetness; surface ponding where undrained.	Severe: wetness; surface ponding where undrained.	Severe: wetness; surface ponding where undrained.	Severe: wetness; surface ponding where undrained.
Lenoir: Ln	Severe: wetness	Severe: wetness	Severe: wetness	Moderate: wetness.
Leon: Lo	Severe: wetness; sand surface layer.	Severe: wetness; sand surface layer.	Severe: wetness; sand surface layer.	Severe: sand surface layer.
Lumbee: Lu	Severe: wetness; surface ponding where undrained.	Severe: wetness; surface ponding where undrained.	Severe: wetness; surface ponding where undrained.	Severe: wetness; surface ponding where undrained.
Lynchburg: Ly	Severe: wetness	Moderate: wetness	Severe: wetness	Moderate: wetness.
Meggett: Me	Severe: wetness; surface ponding where undrained.	Severe: wetness; surface ponding where undrained.	Severe: wetness; surface ponding where undrained.	Severe: wetness; surface ponding where undrained.
Murville: Mu	Severe: wetness; surface ponding where undrained.	Severe: wetness; surface ponding where undrained.	Severe: wetness; surface ponding where undrained.	Severe: wetness; surface ponding where undrained.
Norfolk: Na, Nb, Nc.	Slight if slopes are 0 to 8 percent. Moderate if slopes are 8 to 10 percent.	Slight if slopes are 0 to 8 percent. Moderate if slopes are 8 to 10 percent.	Slight if slopes are 0 to 2 percent. Moderate if slopes are 2 to 6 percent. Severe if slopes are 6 to 10 percent.	Slight.

TABLE 5.—*Degree of soil limitations and major features affecting use of soils for recreational development* —Continued

Soil series and map symbols	Camp areas	Picnic areas	Playgrounds	Paths and trails
Pactolus: Pa	Moderate: wetness; sandy surface layer.	Moderate: wetness; sandy surface layer.	Moderate: wetness; sandy surface layer.	Moderate: sandy surface layer.
Pamlico: Pc	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness.
Pantego: Pe	Severe: wetness; surface ponding where undrained.	Severe: wetness; surface ponding where undrained.	Severe: wetness; surface ponding where undrained.	Severe: wetness; surface ponding where undrained.
Pocalla: Po	Moderate: sandy surface layer; subject to blowing.	Moderate: sandy surface layer; subject to blowing.	Moderate: sandy surface layer; subject to blowing.	Moderate: sandy surface layer.
Portsmouth: Pr	Severe: wetness; surface ponding where undrained.	Severe: wetness; surface ponding where undrained.	Severe: wetness; surface ponding where undrained.	Severe: wetness; surface ponding where undrained.
Rains: Ra	Severe: wetness; surface ponding where undrained.	Severe: wetness; surface ponding where undrained.	Severe: wetness; surface ponding where undrained.	Severe: wetness; surface ponding where undrained.
Stallings: St	Severe: wetness	Moderate: wetness	Severe: wetness	Moderate: wetness.
Torhunta: To	Severe: wetness; surface ponding where undrained.	Severe: wetness; surface ponding where undrained.	Severe: wetness; surface ponding where undrained.	Severe: wetness; surface ponding where undrained.
Umbric Ochraqualfs: Uo.	Severe: wetness; surface ponding where undrained.	Severe: wetness; surface ponding where undrained.	Severe: wetness; surface ponding where undrained.	Severe: wetness; surface ponding where undrained.
Wagram: Wb, Wc, Wd.	Moderate: sandy surface layer; subject to blowing.	Moderate: sandy surface layer; subject to blowing.	Moderate if slopes are 0 to 6 percent; sandy surface layer; subject to blowing. Severe if slopes are more than 6 percent.	Moderate: sandy surface layer.
Wickham: Wk	Slight	Slight	Slight if slopes are 0 to 2 percent. Moderate if slopes are 2 to 6 percent.	Slight.
Woodington: Wn	Severe: wetness; surface ponding where undrained.	Severe: wetness; surface ponding where undrained.	Severe: wetness; surface ponding where undrained.	Severe: wetness; surface ponding where undrained.

not dusty when dry, and is free from flooding during periods of heavy use.

Picnic areas are attractive natural or landscaped tracts used mainly for preparing meals and eating outdoors. These areas are subject to heavy foot traffic. Most of the vehicular traffic, however, is confined to access roads. The best soils are firm when wet but not dusty when dry; are free of flooding during the season of use; and do not have slopes or stoniness that greatly increase 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 need to be able to withstand intensive foot traffic. The best soils have a nearly level surface free of coarse fragments and rock outcrops, good drainage, and freedom from flooding during periods of heavy use. Their surface is firm after rains but not dusty when dry. If grading and leveling are required, depth to rock is important.

Paths and trails are used for local and cross-country travel by foot or horseback. Design and layout should require little or no cutting and filling. The best soils are at least moderately well drained, are firm when wet but not dusty when dry, are flooded not more than once during the season 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 [4]

This section is useful to those who need information about soils used as structural material or as foundation

[4] BILLY H. JONES, civil engineer, Soil Conservation Service, assisted in writing this section.

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 soil reaction. Also important are depth to the water table, depth to bedrock, and soil 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 recreational areas.
2. Evaluate alternate routes for roads, highways, pipelines, and underground cables.
3. Seek sources of gravel, sand, or clay.
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 6, 7, and 8, which show, respectively, several estimated soil properties significant to engineering, interpretations for various engineering uses, and results of engineering laboratory tests on soil samples.

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 table 7. It also can be used to make other useful maps.

This information, however, does not eliminate the need for further investigations at sites selected for engineering works, especially works that involve heavy loads or that require excavations to depths greater than these shown in the tables, generally depths greater than 6 feet. 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 that is not known to all engineers. The Glossary defines many of these terms commonly used in soil science.

Engineering soil classification systems

The two systems most commonly used in classifying samples of soils for engineering are the Unified system used by the SCS engineers, Department of Defense, and others, and the AASHTO system adopted by the American Association of State Highway and Transportation Officials (*1*).

In the Unified system (*2*) soils are classified according to particle-size distribution, plasticity, liquid limit, and organic matter. Soils are grouped in 15 classes: 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, ML–CL.

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 through A–7 on the basis of grain-size distribution, liquid limit, and plasticity index. In group A–1 are gravelly soils of high bearing strength, or the best soils for subgrade (foundation). At the other extreme, in group A–7, are clay soils that have low strength when wet and that are the poorest soils for subgrade. Where laboratory data are available to justify a further breakdown, the A–1, A–2, and A–7 groups are divided as follows: A–1–a, A–1–b, A–2–4, A–2–5, A–2–6, A–2–7, A–7–5, and A–7–6. As additional refinement, the engineering value of a soil material can be indicated by a group index number. Group indexes range from 0 for the best material to 20 or more for the poorest. The AASHTO classification is given in table 6 for all soils mapped in the survey area.

Soil properties significant to engineering

Several estimated soil properties significant in engineering are given in table 6. These estimates are made for typical soil profiles, by 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 counties. Following are explanations of some of the columns in table 6.

Flood hazard is described in terms of the frequency of occurrence and the duration of flooding. Frequency and duration classes are defined in the Glossary.

Depth to seasonal high water table is the distance from the surface of the soil to the highest level that ground water reaches in the soil in most years.

Soil texture is described in table 6 in the standard terms used by the Department of Agriculture. These terms take into account relative percentages 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; for example, "gravelly loamy sand." "Sand," "silt," "clay," and some of the other terms used in USDA textural classification are defined in the Glossary of this soil survey.

Liquid limit and plasticity index indicate the effect of water on the strength and consistence of soil ma-

terial. 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 the plastic state, and the liquid limit is the moisture content at which it changes 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. Liquid limit and plasticity index are estimated in table 6.

Permeability is that quality of a soil that enables it to transmit water or air. It is estimated on the basis of those soil characteristics observed in the field, particularly structure and texture. The estimates in table 6 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.

Reaction is the degree of acidity or alkalinity of a soil, expressed in pH values. The pH value and terms used to describe soil reaction are explained in the Glossary.

Shrink-swell potential is the relative change in volume to be expected of soil material with changes in moisture content; that is, the extent to which the soil shrinks as it dries out or swells when it gets wet. Extent of 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, as used in table 6, pertains to potential soil-induced chemical action that dissolves or weakens uncoated steel or concrete. Rate of corrosion of uncoated steel is related to soil properties such as drainage, texture, total acidity, and electrical conductivity of the soil material. Corrosivity for concrete is influenced mainly by the content of sodium or magnesium sulfate, but also by soil texture and acidity. Installations of uncoated steel that intersect soil boundaries or soil horizons are most susceptible to corrosion than installations entirely in one kind of soil or in one soil horizon. A corrosivity rating of *low* means that there is a low probability of soil-induced corrosion damage. A rating of *high* means that there is a high probability of damage, so that protective measures for steel and more resistant concrete should be used to avoid or minimize damage.

Engineering interpretations of soils

The estimated interpretations in table 7 are based on the engineering properties of soils shown in table 6, on test data for soils in this survey area and others nearby or adjoining, and on the experience of engineers and soil scientists with the soils of Lenoir County. In table 7, ratings are used to summarize limitation or suitability of the soils for all listed purposes other than for drainage of crops and pasture, irrigation, ponds and reservoirs, embankments, and terraces and diversions. For these particular uses, table 7 lists those soil features not to be overlooked in planning, installation, and maintenance.

Soil limitations are indicated by the ratings slight, moderate, and severe. *Slight* means that soil properties are generally favorable for the stated use or, in other words, that limitations are minor and can be easily overcome or modified by special planning and design. *Moderate* means that the soils have one or more properties unfavorable for a particular use, or that the problem can be overcome by proper planning, careful design, and good management. *Severe* means that soil properties are so unfavorable and so difficult to correct or overcome as to require major soil reclamation, special designs, or intensive maintenance. For some uses, the rating of severe is divided to obtain ratings of severe and very severe. *Very severe* means that one or more soil properties are so unfavorable for a particular use that overcoming the limitations is most difficult and costly.

Soil suitability is rated by the terms *good, fair,* and *poor,* which have, respectively, meanings approximately parallel to the terms slight, moderate, and severe.

In the following paragraphs are explanations of some of the columns in table 7.

Topsoil is used for topdressing an area where vegetation is to be established and maintained. Suitability is affected mainly by ease of working and spreading the soil material, as in preparing a seedbed; natural fertility of the material, or the response of plants when fertilizer is applied; and absence of substances toxic to plants. Texture of the soil material also affects suitability. Also considered in the ratings is damage that will result to the area from which topsoil is taken.

Sand and gravel are used in great quantities in many kinds of construction. The ratings in table 7 provide guidance about where to look for probable sources. A soil rated as a good source of sand or gravel generally has a layer at least 3 feet thick, the top of which is within a depth of 6 feet. 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 quality of the deposit.

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 they reflect the relative ease of excavating the material at borrow areas.

Pond reservoir areas hold water behind a dam or embankment. Soils suitable for pond reservoir areas have low seepage, which is related to their permeability and depth to permeable material.

