Series 1961, No. 3 Issued January 1964

SOIL SURVEY

Treutlen County, Georgia

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
in cooperation with
UNIVERSITY OF GEORGIA, COLLEGE OF AGRICULTURE
AGRICULTURAL EXPERIMENT STATIONS

HOW TO USE THE SOIL SURVEY REPORT

THIS SOIL SURVEY of Treutlen County, Ga., will serve several groups of readers. It will help farmers in planning the kind of management that will protect their soils and provide good yields; assist engineers in selecting sites for roads, buildings, ponds, and other structures; aid foresters in managing woodland; and add to our knowledge of soil science.

Locating soils

Use the index to map sheets at the back of this report to locate areas on the large map. The index is a small map of the county on which numbered rectangles have been drawn to show where each sheet of the large map is located. When the correct sheet of the large map has been found, it will be seen that boundaries of the soils are outlined and that there is a symbol for each kind of soil. All areas marked with the same symbol are the same kind of soil, wherever they appear on the map. The symbol is inside the area if there is enough room; otherwise, it is outside the area and a pointer shows where the symbol belongs. Suppose, for example, an area located on the map has the symbol (TqB). The legend for the detailed map shows that this symbol identifies Tifton loamy sand, 2 to 5 percent slopes. This soil and all others mapped in the county are described in the section "Descriptions of Soils."

Finding information

This report contains sections that will interest different groups of readers, as well as some sections that will be of interest to all.

Farmers and those who work with farmers can learn about the soils in the section "Descriptions of Soils" and then turn to the section "How To Use and Manage the Soils." In this way they first identify the soils on their farm and then learn how these soils can be managed and what yields can be expected. The "Guide to Mapping Units" at the back of the report will simplify use of the map and report. This guide lists each soil and land type mapped in the county and the page where each is described. It also lists, for each soil and land type, the capability unit and woodland suitability group, and the pages where each of them is described.

Foresters and others interested in woodland can refer to the section "Use of Soils for Woodland." In that section the soils in the county are grouped according to their suitability for trees, and factors affecting the management of woodland are explained.

Those interested in wildlife can refer to the section "Wildlife and Fish." This section gives information about the suitability of the soils in the county for supporting wildlife.

Engineers will want to refer to the section "Engineering Uses of Soils." Tables in that section show characteristics of the soils that affect engineering.

Persons interested in science will find information about how the soils were formed and how they are classified in the section "Formation, Morphology, and Classification of Soils."

Students, teachers, and other users will find information about soils and their management in various parts of the report, depending on their particular interest.

Newcomers in Treutlen County will be especially interested in the section "General Soil Map," where broad patterns of soils are described. They may also wish to read the section "General Nature of the County," which gives additional information about the county.

* * *

Fieldwork for this survey was completed in 1960. Unless otherwise indicated, all statements in the report refer to conditions in the county at that time. The soil survey of Treutlen County was made as part of the technical assistance furnished by the Soil Conservation Service to the Ohoopee River Soil Conservation District.

***Cover picture.*—Pines growing on a shallow Lakeland loamy sand. Gum for turpentine is taken from these trees.**

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Issued January, 1964

SOIL SURVEY OF TREUTLEN COUNTY, GEORGIA

REPORT BY ERWIN E. ISELEY, ASSISTED BY J. L. SULLIVAN, AND R. L. WILKES, SOIL CONSERVATION SERVICE

SOILS SURVEYED BY ERWIN E. ISELEY, J. L. SULLIVAN, AND D. D. BACON, SOIL CONSERVATION SERVICE

UNITED STATES DEPARTMENT OF AGRICULTURE IN COOPERATION WITH THE UNIVERSITY OF GEORGIA COLLEGE OF AGRICULTURE, AGRICULTURAL EXPERIMENT STATIONS

TREUTLEN COUNTY is in the southeastern-central part of Georgia (fig. 1). The county is bounded on the west by the Oconee River, and the Ohoopee River flows along the northeastern part. Soperton is the county seat.

The soils in this county are mainly sandy or loamy. Most of them are well suited to farming. The climate is also favorable, for the growing season is long and the winters are not severe. A large part of the county is wooded, and pulpwood and turpentine are valuable products taken from the forests. Many people who live in Treutlen County commute to jobs in counties nearby.

How Soils Are Named, Mapped, and Classified

Soil scientists made this survey to learn what kinds of soils are in Treutlen County, where they are located, and how they can be used.

They went into the county knowing they would find many soils they had already seen, and perhaps some they had not. As they traveled over the county, they observed steepness, length, and shape of slopes; size and speed of streams; kinds of native plants or crops; kinds of rock; and many facts about the soils. They dug or bored 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 to the rock material that has not been changed much by leaching or by roots of plants.

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 uniform procedures. To use this report efficiently, it is necessary to know the kinds of groupings most used in a local soil classification.

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. Norfolk and Tifton, 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 natural characteristics.

Many soil series contain soils that differ in the texture of their surface layer. According to such differences, separations called soil types are made. Within a series, all the soils having a surface layer of the same texture belong to one soil type. Tifton sandy loam and Tifton loamy sand are two soil types in the Tifton series. The difference in the texture of their surface layers is apparent from their names.

Some soil types vary so much in slope, degree of erosion, thickness of the surface layer, or some other feature affecting their use that practical suggestions about their management could not be made if they were shown on the soil map as one unit. Such soil types are divided into soil phases. The name of a soil phase indicates a feature that affects management. For example, Tifton loamy sand, 2 to 5 percent slopes, is one of several phases of Tifton

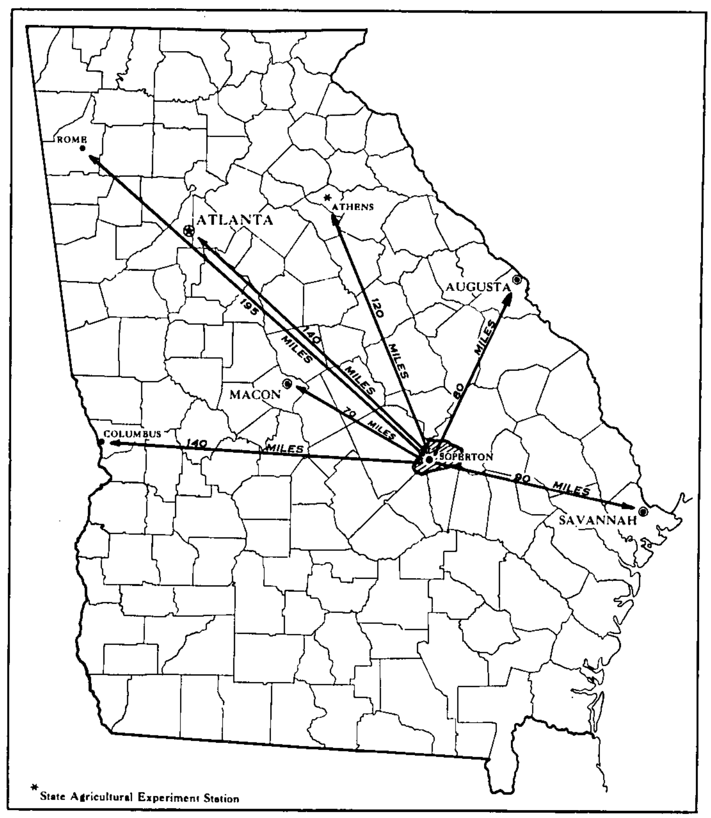

Figure 1.—Location of Treutlen County in Georgia.