Pond embankments are raised structures of soil material constructed across drainageways in order to impound water. These embankments are generally less than 20 feet high, are constructed of "homogeneous" soil material, and are compacted to medium density. Embankments having core- and shell-type construction

TABLE 6.—*Estimated soil properties*

[The symbol > means greater

Soil series and map symbols	Flood hazard: frequency; duration	Depth to seasonal high water table	Depth from surface	USDA texture	Classification		Liquid limit	Plasticity index
					Unified	AASHTO		
		Ft	*In*					
Bibb: BB	Frequent; brief.		0–45	Sandy loam	SM, SM–SC	A–2 or A–4	<35	NP–7
		0	45–70	Loamy sand, sand.	SM	A–2	--	NP
Blanton: Bn	None.	5	0–55	Sand	SM or SP–SM	A–2 or A–3	--	NP
			55–98	Sandy clay loam, sandy loam.	SC	A–4	18–30	8–10
			98–120	Loamy sand	SM	A–2	--	NP
Chewacla: Ch	Frequent; brief.	1.5	0–12	Loam	ML, CL or ML–CL	A–4 or A–6	<40	NP–13
			12–27	Clay loam	CL or ML–CL	A–4 or A–6	20–30	4–11
			27–65	Sandy loam, loamy sand.	SM, SC, or SM–SC	A–2 or A–4	<30	NP–10
Coxville: Co	Ponding [1].	0	0–12	Loam	ML–CL or CL	A–4 or A–6	20–30	4–12
			12–62	Clay loam	CL	A–6	30–40	15–25
			62–75	Sandy clay loam.	SC, CL, ML–CL, or SM–SC	A–4 or A–6	20–30	5–15
Craven: Cr, Cv	None.	2.5	0–13	Fine sandy loam, loam.	ML	A–4	--	NP
			13–52	Clay, clay loam.	CH	A–7	51–60	30–38
			52–80	Sandy clay loam.	SC or CL	A–7	42–50	20–30
Goldsboro: Go	None.	2.5	0–12	Loamy sand	SM	A–2	--	NP
			12–80	Sandy clay loam, sandy loam.	SM–SC, CL, CL–ML or SC	A–4 or A–6	16–35	4–17
Grifton: Gr	Ponding [1].	0	0–15	Sandy loam	SM	A–2 or A–4	<20	NP–3
			15–40	Sandy clay loam, sandy loam.	SC	A–4 or A–6	20–30	8–17
			40–70	Loamy sand, sandy, loam.	SM	A–2 or A–4	15–30	NP–3
Johns: Jo	None.	1.5	0–14	Sandy loam	SM	A–2 or A–4	--	NP
			14–34	Sandy clay loam, sandy loam.	SM–SC, SC or CL, CL–ML	A–4 or A–6	19–35	4–11
			34–65	Sand	SM or SP–SM	A–2 or A–3	--	NP
Johnston: JS	Very frequent; long periods.	0	0–8	Mucky loam	OL	--	--	NP
			8–38	Fine sandy loam, sandy loam.	SM	A–2 or A–4	<25	NP–3
			38–60	Sand	SM or SP–SM	A–2 or A–3	--	NP
Kalmia: Ka, Kb	None.	5	0–14	Loamy sand	SM	A–2	<16	NP–3
			14–38	Sandy clay loam, sandy loam.	SC	A–2 or A–4	25–30	7–10
			38–65	Sand	SP–SM or SM	A–2 or A–3	<25	NP–3
Kenansville: Ke	None.	5	0–24	Loamy sand	SM	A–2	<20	NP–3
			24–36	Sandy loam	SM, SC or SM–SC	A–2	<30	NP–10
			36–80	Loamy sand, sand.	SP–SM or SM	A–2 or A–3	--	NP

significant in engineering

than; < means less than]

Percentage less than 3 inches passing sieve—				Permeability	Available water capacity	Reaction	Shrink-swell potential	Corrosivity	
No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)					Uncoated steel	Concrete
				In per hr	*In per in of soil*	*pH*			
95–100	90–100	60–70	30–40	0.6–2.0	0.10–0.14	4.5–5.5	Low	High	Moderate.
100	100	51-75	15–30	2.0–6.0	0.06–0.10	4.5–5.5	Low.		
100	100	51–70	5–15	6.0–20	0.02–0.05	4.5–5.5	Low	Low	High.
100	95–100	60–90	36–50	0.6–2.0	0.10–0.13	4.5–5.5	Low.		
100	95–100	51–75	15–30	6.0–20	0.05–0.10	4.5–5.5	Low.		
100	100	85–95	60–75	0.6–2.0	0.15–0.19	5.1–6.0	Low	High	Moderate.
100	100	90–100	70–80	0.6–2.0	0.17–0.19	5.1–6.0	Low.		
96–100	96–100	60–70	15–40	0.6–2.0	0.06–0.14	5.1–6.0	Low.		
100	100	85–100	60–75	0.6–2.0	0.15–0.19	4.5–6.0	Low	High	High.
100	100	90–100	70–80	0.2–0.6	0.14–0.18	4.5–5.5	Moderate.		
100	100	80–95	36–55	0.2–0.6	0.13–0.15	4.5–5.5	Low.		
100	100	75–95	51–65	0.6–2.0	0.12–0.18	4.5–6.0	Low	High	High.
100	100	90–100	70–95	0.06–0.2	0.12–0.15	4.5–5.5	Moderate.		
100	100	80–90	36–55	0.06–0.2	0.12–0.15	4.5–5.5	Low.		
100	100	51–75	15–30	2.0–6.0	0.06–0.08	4.5–5.5	Low	Moderate	High.
100	100	60–90	36–55	0.6–2.0	0.12–0.15	4.5–5.5	Low.		
100	95–100	60–95	30–40	2.0–6.0	0.12–0.15	5.1–5.5	Low	High	Moderate.
100	100	60–90	36–50	.60–2.0	0.10–0.15	5.1–6.0	Low.		
100	100	51–75	20–40	.60–2.0	0.12–0.14	6.1–8.4	Low.		
100	100	60–70	30–40	2.0–6.0	0.10–0.14	4.5–5.5	Low	Moderate	High.
100	95–100	60–90	36–55	0.6–2.0	0.12–0.15	4.5–5.5	Low.		
100	90–100	51–70	5–15	6.0–20	0.03–0.06	4.5–5.5	Low.		
100	100	90–100	80–90	0.6–2.0	0.20–0.26	4.5–5.5		High	High.
100	100	60–75	30–45	2.0–6.0	0.10–0.14	4.5–5.5	Low.		
100	100	51–70	5–15	6.0–20	0.02–0.06	4.5–5.5	Low.		
100	100	65–90	15–30	2.0–6.0	0.06–0.10	4.5–5.5	Low	Moderate	High.
100	95–100	65–90	30–50	0.6–2.0	0.12–0.15	4.5–5.5	Low.		
100	90–100	60–100	5–15	6.0–2.0	0.02–0.05	4.5–5.5	Low.		
100	100	51–75	15–30	6.0–20	0.05–0.10	4.5–6.0	Low	Low	High.
100	100	60–70	20–35	2.0–6.0	0.10–0.14	4.5–5.5	Low.		
100	90–100	60–75	5–25	6.0–20	0.02–0.05	4.5–5.5	Low.		

TABLE 6.—*Estimated soil properties*

Soil series and map symbols	Flood hazard: frequency; duration	Depth to seasonal high water table	Depth from surface	USDA texture	Classification		Liquid limit	Plasticity index
					Unified	AASHTO		
		Ft	*In*					
Kinston: Kn	Frequent; brief periods.	0	0–6	Loam	CL	A–6	25–35	15–20
			6–50	Clay loam	CL	A–6	15–40	12–18
			50–65	Clay loam	ML, CL or ML–CL	A–4 or A–6, A–3	<40	NP–18
Lakeland: La	None.	5	0–90	Sand	SP–SM	A–2	--	NP
Leaf: Le	Ponding.	0	0–10	Loam	CL	A–4 or A–6	30–40	8–15
			10–80	Clay, clay loam.	CL or CH	A–7	41–55	19–37
Lenoir: Ln	None.	1.5	0–11	Loam	ML, CL or ML–CL	A–4	<35	NP–10
			11–75	Clay, clay loam.	CL	A–6 or A–7	30–49	20–30
Leon: Lo	None.	1.5	0–14	Sand	SP–SM	A–2 or A–3	<24	NP–3
			14–37	Sand, loamy sand.	SM or SP–SM	A–2 or A–3	<15	NP–3
			37–72	Sand	SP–SM	A–2 or A–3	<15	NP–3
Lumbee: Lu	Ponding.	0	0–12	Sandy loam	SM	A–2 or A–4	<20	NP–3
			12–38	Sandy clay loam, sandy loam.	SC or SM–SC	A–4 or A–6	19–35	4–15
			38–65	Sand	SP–SM or SM	A–2 or A–3	--	NP
Lynchburg: Ly	None.	1.5	0–12	Sandy loam	SM	A–4 or A–2	<25	NP–3
			12–85	Sandy clay loam.	SC or CL, ML–CL, SM–SC	A–4 or A–6	20–40	4–16
Meggett: Me	Ponding.	0	0–12	Fine sandy loam, sandy loam.	SM	A–2 or A–4	--	NP
			12–45	Clay, sandy clay, sandy clay loam.	SC, CL or CH	A–7	45–65	25–40
			45–85	Sandy clay loam.	SC	A–4 or A–6	25–44	7–20
Murville: Mu	Ponding.	0	0–58	Fine sand	SP–SM	A–2 or A–3	--	NP
			58–87	Loamy fine sand.	SM	A–2	--	NP
Norfolk: Na, Nb, Nc	None.	5	0–12	Loamy sand	SM	A–2	<15	NP–3
			12–85	Sandy clay loam.	SC, SM–SC, CL, CL–ML	A–4 or A–6	<35	4–15
Pactolus: Pa	None.	1–2.5	0–38	Loamy sand	SM	A–2	--	NP
			38–75	Sand	SM or SP–SM	A–2 or A–3	--	NP
Pamlico: Pc	Very frequent; long periods.	0	0–33	Muck	Pt	--	--	NP
			33–65	Loamy sand, sand.	SM or SP–SM	A–2	--	--
Pantego: Pe	Ponding.	0	0–14	Loam, sandy loam.	ML, SC or CL–ML	A–4	<40	NP–10
			14–74	Sandy clay loam.	SC or CL	A–6	25–35	11–25
Pocalla: Po	None.	5	0–22	Loamy sand, sand.	SM or SP–SM	A–2 or A–3	--	NP
			22–40	Sandy loam	SM, SC or SM–SC	A–2	<30	NP–10
			40–66	Sand	SM or SP–SM	A–2 or A–3	--	NP
			66–80	Sandy loam	SM, SC or SM–SC	A–2	<30	NP–10

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Percentage less than 3 inches passing sieve—				Permeability	Available water capacity	Reaction	Shrink-swell potential	Corrosivity	
No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)					Uncoated steel	Concrete
				In per hr	*In per in of soil*	*pH*			
100	100	85–95	60–75	2.0–6.0	0.15–0.20	4.5–5.5	Low	High	High.
100	100	90–100	70–80	0.6–2.0	0.15–0.20	4.5–5.5	Low.		
100	90–100	90–100	70–80	0.6–2.0	0.12–0.16	4.5–5.5	Low		
100	100	51–70	5–12	6.0–20	0.02–0.05	4.5–5.0	Low	Low	Moderate.
100	100	85–95	60–75	0.06–.20	0.15–0.20	4.5–5.5	Low	Very high	High.
100	100	90–100	75–95	0.06–.20	0.15–0.20	4.5–5.5	Moderate.		
100	100	85–98	60–85	0.6–2.0	0.15–0.20	4.5–5.5	Low	High	High.
100	100	90–100	60–95	0.06–.20	0.15–0.18	4.5–5.5	Moderate.		
100	100	80–100	5–12	6.0–20	0.02–0.05	4.0–5.5	Very low	Low	High.
100	100	80–100	5–20	2.0–6.0	0.05–0.10	4.0–5.5	Very low.		
100	100	80–100	5–12	6.0–20	0.02–0.05	4.0–5.5	Very low.		
100	100	60–70	30–40	2.0–6.0	0.10–0.12	4.5–6.0	Low	High	High.
100	95–100	65–90	36–50	0.6–2.0	0.12–0.15	4.5–5.5	Low.		
100	90–100	51–70	5–15	6.0–20	0.03–0.06	4.5–5.5	Low.		
100	100	60–70	30–40	2.0–6.0	0.10–0.14	4.0–6.0	Low	High	High.
100	100	80–90	36–55	0.6–2.0	0.12–0.15	4.0–5.5	Low.		
100	100	60–85	30–49	2.0–6.0	0.10–0.15	5.6–6.5	Low	Very high	Low.
100	95–100	80–95	45–75	0.06–0.2	0.15–0.18	6.1–8.4	High.		
100	95–100	70–90	36–50	0.06–0.2	0.15–0.18	6.6–8.4	Moderate.		
100	100	65–80	5–12	6.0–20	0.06–0.08	4.0–5.0	Low	High	High.
100	100	51–75	15–30	2.0–6.0	0.06–0.08	4.0–5.0	Low.		
100	100	51–75	15–30	2.0–6.0	0.06–0.08	4.5–5.5	Low	Low	High.
100	100	80–90	36–55	0.6–2.0	0.12–0.15	4.5–5.5	Low.		
100	100	51–75	15–30	6.0–20	0.06–0.10	4.5–5.5	Low	Low	High.
100	100	51–70	5–15	6.0–20	0.02–0.05	4.5–5.5	Low.		
--	--	--	--	0.6–2.0	0.24–0.26	4.0–5.5	----------	High	High.
100	100	51–75	10–30	2.0–6.0	0.03–0.08	4.0–5.5	Low.		
100	100	65–100	36–65	2.0–6.0	0.15–0.17	4.0–5.5	Low	High	High.
100	95–100	80–100	36–55	0.6–2.0	0.13–0.15	4.0–5.5	Low.		
100	100	51–97	5–30	6.0–20	0.05–0.10	4.5–6.0	Low	Low	High.
100	100	60–97	20–40	0.6–2.0	0.10–0.14	4.5–5.5	Low.		
100	100	51–97	5–20	6.0–20	0.05–0.08	4.5–5.5	Low.		
100	100	60–97	30–40	0.6–2.0	0.10–0.14	4.5–5.5	Low.		

TABLE 6.—*Estimated soil properties*

Soil series and map symbols	Flood hazard: frequency; duration	Depth to seasonal high water table	Depth from surface	USDA texture	Classification		Liquid limit	Plasticity index
					Unified	AASHTO		
Portsmouth: Pr	Ponding	0	0–13	Loam	ML or ML–CL	A–4	20–40	3–10
			13–38	Sandy clay loam, sandy loam.	SC or SM–SC	A–4 or A–6	19–35	4–15
			38–70	Sand	SP–SM or SM	A–2 or A–3		NP
Rains: Ra	Ponding	0	0–13	Sandy loam	SM, SC or SM–SC	A–2 or A–4	<20	NP–10
			13–63	Sandy clay loam.	SC or SM–SC	A–4	15–30	4–20
			63–85	Sandy clay loam.	SC	A–2 or A–6	20–40	11–20
Stallings: St	None.	1	0–12	Loamy sand	SM	A–2	--	NP
			12–42	Sandy loam	SM	A–2 or A–4	<25	NP–3
			42–80	Loamy sand	SM	A–2	--	NP
Torhunta: To	Ponding.	0	0–14	Loam	ML	A–4	--	NP
			14–36	Sandy loam	SM	A–4 or A–2	--	NP
			36–65	Loamy sand, sand.	SM or SP–SM	A–2 or A–3	--	NP
Umbric Ochraqualfs: Uo.	Frequent ponding.	0	0–14	Loam	ML, CL, CL–ML	A–4	<40	NP–10
			14–70	Sandy clay loam, sandy clay.	CL or SC	A–6 or A–7	30–49	15–30
Wagram: Wb, Wc, Wd	None.	5	0–30	Loamy sand	SM	A–2	<20	NP–3
			30–90	Sandy clay loam.	SC, SC–SM	A–4 or A–6	21–30	5–12
Wickham: Wk	None.	5	0–15	Loamy sand	SM	A–2	--	NP
			15–43	Sandy clay loam, sandy loam.	SC, SC–SM, SM	A–4	<30	NP–10
			43–65	Loamy sand	SM	A–2	--	NP
Woodington: Wn	Ponding.	1	0–12	Loamy sand	SM	A–2	--	NP
			12–47	Sandy loam	SM, SC or SM–SC	A–4 or A–2	<30	NP–10
			47–85	Loamy sand	SM	A–2	--	NP

[1] Shallow water commonly stands during or following a rain.

TABLE 7.—*Interpretations of*

[Dashes indicate that information is not

Soil series and map symbols	Suitability as source of—				Limitations for—	
	Topsoil	Sand	Gravel	Road fill	Pond reservoir areas	Pond embankments
Bibb: BB	Poor: poorly drained.	Poor: improbable source.	Poor: improbable source.	Poor: poorly drained.	Severe: moderately rapid permeability in sandy substratum at a depth of about 45 inches.	Moderate: poor resistance to piping and erosion.

significant in engineering—Continued

Percentage less than 3 inches passing sieve—				Permeability	Available water capacity	Reaction	Shrink-swell potential	Corrosivity	
No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)					Uncoated steel	Concrete
100	100	85–95	60–75	0.6–2.0	0.14–0.18	4.0–5.5	Low	High	High.
100	95–100	60–85	36–50	0.6–2.0	0.13–0.15	4.5–5.5	Low.		
100	95–100	51–70	5–15	6.0–20	0.02–0.05	4.5–5.5	Low.		
100	100	60–70	30–40	2.0–6.0	0.08–0.12	4.5–6.0	Low	High	High.
100	100	80–90	36–50	0.6–2.0	0.10–0.14	4.5–5.5	Low.		
100	95–100	60–70	30–40	0.6–2.0	0.11–0.15	4.5–5.5	Low.		
100	100	51–75	15–30	6.0–20	0.06–0.10	4.5–5.5	Low	Moderate	High.
100	100	60–70	30–40	2.0–6.0	0.10–0.14	4.5–5.5	Low.		
100	100	51–75	15–30	6.0–20	0.06–0.08	4.5–5.5	Low.		
100	100	85–95	60–75	2.0–6.0	0.10–0.15	4.0–5.5	Low	High	High.
100	100	60–70	30–40	2.0–6.0	0.10–0.15	4.0–5.5	Low.		
100	95–100	51–75	5–25	6.0–20	0.02–0.05	4.0–5.5	Low.		
100	100	85–95	60–75	0.6–2.0	0.15–0.17	4.5–5.5	Low	High	Low.
100	100	80–95	36–60	0.6–2.0	0.15–0.17	6.1–8.4	Moderate.		
100	100	51–75	15–30	6.0–20	0.06–0.08	4.5–6.0	Low	Low	High.
100	95–100	60–90	36–50	2.0–6.0	0.13–0.15	4.5–5.5	Low.		
100	100	51–75	15–30	2.0–6.0	0.06–0.10	5.1–6.5	Low	Low	Moderate.
100	100	60–90	36–50	0.6–2.0	0.13–0.15	5.1–6.5	Low.		
90–100	90–100	51–70	15–30	6.0–20	0.05–0.10	5.1–6.5	Low.		
100	100	51–75	15–30	6.0–20	0.06–0.10	4.5–5.5	Low	High	High.
100	100	60–70	30–40	2.0–6.0	0.10–0.14	4.5–5.5	Low.		
100	95–100	51–75	15–30	6.0–20	0.06–0.10	4.5–5.5	Low.		

engineering properties of the soils—Continued

available or that the practice is not applicable]

Degree of limitations and major soil features affecting selected use—						
Excavated ponds (aquifer fed)	Dwellings	Septic-tank filter fields	Sewage lagoons	Local roads and streets	Light industries	Sanitary landfill[1] (trench and area method)
Moderate: moderate permeability.	Severe: flooding; seasonal high water table.	Severe: flooding; seasonal high water table.	Severe: probable flood damage to embankment; moderately rapid permeability; sandy substratum at a depth of about 45 inches.	Severe: flooding; poorly drained.	Severe: flooding; seasonal high water table.	Severe: flooding; seasonal high water table; moderately rapid permeability; sandy substratum at a depth of about 45 inches.