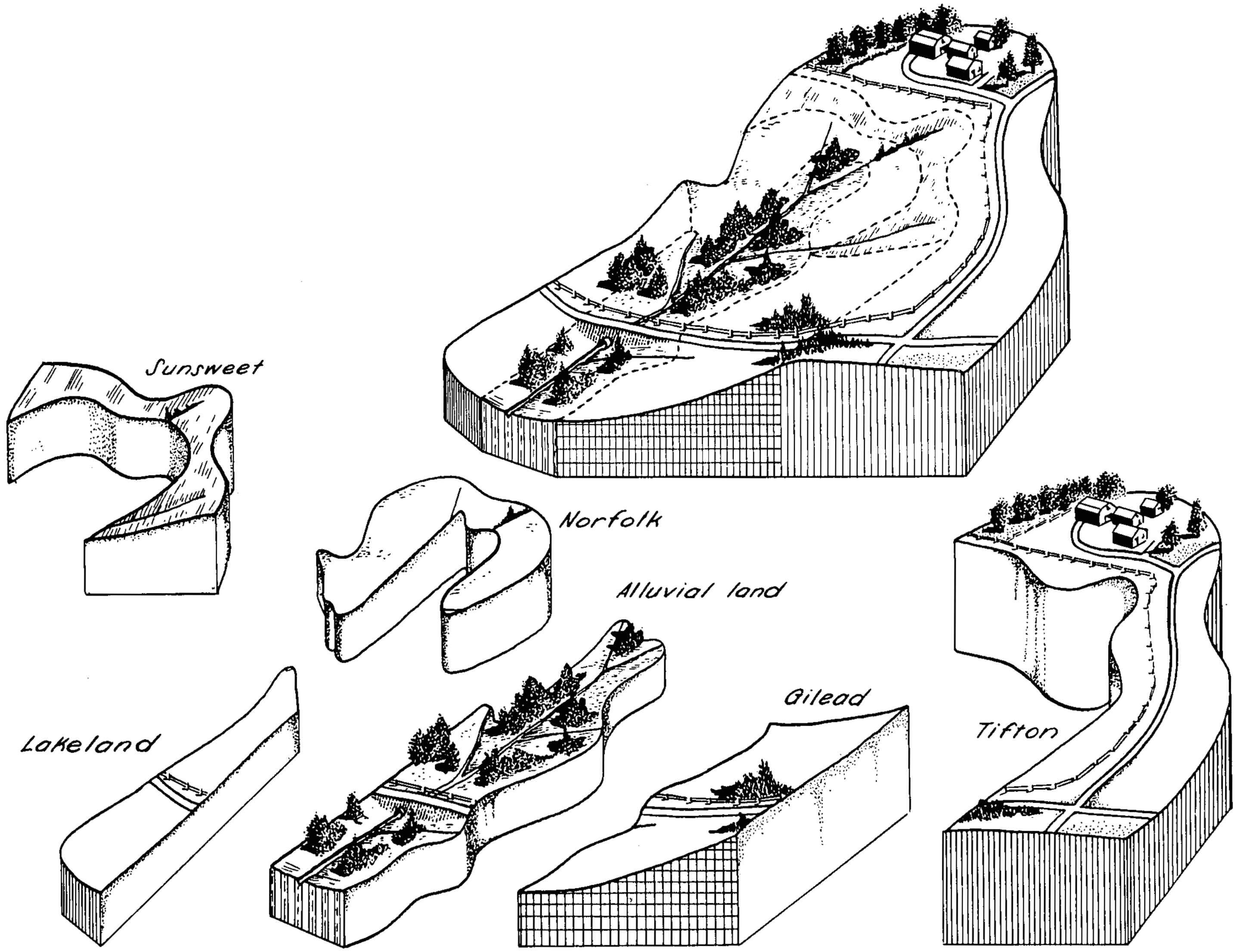

Figure 2.—**A sketch showing how areas of Tifton loamy sand, Gilead sand, Alluvial land, Norfolk loamy sand, Sunsweet sandy loam, and Lakeland sand fit together in a small landscape, similar to the pieces in a jigsaw puzzle. The boundary between adjacent areas is gradual rather than distinct.**

loamy sand, a soil type that, in this county, ranges from nearly level to gently sloping.

After a fairly detailed guide for classifying and naming the soils had been worked out, the soil scientists drew soil boundaries on aerial photographs. These soil boundaries are illustrated in figure 2. This sketch shows how areas of soil types fit together in a small landscape similar to the pieces in a jigsaw puzzle. The boundary between adjacent areas, however, is gradual rather than distinct. The full names of the soils illustrated are Tifton loamy sand, 2 to 5 percent slopes; Gilead sand, 5 to 8 percent slopes, eroded; Alluvial land; Norfolk loamy sand, 2 to 5 percent slopes; Sunsweet sandy loam, 5 to 12 percent slopes, eroded; and Lakeland sand, 0 to 5 percent slopes. All the soils in the sketch might occur within a single farm in the county, but not every farm has all of them.

Soil scientists used aerial photos for their base map because these photos show woodland, buildings, field borders, trees, and other details that greatly help in drawing boundaries accurately. The soil map in the back of this report was prepared from aerial photographs.

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

In preparing some detailed maps, the soil scientist has a problem of delineating areas where different kinds of soils are so intricately mixed, and so small in size, that it is not practical to show them separately on the map. Therefore, he shows this mixture of soils as one mapping unit and calls it a soil complex or an undifferentiated unit. Ordinarily, a soil complex or undifferentiated unit is named for the major soil series in it, for example, Gilead, Lakeland, and Cuthbert sands. Also, in most mapping, there are areas to be shown that are so rocky, so shallow, or so frequently worked by wind and water that they cannot be called soils. These areas are shown on a soil map like other mapping units, but they are given descriptive names, such as Sandy and clayey land or Alluvial land, and are called land types rather than soils.

Only part of the soil survey was done when the soil scientist had named and described the soil series and mapping units, and had shown the location of the mapping units on the soil map. The mass of detailed information he had recorded then needed to be presented in different ways for different groups of users, among them farmers, managers of woodland and rangeland, and engineers. To do this efficiently, the soil scientist had to consult with persons in other fields of work and jointly prepare with them groupings that would be of practical value to different users. Such groupings are the capability classes, subclasses, and units, designed primarily for those interested in producing the short-lived crops and tame pasture; range sites, for those using large tracts of native grass; woodland suitability groups, for those who need to manage wooded tracts; wildlife suitability groups, for those who want to manage wildlife; and the classifications used by engineers who build highways or structures to conserve soil and water.

General Soil Map

After study of the soils in a locality and the way they are arranged, it is possible to make a general map that shows several main patterns of soils, called soil associations. Such a map is the colored soil map in the back of this report. Each association, as a rule, contains a few major soils and several minor soils, in a pattern that is characteristic although not strictly uniform.

The soils within any one association are likely to differ from each other in some or in many properties; for example, slope, depth, stoniness, or natural drainage. Thus, the general soil map shows, not the kind of soil at any particular place, but several distinct patterns of soils. Each pattern, furthermore, contains several kinds of soils.

Each soil association is named for the major soil series in it, but, as already noted, soils of other series may also be present. The major soils of one soil association may also be present in another association, but in a different pattern.

The general map showing patterns of soils is useful to people who want a general idea of the soils, who want to compare different parts of a county, or who want to know the possible location of good-sized areas suitable for a certain kind of farming or other land use. Each of the four soil associations in Treutlen County is discussed in the following pages.

1. Alluvial Land-Swamp-Myatt Association

Very poorly drained to somewhat poorly drained soils of flood plains

Nearly level flood plains of rivers and creeks make up this association. The soils have formed in recent alluvium, and most of the areas receive a thin deposit of fresh soil material each time they are flooded. The association occupies about 15 percent of the county.

Alluvial land, Swamp, and the Myatt soil are dominant in this association. The soil material in Alluvial land and Swamp is variable, and the texture of the surface layer in the Myatt soil ranges from sand to silt loam. Alluvial land is along the larger branches and creeks. Swamp is the wet land along the larger creeks; it is covered with water, except during prolonged dry spells. The Myatt soil is in low areas or in slight depressions on the outer edges of the flood plains. It is poorly drained and occurs with moderately well drained to somewhat poorly drained Izagora and Wahee soils, which occupy a minor acreage in the association.

The poorly drained Leaf soil and somewhat poorly drained to moderately well drained Chewacla soil also occupy a part of this association. They are on the flood plains of the Oconee River.

Alluvial land occupies about 65 percent of this association; Swamp, 15 percent; and the Myatt soil, 10 percent. The Izagora, Wahee, Leaf, and Chewacla soils occupy the rest.

Most of the soils in this association are in capability class IV, but some are in capability classes II and VII. Nearly all the acreage is privately owned, and about 90 percent of it is wooded. The dominant kinds of trees are hardwoods or pines, but the kinds of trees in a given area are determined largely by the degree of wetness or by the way the forests have been managed.

Because the soils in this association are subject to flooding, harvest cutting is done only during dry periods. In areas where surface drainage is feasible, the growth of pines can be improved. Pastures and truck crops make excellent yields on the better drained areas. This association is important for growing trees for pulpwood, lumber, and gum for turpentine.

2. Norfolk-Tifton Association

Well-drained soils that have a sandy surface layer and a yellowish-brown, friable sandy clay loam subsoil

This association is on very gently sloping, broad interstream divides. The divides are dissected by numerous, small, shallow streams that originated within the boundaries of the association (fig. 3). This association occupies about 35 percent of the county.

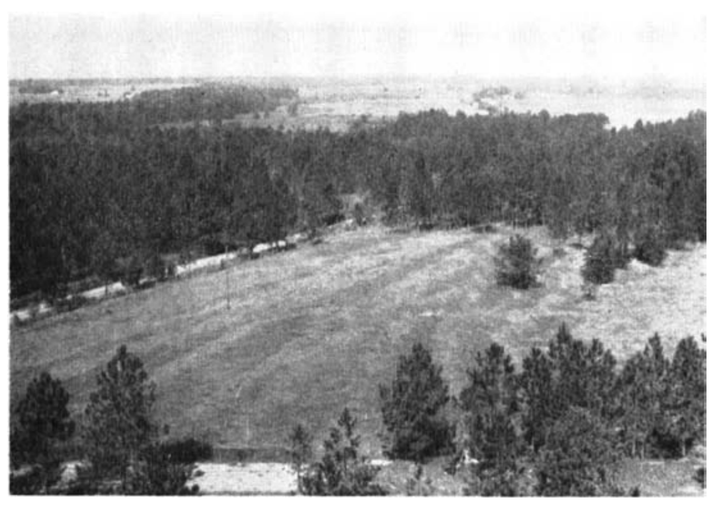

Figure 3.—A typical landscape in soil association 2.

Norfolk and Tifton soils are dominant in this association. These soils are well drained. They have a sandy surface layer and a subsoil of yellowish-brown, friable sandy clay loam. The Norfolk soils lack the many brownish pebbles that are characteristic of the Tifton soils. They are generally at a slightly lower elevation than the Tifton soils, and the areas are parallel to small streams. The Tifton soils are on the tops of interstream divides.