TABLE 7.—*Interpretations of*

Soil series and map symbols	Suitability as source of—				Limitations for—	
	Topsoil	Sand	Gravel	Road fill	Pond reservoir areas	Pond embankments
Blanton: Bn	Poor: sand surface layer.	Poor: excessive fines.	Poor: improbable source.	Good	Moderate: moderate permeability.	Moderate: poor resistance to piping and erosion.
Chewacla: Ch	Good	Unsuited: excessive fines; seasonal high water table; subject to flooding; probable source below depth of about 4 feet.	Unsuited: excessive fines; seasonal high water table; subject to flooding; probable source below depth of about 4 feet.	Fair: somewhat poorly drained.	Moderate: moderate permeability.	Moderate: good to poor resistance to piping and erosion; medium compressibility.
Coxville: Co	Fair: limited amount of suitable material.	Unsuited: excessive fines.	Unsuited: excessive fines.	Poor: poorly drained.	Slight	Moderate: medium compressibility; fair slope stability.
Craven: Cr, Cv	Fair: limited amount of suitable material.	Unsuited: excessive fines.	Unsuited: excessive fines.	Poor: low strength.	Slight	Moderate: medium compressibility; fair slope stability.
Goldsboro: Go	Poor: loamy sand surface layer.	Poor: improbable source.	Poor: improbable source.	Good	Moderate: moderate permeability.	Slight
Grifton: Gr	Poor: poorly drained.	Poor: improbable source.	Poor: improbable source.	Poor: poorly drained.	Moderate: moderate permeability.	Moderate: good to poor resistance to piping and erosion.
Johns: Jo	Good.	Poor: excessive fines; probable source below depth of about 4 feet.	Poor: excessive fines; probable source below depth of about 4 feet.	Fair: somewhat poorly drained.	Severe: rapid permeability; sandy substratum at a depth of 34 inches.	Moderate: good to poor resistance to piping and erosion; medium permeability.
Johnston: JS	Poor: very poorly drained.	Poor: improbable source.	Poor: improbable source.	Poor: very poorly drained.	Severe: rapid permeability; sandy substratum at a depth of about 38 inches.	Severe: poor resistance to piping.
Kalmia: Ka, Kb.	Poor: loamy sand surface layer.	Poor: excessive fines; probable source below depth of about 4 feet.	Poor: excessive fines; probable source below depth of about 4 feet.	Good	Severe: rapid permeability in sandy substratum at a depth of about 38 inches.	Moderate: good to poor resistance to piping and erosion.
Kenansville: Ke.	Poor: loamy sand surface layer.	Fair: few fines.	Poor: excessive fines; probable source below depth of about 4 feet.	Good	Severe: rapid permeability; sandy substratum at a depth of about 36 inches.	Moderate: medium permeability; poor resistance to piping and erosion.

engineering properties of the soils—Continued

Degree of limitations and major soil features affecting selected use—						
Excavated ponds (aquifer fed)	Dwellings	Septic-tank filter fields	Sewage lagoons	Local roads and streets	Light industries	Sanitary landfill [1] (trench and area method)
Severe: deep to water table in dry season.	Slight	Slight	Moderate: moderate permeability.	Slight	Slight	Slight.
Severe: rapid permeability in substratum.	Severe: flooding; seasonal high water table.	Severe: flooding; seasonal high water table.	Severe: depth to seasonal high water table.	Severe: flooding.	Severe: flooding; seasonal high water table.	Severe: flooding; seasonal high water table.
Moderate: depth to water table in dry season.	Severe: seasonal high water table.	Severe: seasonal high water table; moderately slow permeability.	Severe: depth to seasonal high water table.	Severe: poorly drained; clayey texture.	Severe: seasonal high water table; clayey subsoil.	Severe: seasonal high water table.
Moderate: depth to water table in dry season; slowly permeable aquifer.	Severe: clayey subsoil.	Severe: seasonal high water table; slow permeability.	Severe: depth to seasonal high water table.	Severe: clayey texture.	Severe: clayey subsoil.	Severe: seasonal high water table.
Moderate: depth to water table in dry season.	Moderate: seasonal high water table.	Severe: seasonal high water table.	Severe: depth to seasonal high water table.	Slight	Moderate: seasonal high water table.	Severe: seasonal high water table.
Moderate: depth to water table in dry season; marl substratum.	Severe: seasonal high water table.	Severe: seasonal high water table.	Severe: depth to seasonal high water table.	Severe: poorly drained.	Severe: seasonal high water table.	Severe: seasonal high water table; marl substratum.
Moderate: depth to water table in dry season.	Severe: seasonal high water table.	Severe: seasonal high water table.	Severe: depth to seasonal high water table; sandy subtratum at a depth of about 34 inches; rapid permeability.	Moderate: somewhat poorly drained.	Severe: seasonal high water table.	Severe: seasonal high water table; rapid permeability; sandy substratum at a depth of about 34 inches.
Slight	Severe: flooding; seasonal high water table.	Severe: flooding; seasonal high water table.	Severe: flooding; rapid permeability; seasonal high water table.	Severe: flooding; very poorly drained.	Severe: flooding; seasonal high water table.	Severe: seasonal high water table; flooding; rapid permeability; sandy substratum at a depth of about 38 inches.
Severe: depth to water table in dry season.	Slight	Slight	Severe: rapid permeability; sandy substratum at a depth of about 38 inches.	Slight	Slight if 0 to 4 percent slopes. Moderate if 4 to 6 percent slopes.	Severe: sandy substratum at a depth of about 38 inches; rapid permeability.
Severe: depth to water table in dry season.	Slight	Slight	Severe: rapid permeability; sandy substratum at a depth of about 36 inches.	Slight	Slight if 0 to 4 percent slopes. Moderate if 4 to 8 percent slopes.	Severe: rapid permeability; sandy substratum at a depth of about 36 inches.

TABLE 7.—*Interpretations of*

Soil series and map symbols	Suitability as source of—				Limitations for—	
	Topsoil	Sand	Gravel	Road fill	Pond reservoir areas	Pond embankments
Kinston: Kn	Poor: poorly drained.	Poor: excessive fines; seasonal high water table; subject to flooding; probable source below depth of about 4 feet.	Poor: excessive fines; seasonal high water table; subject to flooding; probable source below depth of about 4 feet.	Poor: poorly drained.	Moderate: moderate permeability.	Moderate: good to poor resistance to piping and erosion; medium compressibility.
Lakeland: La	Poor: sand surface layer.	Fair: few fines.	Poor: improbable source.	Good	Severe: rapid permeability.	Severe: poor slope stability; high permeability; poor resistance to piping and erosion.
Leaf: Le	Poor: poorly drained.	Unsuited: excessive fines.	Unsuited: excessive fines.	Poor: poorly drained.	Slight	Moderate: high compressibility.
Lenoir: Ln	Fair: limited amount of suitable material.	Unsuited: excessive fines.	Unsuited: excessive fines.	Fair: somewhat poorly drained.	Slight	Moderate: high compressibility.
Leon: Lo	Poor: sand surface layer.	Fair: few fines.	Poor: improbable source.	Fair: somewhat poorly drained.	Severe: rapid permeability; sandy substratum at a depth of about 37 inches.	Severe: poor slope stability; high permeability; poor resistance to piping and erosion.
Lumbee: Lu	Poor: poorly drained.	Poor: excessive fines; seasonal high water table; subject to flooding; probable source below depth of about 4 feet.	Poor: excessive fines; seasonal high water table; subject to flooding; probable source below depth of about 4 feet.	Poor: poorly drained.	Severe: rapid permeability; sandy substratum at a depth of about 38 inches.	Moderate: good to poor resistance to piping and erosion; suitable material at a depth of about 38 inches.
Lynchburg: Ly	Fair: limited amount of material.	Poor: improbable source.	Poor: improbable source.	Fair: somewhat poorly drained.	Moderate: moderate permeability.	Moderate: poor resistance to piping.
Meggett: Me	Poor: poorly drained.	Unsuited: excessive fines.	Unsuited: excessive fines.	Poor: poorly drained; high shrink-swell potential.	Slight	Moderate: thickness of suitable borrow material.
Murville: Mu	Poor: very poorly drained.	Fair: excessive fines and organic-matter content.	Poor: improbable source.	Poor: very poorly drained; high content of organic matter.	Severe: moderately rapid permeability.	Severe: poor slope stability; high permeability; poor resistance to piping and erosion.

engineering properties of the soils—Continued

Degree of limitations and major soil features affecting selected use—						
Excavated ponds (aquifer fed)	Dwellings	Septic-tank filter fields	Sewage lagoons	Local roads and streets	Light industries	Sanitary landfill [1] (trench and area method)
Moderate: depth to water table in dry season.	Severe: flooding; seasonal high water table.	Severe: flooding; seasonal high water table.	Severe: flooding; seasonal high water table.	Severe: flooding; poorly drained.	Severe: flooding; seasonal high water table.	Severe: flooding; seasonal high water table.
Severe: depth to water table in dry season.	Slight	Slight	Severe: rapid permeability.	Slight	Slight if 0 to 4 percent slopes. Moderate if 4 to 8 percent slopes.	Severe: rapid permeability.
Severe: very slow permeability of aquifer.	Severe: moderate to high shrink-swell potential; clayey subsoil; seasonal high water table; surface ponding.	Severe: slow permeability; seasonal high water table.	Severe: seasonal high water table.	Severe: poorly drained.	Severe: seasonal high water table; clayey; moderate shrink-swell potential.	Severe: seasonal high water table.
Severe: slow permeability of aquifer.	Severe: seasonal high water table.	Severe: seasonal high water table; slow permeability.	Severe: seasonal high water table.	Severe: Unified group is CL.	Severe: seasonal high water table.	Severe: seasonal high water table.
Moderate: depth to water table in dry season.	Severe: seasonal high water table.	Severe: seasonal high water table.	Severe: seasonal high water table; rapid permeability; sandy substratum at a depth of 37 inches.	Moderate: somewhat poorly drained.	Severe: seasonal high water table.	Severe: seasonal high water table; rapid permeability; sandy substratum at a depth of about 37 inches.
Moderate: depth to water table in dry season.	Severe: seasonal high water table.	Severe: seasonal high water table.	Severe: seasonal high water table; rapid permeability; sandy substratum at a depth of about 38 inches.	Severe: poorly drained.	Severe: seasonal high water table.	Severe: seasonal high water table; rapid permeability; sandy substratum at a depth of about 38 inches.
Moderate: depth to water table in dry season.	Severe: seasonal high water table.	Severe: seasonal high water table.	Severe: seasonal high water table.	Moderate: somewhat poorly drained.	Severe: seasonal high water table.	Severe: seasonal high water table.
Moderate: depth to water table in dry season.	Severe: seasonal high water table; high shrink-swell potential.	Severe: seasonal high water table; slow permeability.	Severe: seasonal high water table.	Severe: poorly drained; high shrink-swell potential.	Severe: high shrink-swell potential; seasonal high water table.	Severe: seasonal high water table; marl substratum.
Slight	Severe: seasonal high water table.	Severe: seasonal high water table.	Severe: seasonal high water table; moderately rapid permeability.	Severe: very poorly drained.	Severe: seasonal high water table.	Severe: sea seasonal high water table; moderately rapid permeability.

TABLE 7.—*Interpretations of*

Soil series and map symbols	Suitability as source of—				Limitations for—	
	Topsoil	Sand	Gravel	Road fill	Pond reservoir areas	Pond embankments
Norfolk: Na, Nb, Nc.	Poor: loamy sand surface layer.	Poor: improbable source.	Poor: improbable source.	Good	Moderate: moderate permeability.	Slight
Pactolus: Pa	Poor: loamy sand surface layer.	Fair: some fines.	Poor: improbable source.	Fair: somewhat poorly drained.	Severe: rapid permeability.	Moderate: poor resistance to piping and erosion; poor slope stability; medium to high permeability.
Pamlico: Pc	Poor: very poorly drained.	Poor: improbable source.	Poor: improbable source.	Poor: very poorly drained; organic surface layer.	Severe: moderately rapid permeability; sandy substratum at a depth of 33 inches.	Severe: poor slope stability; high compressibility.
Pantego: Pe	Poor: very poorly drained.	Poor: improbable source.	Poor: improbable source.	Poor: very poorly drained.	Moderate: moderate permeability.	Slight
Pocalla: Po	Poor: loamy sand surface layer.	Poor: excessive fines.	Poor: improbable source.	Good	Severe: rapid permeability; sandy substratum at a depth of about 40 inches.	Moderate: medium permeability; poor resistance to piping and erosion.
Portsmouth: Pr.	Poor: very poorly drained.	Poor: excessive fines; probable source below depth of about 4 feet.	Poor: improbable source.	Poor: very poorly drained.	Severe: rapid permeability; sandy substratum at a depth of about 38 inches.	Moderate: good to poor resistance to piping and erosion; suitable material at a depth of about 38 inches.
Rains: Ra	Poor: poorly drained.	Poor: improbable source.	Poor: improbable source.	Poor: poorly drained.	Moderate: moderate permeability.	Slight
Stallings: St	Poor: loamy sand surface layer.	Poor: improbable source.	Poor: improbable source.	Fair: somewhat poorly drained.	Severe: rapid permeability; sandy substratum at a depth of about 42 inches.	Moderate: poor resistance to piping and erosion; medium permeability; fair slope stability.

engineering properties of the soils—Continued

Degree of limitations and major soil features affecting selected use—						
Excavated ponds (aquifer fed)	Dwellings	Septic-tank filter fields	Sewage lagoons	Local roads and streets	Light industries	Sanitary landfill [1] (trench and area method)
Severe: deep to water table in dry season.	Slight if 0 to 8 percent slopes. Moderate if more than 8 percent slopes.	Slight if 0 to 8 percent slopes. Moderate if more than 8 percent slopes.	Moderate if 0 to 7 percent slopes; moderate permeability. Severe if 7 to 10 percent slopes.	Slight if 0 to 8 percent slopes. Moderate if 8 to 10 percent slopes.	Slight if 0 to 4 percent slopes. Moderate if 4 to 8 percent slopes. Severe if more than 8 to 10 percent slopes.	Slight.
Moderate: depth to water table in dry season.	Severe: seasonal high water table.	Severe: seasonal high water table.	Severe: seasonal high water table; rapid permeability.	Moderate: somewhat poorly drained.	Severe: seasonal high water table.	Severe: seasonal high water table; rapid permeability.
Slight	Severe: seasonal high water table; surface ponding and flooding.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding; high in content of organic matter; moderately rapid permeability; sandy substratum at a depth of 33 inches.	Severe: very poorly drained; flooding.	Severe: seasonal high water table.	Severe: seasonal high water table; flooding; moderately rapid permeability; sandy substratum at a depth of 33 inches.
Slight	Severe: seasonal high water table.	Severe: seasonal high water table.	Severe: seasonal high water table.	Severe: very poorly drained.	Severe: seasonal high water table.	Severe: seasonal high water table.
Severe: deep to water table in dry season.	Slight	Slight	Severe: rapid permeability; sandy substratum at a depth of 40 inches.	Slight	Slight if 0 to 4 percent slopes. Moderate if 4 to 8 percent slopes.	Severe: rapid permeability; sandy substratum at a depth of 40 inches.
Slight	Severe: seasonal high water table.	Severe: seasonal high water table.	Severe: seasonal high water table; rapid permeability; sandy subtratum at a depth of about 38 inches.	Severe: very poorly drained.	Severe: seasonal high water table.	Severe: seasonal high water table; rapid permeability; sandy substratum at a depth of about 38 inches.
Moderate: depth to water table in dry season.	Severe: seasonal high water table.	Severe: seasonal high water table.	Severe: seasonal high water table.	Severe: poorly drained.	Severe: seasonal high water table.	Severe: seasonal high water table.
Moderate: depth to water table in dry season.	Severe: seasonal high water table.	Severe: seasonal high water table.	Severe: seasonal high water table; moderately rapid permeability; sandy substratum at a depth of about 42 inches.	Moderate: somewhat poorly drained.	Severe: seasonal high water table.	Severe: seasonal high water table; moderately rapid permeability; sandy substratum at a depth of 42 inches.

TABLE 7.—*Interpretations of*

Soil series and map symbols	Suitability as source of—				Limitations for—	
	Topsoil	Sand	Gravel	Road fill	Pond reservoir areas	Pond embankments
Torhunta: To	Poor: very poorly drained.	Poor: improbable source.	Poor: improbable source.	Poor: very poorly drained.	Severe: rapid permeability; sandy substratum at a depth of about 36 inches.	Moderate: poor resistance to piping and erosion; medium permeability; fair slope stability.
Umbric Ochraqualfs: Uo.	Poor: very poorly drained.	Unsuited: excessive fines.	Poor: improbable source.	Poor: very poorly drained.	Moderate: moderate permeability.	Slight: very poorly drained.
Wagram: Wb, Wc, Wd.	Poor: loamy sand surface layer.	Fair: probable source.	Poor: improbable source.	Good	Severe: moderately rapid permeability.	Moderate: poor resistance to piping.
Wickham: Wk	Poor: loamy sand surface layer.	Poor: excessive fines; probable source below depth of about 4 feet.	Poor: excessive fines; probable source below depth of about 4 feet.	Good	Severe: rapid permeability; sandy substratum at a depth of about 43 inches.	Moderate: poor resistance to piping.
Woodington: Wn.	Poor: poorly drained.	Poor: excessive fines.	Poor: improbable source.	Poor: poorly drained.	Severe: rapid permeability; sandy substratum at a depth of 47 inches.	Moderate: poor resistance to piping and erosion; medium permeability; fair slope stability.

[1] Onsite studies of the underlying strata, water tables, and hazards of aquifer pollution and drainage into ground water

are not rated in this table. Embankment foundation, reservoir area, and slope are assumed to be suitable for pond construction. Soil properties that affect the embankment and the availability of borrow material are considered. The best soils have good slope stability, low permeability, slight compressibility under load, and good resistance to piping and are thick enough for easy excavation.

An aquifer-fed excavated pond (fig. 12) is a body of water created by excavating a pit or dugout into a ground-water aquifer. Excluded are ponds fed by runoff and also embankment-type ponds where the depth of water impounded against the embankment exceeds 3 feet. The assumption is made that the pond is properly designed, located, and constructed and that the water is of good quality. Properties affecting aquifer-fed ponds are the existence of a permanent water table, permeability of the aquifer, and properties that interfere with excavation, such as marl.

Dwellings (without basements), as rated in table 7, are not more than three stories high and are supported by foundation footings placed in undisturbed soil. The features that affect the rating of a soil for dwellings are those that relate to capacity to support load and resist settlement under load, and those that relate to ease of excavation. Soil properties that affect capacity to support load are wetness, susceptibility to flooding, density, plasticity, texture, and shrink-swell potential. Those that affect excavation are wetness, slope, and depth to marl.

Septic tank filter fields are subsurface systems of tile or perforated pipe that distribute effluent from a septic tank into natural soil. The soil material from a depth of 18 inches to 6 feet is evaluated. The soil properties considered are those that affect both absorption of effluent and construction and operation of the system. Properties that affect absorption are permeability, depth to water table, and susceptibility to flooding. Slope is a soil property that affects difficulty of layout and construction and also the risk of soil erosion,

engineering properties of the soils

Degree of limitations and major soil features affecting selected use—						
Excavated ponds (aquifer fed)	Dwellings	Septic-tank filter fields	Sewage lagoons	Local roads and streets	Light industries	Sanitary landfill [1] (trench and area method)
Slight	Severe: seasonal high water table.	Severe: seasonal high water table.	Severe: seasonal high water table; rapid permeability; sandy substratum at a depth of about 36 inches.	Severe: very poorly drained.	Severe: seasonal high water table.	Severe: seasonal high water table; rapid permeability; sandy substratum at a depth of about 36 inches.
Slight: marl substratum interferes with excavation in places.	Severe: seasonal high water table.	Severe: seasonal high water table.	Severe: seasonal high water table.	Severe: very poorly drained.	Severe: seasonal high water table.	Severe: seasonal high water table.
Severe: depth to water table in dry season.	Slight if 0 to 8 percent slopes. Moderate if 8 to 15 percent slopes.	Slight if 0 to 8 percent slopes. Moderate if 8 to 15 percent slopes.	Severe: moderately rapid permeability.	Slight if 0 to 8 pecent slopes. Moderate if more than 8 percent slopes.	Slight if 0 to 4 percent slopes. Moderate if 4 to 8 percent slopes. Severe if more than 8 percent slopes.	Severe: moderately rapid permeability.
Severe: depth to water table in dry season.	Slight	Slight	Severe: rapid permeability; sandy substratum at a depth of 43 inches.	Slight	Slight	Severe: rapid permeability; sandy substratum at a depth of about 43 inches.
Moderate: depth to water table in dry season.	Severe: seasonal high water table.	Severe: seasonal high water table.	Severe: seasonal high water table; rapid permeability; sandy substratum at a depth of 47 inches.	Severe: poorly drained.	Severe: seasonal high water table.	Severe: seasonal high water table; rapid permeability; sandy substratum at a depth of 47 inches.

[1] need to be made for landfills deeper than 5 to 6 feet.

lateral seepage, and downslope flow of effluent. Soils that are underlain by sandy layers have the potential risk of contaminating nearby water supplies.

Sewage lagoons are shallow ponds constructed to hold sewage within a depth of 2 to 5 feet long enough for bacteria to decompose the solids. A lagoon has a nearly level floor, and sides, or embankments, of compacted soil material. The assumption is made that the embankment is compacted to medium density and the pond is protected from flooding. Properties that affect the pond floor and the embankment are considered. Those that affect the pond floor are permeability, organic matter, slope, and depth to marl (if marl is present). The soil properties that affect the embarkment are the engineering properties of the embankment material as interpreted from the Unified soil classification.

Local roads and streets, as rated in table 7, have an all-weather surface expected to carry automobile traffic all year. They 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. These roads 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 6 feet deep.

Soil properties that most affect design and construction of roads and streets are load-supporting capacity and stability of the subgrade and the workability and quantity of cut and fill material available. The AASHTO and Unified classifications of the soil material, and also the shrink-swell potential, indicate load-supporting capacity. Wetness and flooding affect stability of the material. Slope, depth to marl, and wetness affect ease of excavation and amount of cut and fill needed to reach an even grade.

Ratings for light industry (fig. 13) are for the undisturbed soils that are used to support building foundations. Emphasis is on foundations, ease of exca-

TABLE 8.—

[Tests performed by North Carolina State Highway Commission,

Soil name and location	Parent material	Report No. S70NC54–	Depth	Moisture-density [1]	
				Maximum dry density	Optimum moisture
			In	*Pct*	*Pct*
Coxville loam: 2 miles southeast of LaGrange, 0.4 mile east of intersection of U.S. Highway 70 and State Road 1327, 0.3 mile southeast of State Road 1327, and 20 feet southwest of farm road. (Modal)	Coastal Plain sediment.	5–1 5–3 5–6	0–8 12–27 62–75	107 109 122	16 17 11
Kalmia loamy sand: 4 miles northeast of Kinston, 0.2 mile east of intersection of N.C. 55 and State Road 1810, and 20 feet south of State Road 1810. (Modal)	Old Coastal Plain alluvium.	13–1 13–4 13–7	0–8 16–28 43–65	112 115 101	11 14 16
Pocalla loamy sand: 7 miles south of LaGrange, 0.6 mile east of intersection of N.C. Highway 55 and State Road 1002, and 20 feet north of N.C. Highway 55. (Modal)	Coastal Plain sediment and old alluvium.	14–2 14–4 14–6	8–22 26–40 40–66	109 118 101	12 11 15
Leon sand: 5 miles east of Pink Hill, 0.6 mile east of intersection of State Road 1105 and State Road 1118, and 25 feet south of State Road 1105. (Modal)	Coastal Plain sediment.	19–1 19–3	0–6 14–19	102 117	16 10
Lenoir very fine sandy loam: 8 miles east of Kinston and 50 feet southwest of intersection of State Road 1806 and State Road 1807. (Modal)	Coastal Plain sediment.	18–1 18–4 18–6	0–8 21–48 62–75	107 104 109	15 20 16
Pantego loam: 9.5 miles south of Kinston, 1.2 miles southwest of intersection of State Road 1922 and State Road 1925, and 25 feet northeast of State Road 1922. (Modal)	Coastal Plain sediment.	2–1 2–4 2–6	0–9 19–50 64–74	88 112 113	26 15 14

[1] Based on AASHTO Designation T 99, Method A and C (*1*).