Minor soils in this association are the moderately well drained Goldsboro soil, the somewhat poorly drained Lynchburg soils, the poorly drained Rains soil, and Alluvial land. In some places the Goldsboro and Lynchburg soils occupy narrow strips in low areas parallel to the streams, and in other places they are on flats or in low areas between the streams. The Rains soil is in drainageways, and Alluvial land is on first bottoms. The Norfolk soils occupy about 60 percent of the association, and the Tifton soils, about 35 percent. The rest of the association is occupied by the minor soils.

Most of the acreage that is cultivated in this county is within this association. The soils are mainly in capability class II. They respond well to good management. Cotton, corn, and tobacco are the row crops that are commonly grown. Yields are generally high if the soils are adequately fertilized.

3. Gilead-Lakeland-Cuthbert-Sawyer-Norfolk Association

Chiefly well-drained soils that have a sandy surface layer and a variable subsoil

This association consists of short, narrow, very gently sloping ridgetops; gently sloping and sloping side slopes; numerous small drainageways; and narrow breaks that are parallel to the streams. The larger streams have cut a deep channel and have fairly wide flood plains. This association occupies about 30 percent of the county.

Undifferentiated units of Gilead, Lakeland, and Cuthbert sands and of Sawyer, Norfolk, and Cuthbert loamy sands are dominant in the association. In most of the acreage, the surface layer of the soils is loamy sand or sand. The soils in much of the acreage are well drained.

The Gilead, Lakeland, and Cuthbert sands are on ridgetops and on the upper parts of the side slopes. The Lakeland soils are generally on the less sloping ridgetops. The Gilead soils are well drained and have a subsoil of yellowish-brown, compact sandy clay loam. The Lakeland soils are excessively drained and are sandy to a depth of 40 to more than 72 inches. The Cuthbert soils have a subsoil of mottled clay.

The Sawyer, Norfolk, and Cuthbert loamy sands are also on ridgetops and side slopes, but much of their acreage is on the lower parts of the slopes adjacent to drainageways. The Sawyer soils are moderately well drained, and they have a subsoil of mottled sandy clay loam that overlies sandy clay at a depth of about 20 inches. The Norfolk soils are well drained and have a subsoil of friable sandy clay loam.

The Boswell, Sunsweet, and Susquehanna soils, and Alluvial land occupy a minor part of this association. These have mostly a clayey subsoil. Most of the areas are on breaks, but Alluvial land is on flood plains.

Gilead, Lakeland, and Cuthbert sands make up about 50 percent of the association, and Sawyer, Norfolk, and Cuthbert loamy sands make up about 30 percent. The rest consists of Boswell, Sunsweet, and Susquehanna soils, and Alluvial land.

The soils in many areas of this association are intricately mixed, and it was not feasible to map them separately. They vary widely in characteristics. In much of the acreage, the root zone is shallow, or less than 18 to 24 inches deep, because of the compact, clayey subsoil. The Norfolk and Lakeland soils, however, have a deeper root zone. The limited root zone in some areas and the sandy texture in other areas causes most of the soils to have low available moisture capacity. There is also a severe hazard of erosion in much of the acreage.

The soils in this association are mainly in capability classes III, IV, and VI. Some areas have never been cleared, and most of the areas that have been cleared and cultivated have reverted to pines or are in pasture. Most of the acreage is used to grow pine trees that produce pulpwood, saw timber, and gum for turpentine.

4. Lakeland-Plummer Association

Excessively drained, sandy soils on ridges and poorly drained soils on flats

This association consists mainly of narrow to fairly broad, very gently sloping ridgetops and of gently sloping or sloping side slopes. There are numerous flats, and a number of streams have originated within the association. The streams have not cut deeply, and they have fairly broad flood plains. This association occupies about 20 percent of the county.

Lakeland and Plummer soils are dominant within this association. In much of the acreage, sandy material extends to a considerable depth, the soils are somewhat excessively drained, and they have low available moisture capacity.

The Lakeland soils are somewhat excessively drained and are on ridgetops and side slopes. The Plummer soils are poorly drained and are on flats and around the heads of streams. The Klej soil is moderately well drained or somewhat poorly drained and is in narrow, nearly level areas between areas of Lakeland and Plummer soils. In the Lakeland, Plummer, and Klej soils, sand extends to a depth of 3 to 6 feet and overlies sandy clay. These soils differ mainly in drainage, which influences the growth and type of vegetation.

Lakeland soils occupy about 80 percent of the association, the Plummer soils, about 15 percent; and the Klej soils, about 5 percent.

The vegetation on the Lakeland soils consists of a thin stand of pines, a fairly thick growth of scrub oaks, and a sparse understory of wiregrass and shrubs. On the Plummer soils is a thick stand of pines and a vigorous growth of shrubs and grasses that tolerate a large amount of water. On the Klej soil there is a fairly thick stand of pines, widely scattered scrub oaks, and shrubs that tolerate a large amount of water.

This association is not well suited to cultivation. Drainage is somewhat excessive in the Lakeland soils, and poor in the Plummer soils. The Klej soil is moderately well suited to row crops, especially to tobacco and truck crops. Most of its acreage, however, is in pines because it generally occurs in small, isolated areas.

Most of the soils of this association are in capability classes IV, V, VI, and VII. Nearly all of the areas that were formerly cultivated have been abandoned or have reverted to pines. Most of the acreage is privately owned and is used to grow trees for pulpwood, lumber, and gum for turpentine.

Descriptions of Soils

This section is provided for those who want detailed information about the soils in the county. For more general information about the soils, the reader can refer to the section "General Soil Map" in which the broad patterns of soils are discussed. The location and distribution of the single soils are shown on the soil map near the back of this report. Their approximate acreage and proportionate extent are given in table 1.

An important part of this section is the series description. The series description includes statements about the general nature of the soils in the series, as well as about the relationship of those soils to soils in other series. It also contains statements about the relief, drainage, natural vegetation, and use of the soils.

Following the series description, there are descriptions of the single soils in each series. All the soils in one series that have the same texture are together. The description of the first soil in each series contains a profile description that is generally representative of the soils in the series. The soils that follow, as a rule, are discussed in relation to the first soil described in the series. It will be helpful to the reader to refer to the section "How Soils Are Named, Mapped, and Classified" where series, types, phases, and other special terms used in describing the soils are defined. Other terms used in describing the soils can be found in the Glossary.

Alluvial Land

Alluvial land consists of layers of sediments that were deposited on level or nearly level flood plains by water. The soil material in most areas has remained in place long enough for plants to become established. The de-

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

Soil	Area	Extent
	Acres	*Percent*
Alluvial land	18, 355	14. 8
Boswell sandy loam, 2 to 5 percent slopes	555	. 4
Boswell sandy loam, 2 to 5 percent slopes, eroded	535	. 4
Boswell sandy loam, 5 to 8 percent slopes, eroded	695	. 6
Chewacla silt loam	2, 055	1. 7
Gilead, Lakeland, and Cuthbert sands, 2 to 5 percent slopes	1, 680	1. 4
Gilead, Lakeland, and Cuthbert sands, 2 to 5 percent slopes, eroded	3, 420	2. 8
Gilead, Lakeland, and Cuthbert sands, 5 to 8 percent slopes	1, 390	1. 1
Gilead, Lakeland, and Cuthbert sands, 5 to 8 percent slopes, eroded	4, 200	3. 4
Gilead, Lakeland, and Cuthbert sands, 8 to 12 percent slopes, eroded	420	. 3
Gilead, Lakeland, and Cuthbert coarse sands, 2 to 5 percent slopes	1, 650	1. 3
Gilead, Lakeland, and Cuthbert coarse sands, 5 to 8 percent slopes	735	. 6
Goldsboro loamy sand, thick surface, 2 to 5 percent slopes	195	. 2
Izagora soils	430	. 3
Klej loamy fine sand, 0 to 2 percent slopes	225	. 2
Lakeland sand, 0 to 5 percent slopes	16, 750	13. 5
Lakeland sand, 5 to 8 percent slopes	2, 190	1. 8
Lakeland sand, 8 to 12 percent slopes	285	. 2
Lakeland loamy sand, shallow, 2 to 5 percent slopes	1, 925	1. 6
Lakeland coarse sand, deep, 2 to 5 percent slopes	230	. 2
Lakeland coarse sand, deep, 5 to 12 percent slopes	345	. 3
Leaf fine sandy loam	1, 490	1. 2
Lynchburg loamy sand, thick surface, 0 to 2 percent slopes	375	. 3
Lynchburg loamy sand, thick surface, 2 to 5 percent slopes	230	. 2
Myatt sandy loam	2, 345	1. 9
Norfolk loamy sand, 2 to 5 percent slopes	4, 855	3. 9
Norfolk loamy sand, 0 to 2 percent slopes	505	. 4
Norfolk loamy sand, 2 to 5 percent slopes, eroded	3, 340	2. 7
Norfolk loamy sand, 5 to 8 percent slopes, eroded	390	. 3
Norfolk loamy sand, thick surface, 0 to 2 percent slopes	1, 065	0. 9
Norfolk loamy sand, thick surface, 2 to 5 percent slopes	15, 270	12. 3
Norfolk loamy sand, thick surface, 5 to 8 percent slopes	1, 290	1. 0
Plummer sand, 0 to 2 percent slopes	3, 030	2. 4
Plummer sand, 2 to 5 percent slopes	1, 285	1. 0
Rains sandy loam, thick surface, 2 to 5 percent slopes	2, 605	2. 1
Sandy and clayey land	745	. 6
Sawyer, Norfolk, and Cuthbert loamy sands, 2 to 5 percent slopes	835	. 7
Sawyer, Norfolk, and Cuthbert loamy sands, 2 to 5 percent slopes, eroded	1, 730	1. 4
Sawyer, Norfolk, and Cuthbert loamy sands, 5 to 8 percent slopes	430	. 3
Sawyer, Norfolk, and Cuthbert loamy sands, 5 to 8 percent slopes, eroded	1, 045	. 8
Sunsweet sandy loam, 5 to 12 percent slopes, eroded	350	. 3
Susquehanna sandy loam, 2 to 5 percent slopes	425	. 3
Susquehanna sandy loam, 2 to 5 percent slopes, eroded	265	. 2
Susquehanna sandy loam, 5 to 8 percent slopes	680	. 5
Susquehanna sandy loam, 5 to 8 percent slopes, eroded	555	. 4
Swamp	3, 175	2. 6
Tifton loamy sand, 2 to 5 percent slopes	7, 140	5. 8
Tifton loamy sand, 0 to 2 percent slopes	255	. 2
Tifton loamy sand, 2 to 5 percent slopes, eroded	6, 685	5. 4
Tifton loamy sand, 5 to 8 percent slopes, eroded	1, 125	. 9
Tifton loamy sand, thick surface, 2 to 5 percent slopes	475	. 4
Tifton sandy loam, thin solum, 2 to 5 percent slopes, eroded	790	. 6
Tifton sandy loam, thin solum, 5 to 8 percent slopes, eroded	930	. 8
Wahee fine sandy loam	185	. 1
Total	124, 160	100. 0