[2] Mechanical analyses according to the AASHTO Designation T 88 (*1*). Results by this procedure frequently may differ somewhat from results that would have been 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 soil survey procedure, the fine material is analyzed by the pipette method and the material coarser than 2 millimeters in diameter is excluded from

vation for underground utilities, and corrosion potential of uncoated steel pipe. The undisturbed soil is rated for spread footing foundations for buildings less than three stories high or foundation loads not in excess of that weight. Properties affecting load-supporting capacity and settlement under load are wetness, flooding, texture, plasticity, density, and shrink-swell behavior. Properties affecting excavation are wetness, flooding, slope, and depth to marl. Properties affecting corrosion of buried uncoated steel pipe are wetness, texture, total acidity, and electrical resistivity.

Sanitary landfill is a method of disposing of refuse in dug trenches. The waste is spread in thin layers, compacted, and covered with soil throughout the disposal period. Landfill areas are subject to heavy vehicular traffic. Some soil properties that affect suitability for landfill are ease of excavation, hazard of polluting ground water, and trafficability. The best soils have moderately slow permeability, withstand heavy traffic, and are friable and easy to excavate. Unless otherwise stated, the ratings in table 7 apply only to a depth of about 6 feet; and, therefore, limitation ratings of *slight* or *moderate* may not be valid if trenches are to be much deeper than that. For some soils, reliable predictions can be made to a depth of 10 or 15 feet; but, regardless of that, every site should be investigated before it is selected.

Soil test data

Table 8 contains engineering test data for some of

Engineering test data

Department of Materials and Tests, Raleigh, N.C.]

Mechanical analysis[2]							Lquid 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]
100	97	69	61	50	27	16	25	5	A-4(7)	CL-ML
100	98	81	75	66	44	38	37	20	A-6(12)	CL
100	91	40	37	29	22	19	22	7	A-4(1)	SC
100	90	20	18	12	6	4	16	NP[5]	A-2-4(0)	SM
100	88	36	34	30	26	23	29	9	A-4(0)	SC
100	99	11	9	7	6	4	24	NP	A-2-4(0)	SM-SP
100	97	13	11	9	6	4	17	NP	A-2-4(0)	SM
100	97	24	22	21	17	15	17	NP	A-2-4(0)	SM
100	97	17	7	4	3	2	22	NP	A-2-4(0)	SM
100	90	11	9	6	3	2	24	NP	A-2-4(0)	SM-SP
100	89	17	16	14	9	6	15	NP	A-2-4(0)	SM
100	98	81	70	53	26	15	25	3	A-4(8)	ML
100	99	89	81	69	51	41	49	27	A-7-6(17)	CL
100	98	66	60	50	39	34	41	23	A-7-6(11)	CL
100	95	52	47	40	23	15	38	9	A-4(3)	ML
99.5	95	51	47	43	34	28	27	15	A-6(5)	CL
99	94	46	41	38	31	28	30	13	A-6(3)	SC

calculations of grain-size fractions. The mechanical analyses used in this table are not suitable for use in naming textural classes for soil.

[2] Based on AASHTO Designation M 145-49 (*1*).

[3] Based on ASTM Stand. D 2487-69 (*2*).

[5] NP means nonplastic.

the major soil series in Lenoir 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.

Tests to determine *liquid limit* and *plasticity index* measure the effect of water on the strength and consistence of the soil material, as has been explained for table 6.

Formation and Classification of the Soils

Any one soil has a unique combination of a great many soil characteristics. An individual soil, as one individual body on the landscape, varies in the size of

Figure 12.—High water level in pond on Torhunta loam.

the area it covers and the depth it extends below the surface. Any one individual soil may cover a few square yards or a several-hundred-acre area of the landscape, and different areas may have different shapes.

The factors that have affected the formation and composition of soils in Lenoir County are discussed in this section, and the soils are then classified in the current system.

Factors of Soil Formation

Soil is the product of the combined effects of plants and animals, climate, parent material, relief, and time. The characteristics of the kinds of soil at any place depend on these five factors. All are related, and the soil-forming processes affect the soil; but in many places one or two of the factors may dominate and fix most of the characteristics of a particular soil. The results are the development of kinds of soil and contrasting combinations of profile characteristics.

Parent material

The parent materials of the soils of Lenoir County are closely related. They include unconsolidated rock material, sand, silt, and clay that make up the sediment of the Coastal Plain uplands and soil material washed from the Coastal Plain uplands and deposited in drainageways on flood plains or terraces as alluvium. In places these closely related materials have 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 differences in texture, can be observed in the field. More obscure differences, such as differences in mineral composition, can be determined only by careful laboratory examination.

Many of the differences among the soils of Lenoir County reflect the varying geologic materials from which the soils were formed. Some examples of soils that formed in different parent materials are—

1. Soils that formed in sediment having a low percentage of silt and very fine sand are Norfolk, Goldsboro, Lynchburg, and Rains.
2. Soils that formed in sediment consisting of nearly all sand are Lakeland, Pactolus, Leon, and Murville.
3. Soils that formed in sediment having a high percentage of clay and silt are Craven, Lenoir, and Leaf.

Thus, a sediment of one parent material varying in makeup can form different kinds of soil. Also, the particular location of a parent material can lead to the formation of different kinds of soil. Alluvial deposits of sand, silt, and clay, for example, formed Bibb,

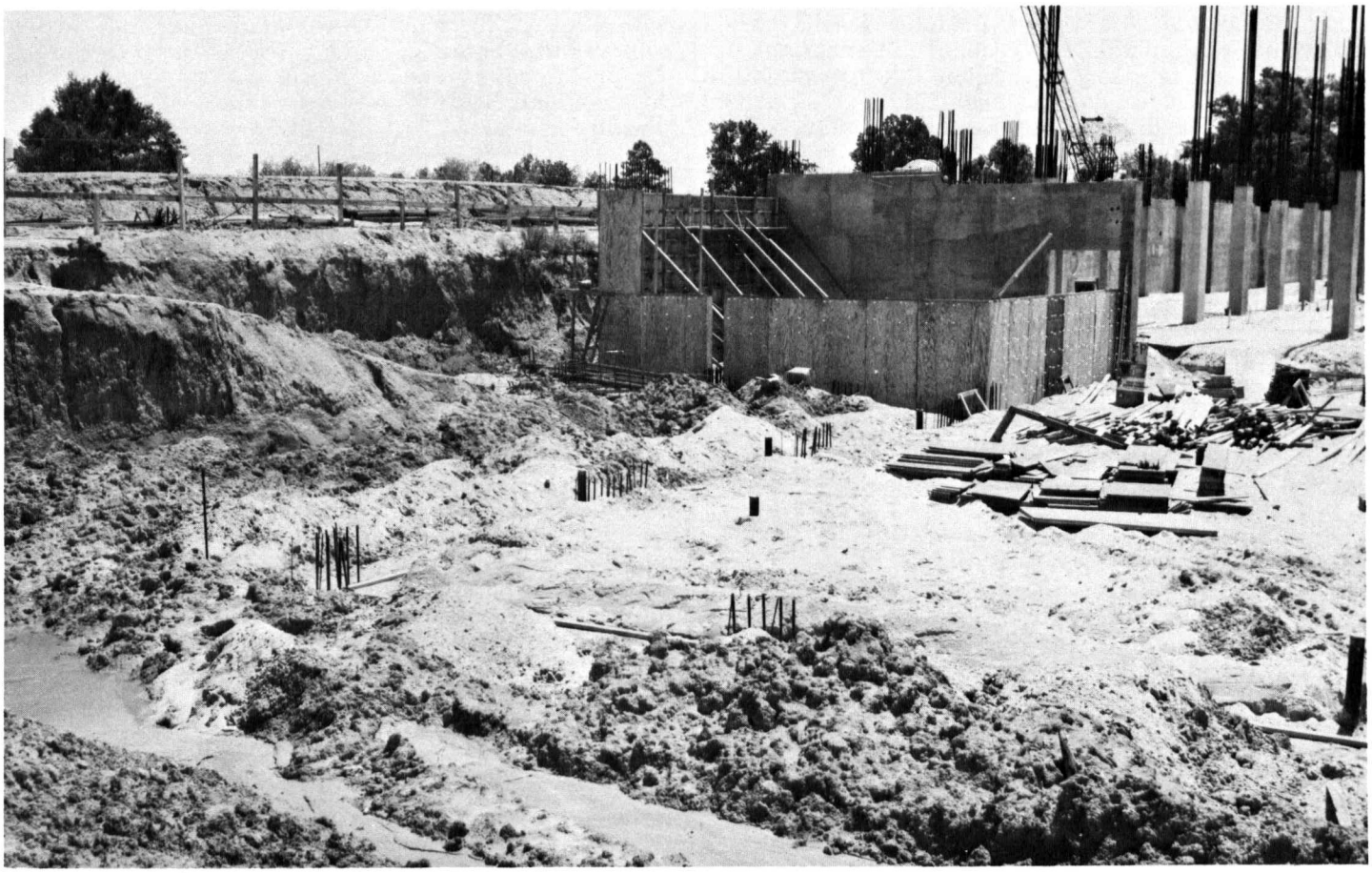

Figure 13.—Construction on Norfolk loamy sand, 2 to 6 percent slopes. Norfolk soils have only slight limitations for building sites.

Johnston, and Chewacla soils on flood plains, but they formed Wickham, Kalmia, Johns, and Lumbee soils on terraces.

In particular, Pamlico and Johnston soils were formed in part from alluvial deposits and in part from the decay of vegetative materials from plants that grew on them while they were in an undrained condition and had a high content of organic matter inherited from plant material.

The Meggett and Grifton soils formed in sediment consisting of a mixture of sand, silt, clay, and marine shells and have a high base saturation of calcium inherited from the marine shells in the parent material.

Thus, parent material has been an important factor that has caused the soils of Lenoir County to be different in such characteristics as thickness and texture of horizons, clay mineralogy, and exchangeable cations.

Climate

The climate of Lenoir County is warm and humid. Summers are long and hot, and winters are short and mild. The climate is fairly even throughout the county and has caused little of the difference among the individual kinds of soils. The average annual temperature is 62 degrees, and the rainfall averages 49.3 inches annually.

The mild temperature and the amount and intensity of rainfall favor rapid decomposition of organic matter, hasten chemical reaction, speed leaching of soluble bases, and increase translocation of the less soluble fine particles in the soil profile (*5*). As a result, the soils of the county, except for a few that formed in marl, are acid in reaction, strongly leached, and low in natural fertility.

Except for those soils that formed in sand and recent alluvium, the soils have a higher content of clays in the B horizon than in the A or C horizon.

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 and in many places transfer soil particles from one horizon to another. Plants and animals also affect the additions and removal of organic matter, nitrogen, and other plant nutrients. The soil structure, porosity, and certain other soil characteristics are also influenced by plant and animal life.

Pine forests originally covered most of the upland in Lenoir County; and cypress, gum, and miscellaneous hardwoods were predominant in 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 the more slowly soluble mineral components and hasten the rate of removal of soluble inorganic materials from the surface horizons. The effect of these organic acids on soil formation is conditioned by climate. Climate modifies the rate of chemical reaction and the rate of leaching and, to a large degree, determines the kinds of plants and animals living in and on the individual kinds of soil.

Organic matter decays more rapidly in the surface horizons of such well-drained soils as the Norfolk, Wagram, and Kenansville soils because the periods of saturation are shorter than they are for the poorly drained soils. There is very little accumulation of organic matter in the surface horizons of the well-drained soils, and their surface horizons remain light colored. Decay of organic matter is retarded in the surface horizons of the poorly drained soils, such as Portsmouth, Torhunta, Murville, and Johnston soils, because the periods of saturation last from one day to several weeks each year. The excess moisture retards the oxidation, allowing wet soils to accumulate a high content of organic matter in the surface horizon. This causes the surface to be darker colored than the surface of well-drained soils.

Also, the organic matter probably is the energy source for micro-organisms involved in oxygen consumption in saturated A horizons. The wet soils have longer periods of saturation, and the biological activity can reduce the oxygen levels of the ground water so anaerobic conditions can exist for several days or weeks.

The reducing conditions along with the saturation are postulated to be responsible for gray colors in the subsoil of the poorly drained soils.

Time

The sequence of horizons in the soil profiles requires a long time to develop. Some of the differences among the kinds of soils reflect differences in their age. Older soils generally have better defined horizons than young soils. In Lenoir County the older Norfolk, Wagram, and Goldsboro soils on the smoother, nearly level upland divides have well-developed horizons. These nearly level soils have formed in Coastal Plain surfaces that are essentially unchanged for as much as 10 million years or since Upper Miocene time.

By contrast, the more recent soils, such as Bibb, Kinston, Johnston, and Chewacla, formed in alluvium that has not been in place long enough to develop well-defined horizons.

Relief

The relief in Lenoir County is largely the result of dissection by the Neuse River and its tributary streams. Landscape dissection, acting through its influence on water table depths and geologic removal of soil material by slope retreat, affects the formation of soils in Lenoir County.

The deepest water tables are near the short, sharply rounded side slopes. Deep water tables are associated with thick A2 horizons, fine-textured B horizons, bright colors in the B horizons, and a decrease in and eventual disappearance of bodies low in content of clay. The Wagram and Norfolk soils reflect those characteristics that are associated with well drained conditions.

The shallow water tables are associated with thin A2 horizons, low-contrast mottling, and presence of bodies low in content of clay. The soils in the interstream areas, such as Lynchburg, Rains, and Pantego, reflect those characteristics that are associated with high water tables.

The removal of soil material by geological erosion has caused the solum of soils that formed on side slopes to remain thin.

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 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 (*4*), (*7*), (*8*).

The Soil Taxonomy has six categories. Beginning with the 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 9 the soil series of Lenoir County are classified according to the Soil Taxonomy. Classes of the 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 subdivided into suborders that are based mainly 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 waterlogging, or soil differences resulting from the climate or vegetation. The names of suborders have two syllables. The last syllable indicates the order.

TABLE 9.—*Soils classified according to current system*

Series	Family	Subgroup	Order
Bibb	Coarse-loamy, siliceous, acid, thermic	Typic Fluvaquents	Entisols.
Blanton	Loamy, siliceous, thermic	Grossarenic Paleudults	Ultisols.
Chewacla	Fine-loamy, mixed, thermic	Fluvaquentic Dystrochrepts	Inceptisols.
Coxville	Clayey, kaolinitic, thermic	Typic Paleaquults	Ultisols.
Craven	Clayey, mixed, thermic	Aquic Hapludults	Ultisols.
Goldsboro	Fine-loamy, siliceous, thermic	Aquic Paleudults	Ultisols.
Grifton	Fine-loamy, siliceous, thermic	Typic Ochraqualfs	Alfisols.
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.
Kenansville	Loamy, siliceous, thermic	Arenic Hapludults	Ultisols.
Kinston	Fine-loamy, siliceous, acid, thermic	Typic Fluvaquents	Entisols.
Lakeland	Thermic, coated	Typic Quartzipsamments	Entisols.
Leaf	Clayey, mixed, thermic	Typic Albaquults	Ultisols.
Lenoir[1]	Clayey, mixed, thermic	Aeric Paleaquults	Ultisols.
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.
Meggett	Fine, mixed, thermic	Typic Albaqualfs	Alfisols.
Murville	Sandy, siliceous, thermic	Typic Haplaquods	Spodosols.
Norfolk	Fine-loamy, siliceous, thermic	Typic Paleudults	Ultisols.
Pactolus	Thermic, coated	Aquic Quartzipsamments	Entisols.
Pamlico	Sandy or sandy-skeletal, siliceous, dysic, thermic.	Terric Medisaprists	Histosols.
Pantego	Fine-loamy, siliceous, thermic	Umbric Paleaquults	Ultisols.
Pocalla	Sandy, siliceous, thermic	Arenic Paleudults	Ultisols.
Portsmouth	Fine-loamy, siliceous, thermic	Typic Umbraquults	Ultisols.
Rains	Fine-loamy, siliceous, thermic	Typic Paleaquults	Ultisols.
Stallings	Coarse-loamy, siliceous, thermic	Aeric Paleaquults	Ultisols.
Torhunta	Coarse-loamy, siliceous, acid, thermic	Typic Humaquepts	Inceptisols.
Wagram	Loamy, siliceous, thermic	Arenic Paleudults	Ultisols.
Wickham	Fine-loamy, mixed, thermic	Typic Hapludults	Ultisols.
Woodington	Coarse-loamy, siliceous, thermic	Typic Paleaquults	Ultisols.

[1] Taxadjuncts to the Lenoir series because the combined thickness of A and B1 horizons ranges from 10 to 14 inches in about 70 percent of the unit, and the character of change in texture between the A and the B2t horizon is on the limit to an abrupt textural change.

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 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 subdivided 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 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 mainly 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 as family differentiae as shown in table 9.

General Nature of the County

This section gives general facts about Lenoir County. It briefly discusses physiography, relief, and drainage; water supply; climate; settlement and development; transportation; and industry.

Physiography, Relief, and Drainage

Lenoir County is in the Coastal Plain physiographic province. The soils are underlain by unconsolidated sand, silt, and clay except for small intermittent areas on the southeast side of the county. These small areas are underlain by friable to weakly cemented, greenish-gray marl that has a high content of sand. Most of

the county is nearly level, and the rest is gently sloping to strongly sloping.

According to elevation data based on U.S. Geological Survey quadrangle sheets, the highest elevation is about 161 feet at the corner boundary with Duplin and Wayne counties, which is about middle way on the west side of the county. From this highest elevation, the county slopes northward to about 120 feet in elevation at the boundary, southward to about 140 feet at the boundary, and to about 70 feet elevation for the eastern boundary. At the places on the eastern boundary where the Neuse and Trent Rivers leave the county, elevations are 10 feet near the Neuse River and 60 feet near the Trent River.

The Neuse River drains three-fourths of the county, and the Trent River drains the rest. Movement of surface water is slow on the smooth, broad, nearly level divides and on the heavily vegetated, nearly flat flood plains. A few interstream areas, such as the Bearwell and Ball Pocosin on the southeast side of the county and the Jones Pocosin southeast of LaGrange, are wide and have large areas of wet soils.

Water Supply

Ground water is plentiful throughout the county and is near the surface in most places. It is easily tapped for municipal, household, and farm uses. Many farms have excavated ponds less than 15 feet deep that supply water for livestock, irrigation, and recreation. Impounded ponds will store a large water supply for farm use. Wells supply plenty of water for municipal and household use.

Climate [5]

Causal Factors.—Lenoir County lies near the center of the North Carolina Coastal Plain. The climate of the county is influenced by this location because of elevation, latitude, distance from the ocean, and other lesser factors. See table 10 for temperature and precipitation data. The Neuse River divides the county in a roughly east-west direction. Kinston, where the weather observations on which this report is based were made, is on this river.

Temperature.—The average length of the freeze-free growing season is about 225 days, lasting from late March to early November. See table 11 for more information on the probability of freezes of various intensities in spring and fall. Weather records since 1900 indicate the lowest temperature recorded as 0° F and the highest as 106° F. The temperature reaches 100° sometime in about half of the summers and 90° or higher on more than half of the days in June, July, and August.

Precipitation.—Summer thunderstorms account for a large part of the growing season rainfall, which is therefore subject to wide variations from year to year, from month to month, and even from place to place over Lenoir County. In some years there may be periods of 5 to 20 days when some local areas do not have any significant amount of rain. In such cases irrigation may be a worthwhile aid to crop production. Frequently in autumn and sometimes in summer, rain-

[5] By A. V. HARDY, climatologist for North Carolina National Weather Service, U.S. Department of Commerce.

TABLE 10.—*Temperature and precipitation*

[All data except soil temperatures were obtained from records at Kinston]

Month	Temperature					Precipitation				Average soil temperature at depth of 4 inches in an area of bare, level soil
	Average daily maximum	Average daily minimum	Two years in 10 will have at least 4 days with—		Average monthly total precipitation	One year in 10 will have—		No. 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	In	In	In		In	°F
January	57	34	76	13	3.0	1.3	5.8	1	2	45
February	58	34	79	12	3.5	1.0	6.0	(1)	2	46
March	66	40	85	23	3.5	1.5	5.7	(1)	2	53
April	75	49	91	33	3.2	1.5	4.6	0	0	62
May	83	57	95	38	3.6	1.2	7.8	0	0	72
June	90	65	100	50	4.6	1.4	10.6	0	0	78
July	91	69	100	58	7.1	3.2	12.9	0	0	81
August	91	68	99	53	5.8	2.1	10.5	0	0	80
September	86	62	96	45	4.8	1.2	9.8	0	0	75
October	77	51	90	29	2.6	0.6	6.0	0	0	66
November	67	40	83	20	3.0	0.9	6.2	0	0	56
December	57	33	78	14	3.2	1.3	5.4	(1)	1	46
Year	75	50	[2] 100	[3] 12	47.9	38.8	61.0	3	2	63

[1] Less than one-half day.
[2] Average annual highest temperature.
[3] Average annual lowest temperature.