posits are too recent, however, for a soil profile to have had time to develop.

Alluvial land (0 to 2 percent slopes) (Acn).—This miscellaneous land type is made up of somewhat poorly drained and poorly drained, strongly acid sediments deposited by streams. The soil material varies from place to place, but in most places it is stratified. In some areas sandy material is underlain by a finer textured material. In others the finer textured material overlies sandy material. In a few places the soil material is uniform to a depth of more than 10 feet.

In the upper part of the soil, the color ranges from black to light gray, and the texture, from silt loam to sand. A thin layer of organic matter has accumulated on the surface in some areas. The natural fertility is low.

Alluvial land occurs along the larger branches and small creeks. It is commonly adjacent to the Plummer and Rains soils, which are on flats and at the head of streams. In some places it is adjacent to Swamp. This land type is more variable in color and texture than the Plummer and Rains soils, and it is flooded for longer periods.

This land type occupies a large acreage, but it has little value for agriculture. The land is well suited to trees, and most of the acreage is in forest. The natural vegetation is mixed hardwoods and pines and an understory of gallberry. Cypress, sweetgum, blackgum, slash pine, and scrub trees that tolerate water are the most common. Because of the poor drainage, frequent flooding, and the constant shifting of the stream channel, no attempt has been made to develop this land for any use other than for forest. Capability unit IVw–2; woodland suitability group 4; wildlife group 5.

Boswell Series

The Boswell series consists of moderately well drained soils that developed in acid clays and sandy clays on uplands of the Coastal Plain. In the less eroded areas, these soils have a surface layer of grayish-brown sandy loam and a subsoil of yellowish-red to red, plastic clay. Mottled, plastic clay is at a depth of about 18 inches. The slope ranges from 2 to 8 percent.

These soils are low in natural fertility and contain little organic matter. They are strongly acid.

The Boswell soils occur with the Gilead soils on very gently undulating to undulating uplands. In many places they are adjacent to Susquehanna soils, which are more strongly sloping, and to Sawyer soils, which are in slight depressions. The Boswell soils have a finer textured, more plastic subsoil than the Gilead soils. They have a distinct, rather thin B horizon that is lacking in the Susquehanna soils. The Boswell soils are somewhat better drained than the Sawyer soils, and they have a redder, finer textured subsoil.

The Boswell soils occur mainly in small areas in the northern part of the county. Most of the acreage is wooded. The natural vegetation is mostly mixed pines and hardwoods, and the understory is wiregrass. The common trees are shortleaf, longleaf, and loblolly pines, sweetgum, blackgum, and some scrub oak. These soils are over dense, plastic clay, which limits their suitability for cultivation.

Boswell sandy loam, 2 to 5 percent slopes (BqB).—This moderately well drained soil of the uplands has a subsoil of yellowish-red to red, plastic clay. The following describes a typical profile of this soil:

0 to 8 inches, grayish-brown, very friable sandy loam.
8 to 16 inches, yellowish-red, plastic clay that has strong, blocky structure.
16 to 36 inches +, mottled dark-red, light-gray, and yellowish-brown, plastic, dense clay.

In cultivated areas the color of the plow layer is light brownish gray. The surface layer in some places is loamy fine sand. The subsoil ranges from yellowish red to red in color, from sandy clay to clay in texture, and from 4 to 16 inches in thickness. Depth to the mottled clay ranges from 14 to 24 inches.

This soil is strongly acid. It is low in natural fertility and low in organic matter. The surface layer has good tilth. The clay subsoil is slowly permeable. It is very sticky when wet, and it hardens and cracks when it dries. The clay restricts the depth to which roots can grow, and it thereby limits the moisture available to plants.

This soil is fairly well suited to cultivation if it is well managed. When the soil is cultivated, however, erosion is a moderate hazard. The soil is well suited to permanent pasture and to pines. Capability unit IIIe–3; woodland suitability group 3; wildlife group 1.

Boswell sandy loam, 2 to 5 percent slopes, eroded (BqB2).—This soil is more eroded than Boswell sandy loam, 2 to 5 percent slopes, and it has a thinner, somewhat finer textured surface layer. In areas where the soil has been cultivated, the surface layer is reddish yellow. Severely eroded patches are common, and in these the yellowish-red clay that was formerly part of the subsoil is exposed. Infiltration is slower than in the less eroded soil, and tilth is generally poor. Part of the acreage is still cultivated, but much of it has reverted to pines. Capability unit IIIe–3; woodland suitability group 3; wildlife group 1.

Boswell sandy loam, 5 to 8 percent slopes, eroded (BqC2).—The surface layer of this soil is somewhat finer textured than that of Boswell sandy loam, 2 to 5 percent slopes. It is reddish yellow and is 4 to 6 inches thick. Mottled, plastic clay is about 12 inches from the surface. Severely eroded patches are common. In these the yellowish-red clay that was formerly part of the subsoil is exposed. Infiltration is slower than in the less eroded areas, and tilth is poor. This soil has been cultivated, but much of the acreage has reverted to pines. The soil is poorly suited to regular cultivation, but it can be used occasionally to grow cultivated crops. Capability unit IVe–3; woodland suitability group 3; wildlife group 4.

Chewacla Series

The Chewacla series consists of moderately well drained to somewhat poorly drained soils on the lower flood plains of the Oconee River. The soils developed in sediments that were washed from the Piedmont Plateau and were deposited by the Oconee River. They have a surface layer of dark-brown silt loam. Their subsoil is yellowish-brown silty clay loam and is mottled at a depth of 10 to 24 inches. The slope ranges from 0 to 2 percent. These soils are moderately low in natural fertility and in organic matter. They are strongly acid.

The Chewacla soils occur with the Leaf soils, but they are somewhat better drained and less grayish than the Leaf soils. They also have a coarser textured subsoil and a greater depth to mottles.

The natural vegetation on the Chewacla soils is mostly hardwoods and some scattered pines. All the acreage is wooded. The most common trees are loblolly and spruce pines, water oak, red oak, white oak, sweetgum, and blackgum. These soils are subject to flooding. The hazard of overflow and the high water table limit their suitability for cultivation.

Chewacla silt loam (0 to 2 percent slopes) (Csl).—This is the only Chewacla soil mapped in the county. It is a moderately well drained to somewhat poorly drained soil and is on flood plains. The following describes a typical profile of this soil:

0 to 6 inches, dark-brown, friable silt loam.
6 to 19 inches, yellowish-brown, firm silty clay loam mottled with yellow in the lower part; massive.
19 to 42 inches, yellowish-brown, firm silty clay that has many, medium, distinct mottles of red and gray; the gray color increases with increasing depth; massive.

The color of the surface layer ranges from brown to dark brown, and the texture of the surface layer ranges to fine sandy loam in a few areas. The texture of the subsoil ranges from sandy loam to silty clay. Depth to mottling ranges from 10 to 24 inches. Some areas contain fine mica flakes.

Mapped with this soil are areas of Leaf soils where mottles are within 10 inches of the surface. These areas are too small to be mapped separately.

Chewacla silt loam is strongly acid. It is moderately low in natural fertility and in organic matter. It has moderate available water capacity and moderately slow permeability.