TABLE 11.—*Probabilities of last freezing temperatures in spring and first in fall*

[All data were obtained from records at Kinston]

Probability	Dates for given probability and temperature of—				
	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 25	March 8	March 20	April 2	April 13
2 years in 10 later than	February 12	February 24	March 11	March 24	April 7
5 years in 10 later than	January 22	February 8	February 25	March 12	March 27
Fall:					
1 year in 10 earlier than	December 9	November 22	November 14	October 31	October 24
2 years in 10 earlier than	December 14	November 30	November 20	November 6	October 30
5 years in 10 earlier than	December 21	December 10	November 29	November 15	November 8

fall is increased by the passage of a tropical storm through eastern North Carolina or the waters offshore.

Winter rainfall is generally associated with large low-pressure storms moving through the Eastern United States or the waters offshore. It varies less than does summer rainfall. Even in winter, however, several days may sometimes pass without significant precipitation. This is of less importance in winter because of lower evaporation and transpiration and less water usage generally.

Some snow or sleet occurs almost every winter, but accumulations are generally small and melt in a few hours. The blanketing effect of a layer of snow lasting several days is rare in this area. About once a decade, on the average, as much as 9 or 10 inches may accumulate. Perhaps one in four of these rare snowfalls may remain on the ground a week or more.

Cloudiness is variable. The sun shines, on the average, more than half the daylight hours in winter and nearly two thirds of them in other seasons. The average relative humidity is near 85 percent at sunrise, dropping off to near 50 percent at midafternoon.

Tropical storms only occasionally bring destructive winds inland as far as Lenoir County. Tornados are even more rare. Highest winds most commonly result from summer thunderstorms. Such winds are highly local and of brief duration. Surface winds are variable in direction at all seasons, but they blow most often from the southwest. Northeasterly winds are a close second in autumn. The average surface windspeed is about 8 miles per hour, varying in a typical day from nearly calm in the early morning before dawn to 12 or 14 miles per hour in the early afternoon.

Settlement and Development

Lenoir County was established from Dobbs County in 1791 by an Act of the North Carolina General Assembly.

As early as 1587 the area now known as Lenoir County was noted for the production of tobacco. Thomas Hariot, an early English explorer, commented upon the fertile fields and the tobacco. Indians at that time grew tobacco, corn, and pumpkins. Hariot described how the Indians grew, cured, and used the tobacco.

Later, the first permanent white settlers moved into what would become North Carolina. In 1711, Europeans John Lawson and Baron Christopher Von Graffenried founded New Bern, a town south of Kinston on the Neuse. These two men left New Bern in 1711 and followed the Neuse River upstream in the hope of finding a shorter route to Virginia. While in the vicinity of Contentnea Neck, a section of what is now northern Lenoir County, they were captured by Indians. Lawson was killed and Von Graffenried was released. This event started the Tuscarora War. After the conclusion of this war in 1714, the Indians moved away and white settlers from the New Bern colony migrated into what is now Lenoir County (*3*).

These early settlers established the town of Kingston in 1762. After the Revolution, in defiance to the Crown the zealous patriots changed the name to "Kinston."

In 1810 John Washington, a citizen of Kinston, wrote of Kinston and Lenoir County. He described the main products as corn and peas and some other crops of cotton, sweetpotatoes, and small grain. Most of the feed crops were used to produce the pork consumed by the residents, and the surplus was sold for cash. Some 16 or 17 grist mills operated at the time. Roads were few, and river traffic was limited to flatbottom boats drawing 18 to 36 inches of water.

The first rail transportation was completed between Kinston and Goldsboro in 1858.

During the Civil War several battles were fought on Lenoir County soil. Today, breastworks are visible in many areas. Bullets may be found in the fields of the county. A gunboat, "The Neuse," was built at White Hall, clad with iron at Kinston, and kept there to clear the Neuse of Union ships. It was scuttled when it was evident Kinston would be occupied by the Union (*3*).

Locally financed knitting mills began operating in Kinston in the late 1800's. Textiles is one of the largest industries.

The first tobacco warehouse was opened in 1895 by Jesse W. Grainger, who had given Lenoir County farmers some $500 worth of tobacco seed to encourage the growth of tobacco. Tobacco became the chief money crop in 1946. Some 12,000 acres have been planted annually in recent years.

Lenoir County today is diversified in farm production. Tobacco, corn, and soybeans are the main crops. Livestock provides income for many people.

Transportation and Industry

Transportation facilities include one commercial airline, two air taxi and charter airlines, two railway systems, 12 common carriers, three bus lines, and a modern highway system of primary and secondary roads. Major industries are textiles, tobacco processing, and meatpacking.

Community Facilities

Lenoir County Community College, a tax-supported, fully accredited junior college offering liberal arts studies and technical and vocational training, is located in Kinston.

The School of Nursing, Lenoir Memorial Hospital, offers a 3-year course in nursing. The school is fully accredited, and graduates may become registered nurses by passing the State Board examination.

Hardbarger Business College, a private commercial college offering advanced courses in typing, shorthand, filing, bookkeeping, business practices, and business machines, is located in Kinston.

The Lenoir County public school system consists of five high schools and nine elementary schools. There is no junior high school. The system has about 400 teachers and about 9,000 pupils. All schools are fully accredited or are being upgraded to meet these standards.

The Kinston city school system is composed of two high schools, two junior high schools, and five elementary schools. The system has about 300 teachers and about 6,500 pupils. All schools are fully accredited. Each school has a music teacher and a librarian. There is an art program in four of these schools.

Kinston presently has three parochial schools, two Roman Catholic schools, and one Baptist school.

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Glossary

Alluvium. Soil material, such as sand, silt, or clay, that has been deposited on land by streams.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern.

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.

Base saturation. The degree to which material that has base-exchange properties is saturated with exchangeable cations other than hydrogen, expressed as a percentage of the cation-exchange capacity.

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.

Colluvium. Soil material, rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

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.

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 upper 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.

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.

Genesis, soil. The manner in which a soil originates. Refers especially to the processes initiated by climate and organisms that are responsible for the development of the solum, or true soil, from the unconsolidated parent material, as conditioned by relief and age of landform.

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.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state. In engineering, a high liquid limit indicates that the soil has a high content of clay and a low capacity for supporting loads.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and their thickness and arrangement in the soil profile.

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.

Munsell notation. A system for designating color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with a hue of 10YR, a value of 6, and a chroma of 4.

Parent material. Disintegrated and partly weathered rock from which soil has formed.

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*.

Phase, soil. A subdivision of a soil, series, or other unit in the soil classification system made because of differences in the soil that affect its management but do not affect its classification in the natural landscape. A soil series, for example, may be divided into phases because of differences in slope, stoniness, thickness, or some other characteristic that affects its management but not its behavior in the natural landscape.

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.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from a semisolid to a plastic state.

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.

Series, soil. A group of soils developed from a particular type of parent material and having genetic horizons that, except for texture of the surface layer, are similar in differentiating characteristics and in arrangement in the profile.

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.

Site index. A numerical means of expressing the quality of a forest site that is based on the height of the dominant stand at an arbitrarily chosen age; for example the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years.

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.

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 characteristics 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.

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."

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.

Topsoil. A presumed fertile soil or soil material, or one that responds to fertilization, ordinarily rich in organic matter, used to topdress roadbanks, lawns, and gardens.

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.

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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 it belongs. The suitability of the soils for use as cropland and pasture is discussed in the soil descriptions and in the section "Use and Management of the Soils." The capability classification system is discussed on pages 29 and 30. For information about woodland groups, see the section beginning on page 31.

Map symbol	Mapping unit	Described on page	Capability unit or subclass	Woodland suitability group
			Symbol	Number
BB	Bibb soils, frequently flooded	6	Vw, frequently flooded	2w9
Bn	Blanton sand, 0 to 6 percent slopes	6	IIIs-1	3s2
Ch	Chewacla loam, frequently flooded	7	Vw, frequently flooded	1w8
Co	Coxville loam	8	IIIw-2, drained IVw, undrained	2w9
Cr	Craven fine sandy loam, 1 to 4 percent slopes	9	IIIe-1	3w2
Cv	Craven fine sandy loam, 4 to 8 percent slopes	9	IVe-1	3w2
Go	Goldsboro loamy sand, 0 to 2 percent slopes	9	IIw-1	2w8
Gr	Grifton sandy loam	11	IIIw-3, drained VIw, undrained	2w9
Jo	Johns sandy loam	11	IIw-2	2w2
JS	Johnston soils	12	IVw-4, drained VIIw, undrained	1w9
Ka	Kalmia loamy sand, 0 to 2 percent slopes	12	I-1	2o7
Kb	Kalmia loamy sand, 2 to 6 percent slopes	13	IIe-1	2o7
Ke	Kenansville loamy sand, 0 to 6 percent slopes	13	IIs-1	3s2
Kn	Kinston loam, frequently flooded	14	IIIw, drained Vw, undrained	1w9
La	Lakeland sand, 0 to 6 percent slopes	14	IVs-1	4s2
Le	Leaf loam	15	IVw-2	2w9
Ln	Lenoir loam	16	IIIw-4	2w8
Lo	Leon sand	16	IVw-1	4w2
Lu	Lumbee sandy loam	17	IIIw-3	2w9
Ly	Lynchburg sandy loam	18	IIw-2	2w8
Me	Meggett fine sandy loam	18	IIIw-2	1w9
Mu	Murville fine sand	19	IVw, drained VIIw, undrained	2w9
Na	Norfolk loamy sand, 0 to 2 percent slopes	20	I-1	2o1
Nb	Norfolk loamy sand, 2 to 6 percent slopes	20	IIe-1	2o1
Nc	Norfolk loamy sand, 6 to 10 percent slopes	20	IIIe-1	2o1
Pa	Pactolus loamy sand	21	IIIs-1	3w2
Pc	Pamlico muck	21	IVw-1, drained VIIw, undrained	4w3
Pe	Pantego loam	22	IIIw-3, drained VIw, undrained	1w9
Po	Pocalla loamy sand, 0 to 6 percent slopes	23	IIs-1	3s2
Pr	Portsmouth loam	23	IIIw-3, drained Vw, undrained	1w9
Ra	Rains sandy loam	24	IIIw-3, drained Vw, undrained	2w3
St	Stallings loamy sand	25	IIw-2	2w8
To	Torhunta loam	25	IIIw-3, drained VIw, undrained	2w9
Uo	Umbric Ochraqualfs	26	IIIw-3	1w9
Wb	Wagram loamy sand, 0 to 6 percent slopes	26	IIs-1	3s2
Wc	Wagram loamy sand, 6 to 10 percent slopes	27	IIIs	3s2
Wd.	Wagram loamy sand, 10 to 15 percent slopes	27	IVs	3s2
Wk	Wickham loamy sand, 1 to 6 percent slopes	28	IIe-1	2o7
Wn	Woodington loamy sand	28	IIIw-3, drained VIw, undrained	2w9

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