Under cultivation, this soil responds well to good management. It is suited to crops, especially to corn and to forage plants grown in improved pastures. Periodic flooding and the high water table, however, reduce yields. Capability unit IIIw-2; woodland suitability group 4; wildlife group 3.

Cuthbert Series

The soils in the Cuthbert series are moderately well drained and are strongly acid. They formed in beds of clay that contain thin lenses of sand.

The Cuthbert soils are not mapped separately in this county but are mapped in undifferentiated units with the Gilead and Lakeland soils. They are similar to the Gilead soils, but they have a mottled subsoil. The Cuthbert soils are moderately well drained, and the Lakeland soils are excessively drained because they have a sandy texture throughout. The Cuthbert soils have a subsoil of mottled sandy clay loam instead of sand. A typical profile of a Cuthbert soil is described under the mapping unit, Gilead, Lakeland, and Cuthbert sands, 2 to 5 percent.

Gilead Series

The Gilead series consists of well-drained, strongly acid soils developed in sediments of the Coastal Plain. The sediments consist of sandy clay or sandy clay loam. The surface layer commonly is grayish-brown sand, and the subsoil is yellowish-brown, compact sandy clay loam. Mottles occur at a depth of 19 to 28 inches. The slope ranges from 2 to 12 percent.

These soils contain little organic matter. They are low in natural fertility.

The Gilead soils occur with the Lakeland and Cuthbert soils, but they are less sandy than the Lakeland soils. Their surface layer resembles that of the Cuthbert soils, but their subsoil is free of mottles. In places the Gilead soils are adjacent to the Norfolk and Tifton soils, but they have a thinner, more compact subsoil than the Norfolk soils. They lack the numerous iron concretions that are common in the Tifton soils.

Much of the acreage of Gilead soils is wooded. The natural vegetation is chiefly pines, scattered hardwoods, and an understory of wiregrass. Fields that were formerly cultivated but that have since been abandoned commonly revert to slash, loblolly, and longleaf pines.

The Gilead soils are not mapped separately in this county but are mapped in undifferentiated units with the Lakeland and Cuthbert soils.

Gilead, Lakeland, and Cuthbert sands, 2 to 5 percent slopes (GAB).—The soils in this mapping unit are somewhat similar, occur in intricate mixtures, and in many places are covered by a thick stand of trees. Therefore, it was impractical to map them separately. All of these soils developed in thick beds of sediments of the Coastal Plain.

The Gilead and Cuthbert soils have a surface layer that is similar, but the Cuthbert soil is only moderately well drained. The Gilead soil has a subsoil of sandy clay loam and is free of mottles to a depth of about 19 inches, but the Cuthbert soil has a subsoil of mottled sandy clay loam. The Lakeland soil is excessively drained and has a sandy texture throughout.

The Gilead soil makes up about 40 percent of this mapping unit; the Lakeland soil, about 35 percent; and the Cuthbert soil, about 25 percent. Some areas consist only of the Gilead soil, others consist only of the Lakeland soil, and still others consist only of the Cuthbert soil. Most areas contain all three soils.

The following describes a typical profile of a Gilead soil:

0 to 15 inches, grayish-brown to light yellowish-brown, very friable sand that contains a few, small, white, quartz pebbles.
15 to 25 inches, yellowish-brown, compact sandy clay loam that has weak, subangular blocky structure; the mottles in the lower part of the horizon are light gray, strong brown, and red.
25 to 40 inches +, yellowish-brown, firm sandy clay with many, prominent mottles of red, light gray, and light olive brown.

The following describes a typical profile of a Cuthbert sand:

0 to 3 inches, dark-gray sand.
3 to 15 inches, reddish-yellow sand.
15 to 40 inches, mottled strong-brown to reddish-yellow, compact sandy clay that has medium, subangular blocky structure.
40 to 50 inches, mottled light-gray, compact clay.

A representative profile of a Lakeland sand is described under the Lakeland series.

The soils of this unit are strongly acid and are low in organic matter and in natural fertility. They are moderately responsive to good management, however, especially to fertilization. These soils have good tilth and can be

Figure 4.—**Stand of planted pines on Gilead, Lakeland, and Cuthbert sands, 2 to 5 percent slopes, eroded. The trees are 4 years old.**

worked within a wide range of moisture content. The effective rooting depth is shallow in much of the acreage, but it ranges to deep in the Lakeland soils. Water moves into these soils rapidly, but permeability is slow in the subsoil of the Gilead and Cuthbert soils and rapid in the Lakeland soil. The available moisture capacity is low, especially in the Lakeland soil.

Although most of this mapping unit is in trees, the soils in much of the acreage are moderately well suited to row crops. In the areas used for row crops, only moderate yields are obtained because of the low available moisture capacity. When the soils are cultivated, the hazard of erosion is slight to moderate. Capability unit IIe–4; woodland suitability group 3; wildlife group 1.

Gilead, Lakeland, and Cuthbert sands, 2 to 5 percent slopes, eroded (GAB2).—The surface layer of these soils is thinner and lighter colored than that in Gilead, Lakeland, and Cuthbert sands, 2 to 5 percent slopes. Depth to mottled clay is less, and the rate of infiltration is slower. The surface layer commonly is light yellowish-brown to brownish-yellow sand that is 6 to 10 inches thick. Generally, there are small areas where the former subsoil is exposed. Shallow gullies are common in places.

Most of the acreage has been cultivated intensively in the past, but much of the acreage has reverted to pines or is in improved pasture (fig. 4). When the soils are cultivated, the hazard of erosion is moderate to severe. Capability unit IIIe–4; woodland suitability group 3; wildlife group 1.

Gilead, Lakeland, and Cuthbert sands, 5 to 8 percent slopes (GAC).—These soils have stronger slopes and, in places, a slightly thicker and coarser textured surface layer than Gilead, Lakeland, and Cuthbert sands, 2 to 5 percent slopes. Most of the acreage is in pines. These soils have fairly good tilth and are suited to many different crops. Yields are low, generally, because of the low available moisture capacity. When the soils are cultivated, however, there is a moderate to severe hazard of erosion. Capability unit IIIe–4; woodland suitability group 3; wildlife group 1.

Gilead, Lakeland, and Cuthbert sands, 5 to 8 percent slopes, eroded (GAC2).—These soils have stronger slopes and a thinner surface layer than Gilead, Lakeland, and Cuthbert sands, 2 to 5 percent slopes. Depth to mottled clay is less, and the rate of infiltration is slower. The surface layer is commonly light yellowish brown and is 4 to 8 inches thick. The former subsoil is exposed in many places, and shallow gullies are common.

Most of the acreage in this mapping unit has been cultivated. Where the soils have not been protected from erosion, the hazard of erosion has increased considerably. Much of the acreage has been planted to improved pasture grasses and pines. Capability unit IVe–4; woodland suitability group 3; wildlife group 1.

Gilead, Lakeland, and Cuthbert sands, 8 to 12 percent slopes, eroded (GAD2).—These soils have much stronger slopes and a thinner surface layer than Gilead, Lakeland, and Cuthbert sands, 2 to 5 percent slopes. Also, mottles are nearer the surface.

In some areas too small to be mapped separately, these soils are severely eroded, shallow gullies are common, and the texture of the surface layer ranges to sandy clay loam.

Because of the rapid runoff and the serious hazard of erosion, the soils of this mapping unit are not suited to cultivated crops. Although most of the acreage is in pines, the soils can be used for grazing. Capability unit VIe–2; woodland suitability group 3; wildlife group 4.

Gilead, Lakeland, and Cuthbert coarse sands, 2 to 5 percent slopes (GBB).—These soils are similar to Gilead, Lakeland, and Cuthbert sands, 2 to 5 percent slopes, but their surface layer is mainly coarse sand and is 18 to 30 inches thick. In places the surface layer is coarse gravelly sand, and there are many, small, white, quartz pebbles throughout the profile.

The rate of infiltration is somewhat rapid. Runoff is very slow.

The coarse texture of the surface layer causes these soils to have low available moisture capacity. As a result, crop yields are low. Most of the acreage is in pines and scattered hardwoods. A small acreage is in improved pasture. Capability unit IIIs–1; woodland suitability group 3; wildlife group 2.

Gilead, Lakeland, and Cuthbert coarse sands, 5 to 8 percent slopes (GBC).—These soils have stronger slopes and a thicker, coarser textured surface layer than Gilead, Lakeland, and Cuthbert sands, 2 to 5 percent slopes. The surface layer ranges from 18 to 30 inches or more in thickness. Normally, there are many, small, white, quartz pebbles throughout the profile. The texture of the surface layer ranges from loamy sand to gravelly sand.

Mapped with these soils are some small, severely eroded areas where the surface layer is 6 to 10 inches thinner than that in the typical profile. Shallow gullies are common in these eroded areas.

Because of the rapid rate of infiltration in Gilead, Lakeland, and Cuthbert coarse sands, 5 to 8 percent slopes, runoff is generally slow. The sandy texture of the soil material in the root zone causes the available moisture capacity to be low and limits the usefulness of these soils for cultivation. Nearly all the acreage is in woods. Capability unit IVs–1; woodland suitability group 3; wildlife group 2.

Goldsboro Series

The Goldsboro series consists of moderately well drained soils developed in sediments of the Coastal Plain. These sediments consist of acid sandy loam and acid sandy clay loam. The soils have a surface layer of grayish-brown loamy sand that grades to light yellowish brown. Their subsoil is brownish-yellow, friable sandy clay loam. Gray and red mottles occur at a depth of about 26 inches. The slope ranges from 2 to 5 percent.

These soils contain little organic matter and are low in natural fertility. They are strongly acid.

The Goldsboro soils occur with the Lynchburg soils on flats at the foot of very gentle slopes. They are at a slightly higher elevation than the Lynchburg soils. They also occur with the Rains soils, which are in depressions and in the adjacent drainageways. The Goldsboro soils are better drained than the Lynchburg and Rains soils, and the lower part of their subsoil is less gray.

The Goldsboro soils occur in small, scattered areas throughout the county. Most of the acreage is wooded. The natural vegetation is chiefly pines and scattered hardwoods, mainly slash, longleaf, and loblolly pines, sweetgum, blackgum, and scrub oak. Gallberry bushes and wiregrass make up the understory. There is a slight hazard of erosion on these soils.

Goldsboro loamy sand, thick surface, 2 to 5 percent slopes (GnB).—This is the only Goldsboro soil mapped in this county. It is moderately well drained and has a surface layer of thick loamy sand. The subsoil is mottled in the lower part and is sandy clay loam. The following describes a typical profile of this soil:

0 to 22 inches, grayish-brown, very friable loamy sand that grades to light yellowish brown in the lower part.
22 to 42 inches, brownish-yellow, very friable sandy clay loam that has a few, faint mottles of red and gray.
42 to 50 inches +, gray, friable sandy clay loam that has many, distinct mottles of brownish yellow and red.

In areas that have been cultivated, the plow layer is lighter gray than that in areas that have not been cultivated. In most places the surface layer is loamy sand and is 18 to 30 inches thick, but in places it is loamy fine sand. The subsoil ranges from 12 to 24 inches in thickness.

This soil has a deep root zone. It is permeable to a considerable depth, and it has moderate available moisture capacity. The surface layer has good tilth. This soil responds well to good management. It is well suited to tobacco and most cultivated crops, and to improved pasture and pine trees. The hazard of erosion is slight. Capability unit IIe-3; woodland suitability group 2; wildlife group 3.

Izagora Series

The Izagora series consists of moderately well drained soils on stream terraces. These soils have a grayish-brown sandy loam surface layer and a yellowish-brown sandy clay loam subsoil that is mottled in the lower part. They developed in thin beds of sandy alluvium that overlies clayey alluvium. The alluvium washed mainly from such soils as the Norfolk, Tifton, Boswell, and Susquehanna. Depth to mottles ranges from 12 to 30 inches. The slope ranges from 0 to 2 percent.

These soils are low in natural fertility and contain little organic matter. They are strongly acid.

The Izagora soils are on the outer edges of stream terraces, as are also the Wahee soils. The subsoil of the Izagora soils is coarser textured and more friable than that of the Wahee soils. Many areas of Izagora soils lie next to Myatt soils, which are low, wet, and poorly drained. They are also near the Leaf soils, which are on wet, low terraces. The Izagora soils are better drained than the Myatt or the Leaf soils.

The Izagora soils occupy areas of different sizes on terraces along rivers and the larger creeks. The natural vegetation is mainly pine and scattered hardwood trees and an understory of gallberry bushes and wiregrass. About 40 percent of the acreage is cultivated, and the remainder is in trees. The common trees are slash and loblolly pines, blackgum, water oak, maple, and hickory. Cultivation is limited by position and drainage.

Izagora soils (0 to 2 percent slopes) (Izs).—One mapping unit of Izagora soils is shown on the soil map. The Izagora soils of this unit are moderately well drained and are on stream terraces. The following describes a typical profile of an Izagora sandy loam:

0 to 10 inches, grayish-brown, very friable sandy loam.
10 to 28 inches, yellowish-brown, friable sandy clay loam.
28 to 42 inches +, mottled yellowish-brown, red, and gray, friable sandy clay that has subangular blocky structure.

The color of the surface layer ranges from dark gray to dark grayish brown or grayish brown. In general, the texture of the surface layer is sandy loam to loamy sand, but locally it is fine sand or loamy fine sand. The thickness of the surface layer ranges from 10 to 28 inches. The color of the subsoil ranges from brownish yellow to yellowish brown, and the texture of the subsoil ranges from sandy loam to sandy clay. Depth to mottling ranges from 12 to 30 inches.

These soils have slow runoff and moderate to moderately rapid permeability. They have moderate available moisture capacity. During periods of high rainfall, they are subject to flooding. The plow layer has good tilth, and the soils respond well to good management. Where simple drainage practices are feasible, good crops could be produced and improved pastures could be established. Capability unit IIw-2; woodland suitability group 2; wildlife group 3.

Klej Series

The Klej series consists of soils developed in sandy sediments of the Coastal Plain. The soils have a surface layer of dark-gray loamy fine sand that is underlain by pale-yellow loamy fine sand. Faint mottles are at a depth of 18 to 30 inches. The slope ranges from 0 to 2 percent.

These soils are low in natural fertility and in organic matter. They are strongly acid.

The Klej soils occur at the foot of gentle slopes and on flats that connect streams. They are somewhat poorly drained to moderately well drained. These soils are less gray and are slightly better drained than the Plummer soils, and they are more poorly drained than the Lakeland soils. They are sandy and have less distinct horizons than the Lynchburg and Izagora soils.

The natural vegetation is mostly pines, some mixed hardwoods, and an understory of gallberry bushes. Most of the acreage is in sweetgum, blackgum, and longleaf, shortleaf, loblolly, and slash pines, but there is an occasional blackjack oak. If some drainage is provided, these soils are well suited to such crops as tobacco and corn.

Klej loamy fine sand, 0 to 2 percent slopes (KgA).—This is the only Klej soil mapped in the county. It is a moderately well drained to somewhat poorly drained, sandy soil that has rapid permeability. The following describes a typical profile of this soil:

0 to 28 inches, dark-gray to gray, very friable loamy fine sand.
28 to 40 inches, faintly mottled pale-yellow and white, friable loamy sand.
40 to 52 inches, distinctly mottled light-gray and brownish-yellow, friable sandy loam that is massive.

Cultivated areas generally have a plow layer that is lighter gray than that in wooded areas. In places the texture of the surface layer is loamy fine sand. The subsoil ranges from pale yellow to yellowish brown in color, from loamy sand to sandy loam in texture, and from 15 to 30 inches in thickness.

The Klej soil is low in natural fertility and in organic matter. It is strongly acid.

This soil responds well to good management. The surface layer has good tilth. The available moisture capacity is low, but the water table is high enough so that plants have sufficient moisture, even in dry years. This soil is well suited to such crops as tobacco and corn. If some drainage is provided during wet seasons, the soil is well suited to improved pasture and pines. Capability unit IIIw–1; woodland suitability group 7; wildlife group 3.

Lakeland Series

The Lakeland series consists of somewhat excessively drained, sandy soils. These soils developed in acid sands on uplands of the Coastal Plain. They are grayish yellow. Finer textured material is at a depth of 30 to more than 72 inches. The slope ranges from 0 to 12 percent.

These soils are low in natural fertility and in organic matter. They are strongly acid.

The Lakeland soils are on narrow ridges, in sloping areas, and in broad, undulating areas among the Gilead, Cuthbert, and Norfolk soils. They differ from those soils because they are sandy to a depth greater than 30 inches. Near the Lakeland soils, in adjacent, slightly depressed places, are areas of the moderately well drained to somewhat poorly drained Klej soils. In drainageways and on sandy flats between streams are the poorly drained Plummer soils.

Much of the acreage of Lakeland soils is in trees. The native vegetation is longleaf pine, blackjack oak, post oak, turkey oak (locally called scrub oak), and an understory of wiregrass. Areas that have been abandoned usually revert to slash, loblolly, or longleaf pines. Control of hardwood trees is practiced to aid in obtaining better stands and growth of pines. The excessive drainage, rapid permeability, and low water-holding capacity limit the suitability of these soils for cultivation.

Lakeland sand, 0 to 5 percent slopes (LpB).—This is a deep, somewhat excessively drained, sandy soil of the uplands. It has rapid permeability. The following describes a typical profile of this soil:

0 to 6 inches, gray to grayish-brown sand; loose to very friable; structureless.
6 to 42 inches, yellowish-brown to yellow sand; loose to very friable; structureless.
42 to 50 inches, brownish-yellow, loose sand; structureless.
50 to 60 inches +, mottled strong-brown, yellow, and red, friable fine sandy clay loam; subangular blocky structure.

The color of the surface layer ranges from gray to light yellowish gray. In some places the surface layer is coarse sand. In some areas a few fragments of white quartz and scattered iron concretions are on the surface. Depth to mottled, finer textured material ranges from about 40 to more than 72 inches.

This soil is strongly acid. It is low in natural fertility and in organic matter. The available moisture capacity is low.

This soil responds fairly well to good management, but yields are moderately low. The surface layer has good tilth. This soil is limited in its use for cultivation because it is rapidly permeable, sandy, and droughty. It is suited to improved permanent pasture or pines. Capability unit IVs–1; woodland suitability group 5; wildlife group 2.

Lakeland sand, 5 to 8 percent slopes (LpC).—The suitability of this soil for cultivation is limited by its rapid permeability, excessive drainage, and low available moisture capacity. When the soil is cultivated, there is a slight hazard of erosion.

Most of this soil is in mixed pines and hardwoods. Much of the acreage has been cultivated, but it has reverted to pines or is now in improved pasture. Capability unit IVs–1; woodland suitability group 5; wildlife group 2.

Lakeland sand, 8 to 12 percent slopes (LpD).—This soil has much steeper, shorter slopes than Lakeland sand, 0 to 5 percent slopes. In some small areas erosion has caused the surface layer to be thinner than that in the profile described for Lakeland sand, 0 to 5 percent slopes. Small, shallow gullies occur in places. This soil has not been cleared. It is generally unsuited to cultivation, because of its sandy texture, rapid permeability, and low available moisture capacity. If deep-rooting perennial plants can be established, however, the soil is moderately well suited to pasture. All the acreage is in trees. Capability unit VIs–2; woodland suitability group 5; wildlife group 4.

Lakeland loamy sand, shallow, 2 to 5 percent slopes (LoB).—The surface layer of this soil is finer textured than that of Lakeland sand, 0 to 5 percent slopes. Brownish-yellow light sandy clay loam is at a depth of 30 to 42 inches. The soil has less rapid permeability than Lakeland sand, 0 to 5 percent slopes, and somewhat higher available moisture capacity. Crop yields are generally slightly higher. This soil is moderately well suited to cultivation. Much of the acreage has been cultivated, but most of it has reverted to pines or is in improved pasture. Capability unit IIIs–1; woodland suitability group 5; wildlife group 2.

Lakeland coarse sand, deep, 2 to 5 percent slopes (LwB)—This soil is on conspicuous, narrow ridges that are parallel to the eastern side of Pendleton Creek. Locally, they are called oak ridges. The following describes a typical profile of this soil:

0 to 2 inches, dark-gray coarse sand that contains little organic matter; single grain; loose; abrupt, smooth boundary; strongly acid.
2 to 72 inches +, yellowish-brown coarse sand; loose and open; sand grains are rounded and uniform in size; strongly acid.

Depth to the finer textured material that underlies this soil ranges from 6 to 30 feet (fig. 5). The color of the underlying sandy material ranges from yellowish brown to light gray. This excessively drained soil has very rapid permeability. It is low in organic matter and in natural fertility. The vegetation is chiefly blackjack oak, turkey oak, and post oak, which are all scrub oaks, but there are some widely scattered pines.

All of this soil is thinly wooded. The deep sand is poorly suited to use in construction because of the uniform size and rounded shape of the sand grains. Capability unit VIs-2; woodland suitability group 5; wildlife group 4.

Lakeland coarse sand, deep, 5 to 12 percent slopes (LwD).—This soil is on the more sloping parts of the sandy ridges where Lakeland sand, deep, 2 to 5 percent slopes, occurs. The areas resemble dunes. The coarse underlying sands are fairly uniform in color and in texture. They extend to a depth of about 30 feet.

Lakeland coarse sand, deep, 5 to 12 percent slopes, is extremely droughty in summer, and, as a result, plants make little growth. The vegetation consists mainly of scrub oaks, but there are widely scattered pines (fig. 6). Capability unit VIIs-1; woodland suitability group 5; wildlife group 4.

***Figure 5.*—Profile of Lakeland coarse sand, deep, 2 to 5 percent slopes. Roots have penetrated to a great depth in this soil.**

***Figure 6.*—Scrub oaks and widely scattered pines growing along a road through an area of Lakeland coarse sand, deep, 5 to 12 percent slopes.**

Leaf Series

The Leaf series consists of poorly drained soils on stream terraces adjacent to the larger streams. These soils developed in acid clays and sandy clays. They were washed from fine-textured soils of the uplands, such as the Boswell and Susquehanna. The surface layer is dark-gray to light-gray fine sandy loam. Mottled gray, strong-brown, and red, plastic clay is at a depth of about 12 inches. The slope ranges from 0 to 2 percent.

These soils are low in natural fertility and contain little organic matter. They are medium to strongly acid.

The Leaf soils commonly occur with the Myatt soils on low stream terraces or on slightly depressed stream terraces. In many places they are adjacent to the Wahee, Chewacla, and Izagora soils, which are better drained than the Leaf soils. The Leaf soils have a finer textured, more plastic subsoil than the Myatt soils. Their texture is similar to that of the Wahee soils, but they are grayer and have a higher water table. The Leaf soils are finer textured and less well drained than the Chewacla and Izagora soils, and they have a more plastic subsoil.

All the acreage of Leaf soils is in forest. The natural vegetation consists of pines, water oaks, sweetgum, and a rather vigorous growth of shrubs that are tolerant to water. The suitability of these soils is limited for cultivation by the shallow depth to plastic clay and poor drainage. These soils are best suited to forest and wildlife.

Leaf fine sandy loam (0 to 2 percent slopes) (Lea).—This is the only Leaf soil mapped in the county. It is on stream terraces. The soil is poorly drained and has a subsoil of plastic clay. The following describes a typical profile of this soil:

0 to 3 inches, dark-gray fine sandy loam.
3 to 12 inches, light-gray, very friable fine sandy loam.
12 to 42 inches, mottled gray, strong-brown, and red, massive, plastic clay.

The surface layer ranges in thickness from about 5 to 20 inches. Some areas may have a thin layer of overwash. In some areas the texture of the surface layer is silt loam. The subsoil varies in degree of mottling. It is very hard when dry and plastic when wet.

Because of the slowly permeable subsoil and low position, drainage for cultivation is not economically feasible in some areas. Some areas that have been cleared and drained, however, are suited to truck crops, pasture plants, and pines. Capability unit IVw–2; woodland suitability group 4; wildlife group 3.

Lynchburg Series

The Lynchburg series consists of soils that are somewhat poorly drained. These soils developed in acid loamy sand that overlies sandy clay loam of the Coastal Plain. Their surface layer is dark-gray to light-gray loamy sand that is 16 to 30 inches thick. Their subsoil is light-gray to yellowish-brown sandy clay loam. Mottled sandy clay loam is at a depth of about 24 inches. The slope ranges from 0 to 5 percent.

These soils are low in natural fertility and contain little organic matter. They are strongly acid.

The Lynchburg soils occur with the Goldsboro soils on flats and at the foot of very gentle slopes. They are also near the Rains soils, which are in low, natural drainage areas. In places the Lynchburg soils are adjacent to the Norfolk soils on the lower parts of the very gentle slopes. They are also near the Tifton soils, on the upper parts of broad ridges and on the very gentle side slopes. The Lynchburg soils are more poorly drained than the Goldsboro, Norfolk, and Tifton soils, but they are better drained than the Rains soils. Their subsoil is more grayish than that of the Goldsboro soils.

The Lynchburg soils occupy small areas scattered throughout the county. Most of the acreage is wooded. The common trees are longleaf, slash, and loblolly pines, and there are scattered blackjack oaks and sweetgums. The understory is gallberry bushes and wiregrass. These soils are very productive, but their suitability for some plants is limited by poor drainage.

Lynchburg loamy sand, thick surface, 0 to 2 percent slopes (LzA).—This soil is somewhat poorly drained. It has a thick, sandy surface layer that overlies sandy clay loam. The following describes a typical profile of this soil:

- 0 to 17 inches, dark-gray to grayish-brown, very friable loamy sand.
- 17 to 24 inches, light-brown sandy loam that has pale-yellow featherings.
- 24 to 40 inches, light-brown sandy clay loam, distinctly mottled with yellowish brown and gray; strong brown in the lower part.
- 40 to 48 inches, light-gray, firm sandy clay that has many, prominent mottles of yellowish red and strong brown.

In cultivated areas the surface layer is commonly lighter gray than in undisturbed areas. The texture of the surface layer ranges from sandy loam to loamy fine sand. The texture of the subsoil ranges from sandy loam to sandy clay loam, and the thickness of the subsoil ranges from 12 to 24 inches.

This soil is strongly acid. It is low in natural fertility and in organic matter. The surface layer is in good tilth. The soil has a moderately high available moisture capacity, moderately rapid permeability, and a deep root zone. It responds well to good management and is very productive.

This soil is well suited to permanent pasture and pines. Its capability for some plants, such as alfalfa, is limited by impeded drainage. If this soil is cultivated, a suitable drainage system should be installed. Capability unit IIw–2; woodland group 2; wildlife group 3.

Lynchburg loamy sand, thick surface, 2 to 5 percent slopes (LzB).—This soil has stronger slopes, more rapid runoff, and a thinner surface layer than Lynchburg loamy sand, thick surface, 0 to 2 percent slopes. Most of the acreage is near the base of gently sloping uplands, where this soil receives seepage water. It is slow to dry out in spring or after periods of high rainfall. There are shallow washes in some areas.

Most of this soil is wooded. If some drainage is provided, it is well suited to cultivation. The hazard of erosion is slight to moderate. Capability unit IIe–3; woodland group 2; wildlife group 3.

Myatt Series

The Myatt series consists of poorly drained soils on low stream terraces. These soils developed in alluvium washed from Norfolk, Tifton, and similar soils of the Coastal Plain. They have a surface layer of dark-gray sandy loam and a subsoil of mottled sandy clay loam. The soils are level to nearly level.

These soils are low in natural fertility and contain little organic mater, except in the uppermost 1 or 2 inches. They are strongly acid.

The Myatt soils occur with the Izagora and Wahee soils. Their texture is similar to that of the Izagora soils, but they are coarser textured and more friable than the Wahee soils. They are more poorly drained than the Izagora and Wahee soils.

The Myatt soils occur in slightly depressed areas on stream terraces along the flood plains of the rivers and larger creeks. The native vegetation is mainly mixed hardwoods and an understory of gallberry bushes, myrtle, and other shrubs that tolerate water. Most of the acreage is wooded. The trees that are the most common are cypress, water oak, bay, sweetgum, and pine. The capability of these soils is limited by their poor drainage and frequent flooding. They are suited mainly to forest, lowland pasture, and wildlife.

Myatt sandy loam (0 to 2 percent slopes) (Mya).—This is the only Myatt soil mapped in the county. It is poorly drained and is in depressions on low stream terraces. The following describes a typical profile of this soil:

- 0 to 14 inches, dark-gray to grayish-brown, very friable sandy loam.
- 14 to 36 inches, gray, firm sandy loam to sandy clay loam that is mottled with strong brown; sticky when wet.
- 36 to 42 inches +, reddish-yellow, very friable sandy loam with many distinct mottles of light gray.

The color of the surface layer ranges from dark gray to grayish brown. The texture of the subsoil ranges from sandy loam to silty clay loam. The subsoil is mottled with gray, strong brown, yellowish brown, and brownish yellow. Depth to mottling ranges from 10 to 24 inches.

Mapped with this soil are small areas where the texture of the surface layer is silt loam or ranges to loamy sand.

Myatt sandy loam is poorly drained and has slow internal drainage. During periods of high rainfall, it is subject to flooding, but in drier months the water table is generally within a few feet of the surface. In some areas drainage of this soil for cultivation is not economically feasible, because of the hazard of flooding and poor natural drainage. In other areas it would be feasible to drain this soil by using shallow, open ditches. If artificial drainage were provided, grasses could be grown under good management. Trees would also grow better, and better stands would be obtained through natural reproduction. The capability of this soil is limited by its poor drainage and location. Capability unit IVw–2; woodland group 4; wildlife group 5.

Norfolk Series

The soils of the Norfolk series developed from acid sandy loams and sandy clay loams on uplands of the Coastal Plain. The soils are well drained. Where erosion has not occurred, these soils commonly have a surface layer that is grayish brown. They have a subsoil of brownish-yellow to yellowish-brown sandy clay loam. In many places depth to mottling is about 40 inches. The slope ranges from 0 to 8 percent.

These soils are low in natural fertility and in organic matter. They are strongly acid.

In many places the Norfolk soils are adjacent to or near the Tifton, Gilead, and Goldsboro soils. The Norfolk and Tifton soils are on the less sloping parts of the uplands, the Gilead soils are on the more sloping parts, and the Goldsboro soils are in a slightly higher position than the Lynchburg soils, and are on the lower flat areas at the foot of slopes. The Norfolk soils have more sand throughout the profile than the Tifton soils and lack the numerous iron concretions that are common in the Tifton soils. The Norfolk soils are better drained than the Goldsboro and Lynchburg soils. Their subsoil is thicker and more friable than that of the Gilead soils.

The Norfolk soils occur throughout the county. The natural vegetation is mixed pines, a few scattered hardwoods, and an understory of wiregrass. These soils are suited to many different kinds of plants. They are well suited to cultivation and are cultivated extensively. Much of the acreage that has been cultivated, however, has reverted to pines or is in improved pasture (fig. 7).

Norfolk loamy sand, 2 to 5 percent slopes (NhB).—This is a well-drained soil of the uplands. It has a sandy, thick, friable surface layer and a subsoil of yellowish-brown sandy clay loam. The following describes a typical profile of this soil:

0 to 12 inches, grayish-brown, very friable loamy sand.
12 to 42 inches, brownish-yellow to yellowish-brown, friable sandy clay loam; moderate, subangular blocky structure.
42 to 50 inches +, firm sandy clay loam mottled with yellowish brown, red, and light gray; medium, subangular blocky structure.

Mapped with this soil are areas where the texture of the surface layer is fine sandy loam to loamy sand. These areas are too small to be mapped separately.

In areas that have been cultivated, the plow layer of Norfolk loamy sand, 2 to 5 percent slopes, is light gray. The subsoil ranges from light sandy clay loam to sandy clay loam in texture and is 24 to 36 inches thick. Depth to mottling ranges from about 30 to 50 inches.

***Figure 7.*—Cattle grazing on a pasture of Coastal bermudagrass in an area of Norfolk loamy sand, 2 to 5 percent slopes. This area was formerly used to grow row crops.**

This soil is low in natural fertility and in organic matter. It is strongly acid. Except in a few areas that are eroded, this soil has a deep root zone and is permeable to a considerable depth. It has medium available moisture capacity. The surface layer has good tilth and responds well to good management. The rate of infiltration is moderately rapid. Where this soil occurs with the Tifton soils, some small iron concretions are on the surface.

This soil is well suited to intensive use. There is some hazard of erosion. Capability unit IIe–1; woodland suitability group 1; wildlife group 1.

Norfolk loamy sand, 0 to 2 percent slopes (NhA).—This soil is on level to nearly level ridgetops where little erosion has occurred. The surface layer is about 14 inches thick. Mottles are at a depth of about 36 inches. This soil has good tilth, and roots can penetrate the subsoil readily. Infiltration and permeability are moderately rapid. The soil retains enough moisture, however, to insure at least a partial crop, even during droughts.

This soil is easy to till and is well suited to intensive use for cultivated crops. It can be cultivated soon after rains. The soil is well suited to many different crops, and most of the acreage is cultivated. Capability unit I–1; woodland suitability group 1; wildlife group 1.

Norfolk loamy sand, 2 to 5 percent slopes, eroded (NhB2).—The surface layer of this soil is thinner and somewhat finer textured than that of Norfolk loamy sand, 2 to 5 percent slopes. It is about 4 to 8 inches thick. In areas that have been cultivated, the surface layer is yellowish brown. The subsoil of yellowish-brown sandy clay loam is exposed in some severely eroded patches. The rate of infiltration is slower in this soil than in areas that are not eroded, and the amount of runoff is greater.

This soil responds well to good management, but if it is cultivated, a system to dispose of excess water is necessary to prevent further erosion. The soil is well suited to moderately intensive use because of its good tilth, deep root zone, ability to respond to good management, and its gentle slope. There is, however, some hazard of erosion. Most of the acreage is in cultivated crops and improved pasture. Capability unit IIe–1; woodland suitability group 1; wildlife group 1.

Norfolk loamy sand, 5 to 8 percent slopes, eroded (NhC2).—The surface layer of this soil is yellowish-brown loamy sand that is 4 to 8 inches thick. This soil is in a narrow band between the less sloping ridgetops and drainageways. Where it occurs as an outer border along areas of Norfolk loamy sand, 0 to 2 percent slopes, severe erosion results when water concentrates during heavy summer storms. In many places there are gullies.

In general, this soil is suited to the same crops as Norfolk loamy sand, 2 to 5 percent slopes, eroded, but the rate of infiltration is less, runoff is more rapid, and there is a moderate to severe hazard of erosion. As a result, this soil requires more intensive management to maintain productivity. Areas that have not been cultivated have been planted to improved pasture and to pines. This soil has moderately good tilth, a deep root zone, and moderate permeability. Capability unit IIIe-1; woodland suitability group 1; wildlife group 1.

Norfolk loamy sand, thick surface, 0 to 2 percent slopes (NfA).—The surface layer of this soil is 18 to 30 inches thick, and mottling is at a depth of 30 to 42 inches. This soil is well drained to somewhat excessively drained, and the available moisture capacity is low. Because the soil is nearly level, has a rapid rate of infiltration, and moderately rapid permeability, it is not subject to erosion.

This soil has good tilth, can be cultivated shortly after rains, and responds well to good management. Most of the acreage has been cultivated, but some of it has reverted to pines or is in improved pasture. If the soil is used for cultivated crops, the crop residues ought to be turned under to supply organic matter, and cover crops should be included in the cropping system. Capability unit IIs-1; woodland suitability group 1; wildlife group 1.

Norfolk loamy sand, thick surface, 2 to 5 percent slopes (NfB).—The surface layer of this soil ranges from 18 to 30 inches in thickness. Depth to mottled sandy clay loam ranges from 32 to 42 inches.

The hazard of erosion is moderate on this soil. The rate of infiltration is moderately rapid, and runoff is moderately slow. The soil is moderately well drained to somewhat excessively drained. The available moisture capacity is moderately low because of the sandy texture of the surface layer. Crops grown on this soil are likely to be damaged during short dry periods.

This soil responds well to good management, has good tilth, and can be cultivated shortly after rains. When the soil is cultivated, crop residues ought to be turned under and cover crops should be included in the cropping system to add organic matter. Most of this soil has been cultivated, but some of the acreage has reverted to pines or has been planted to pines (fig. 8). Some of it is in improved pasture. Capability unit IIs-1; woodland suitability group 1; wildlife group 1.

Norfolk loamy sand, thick surface, 5 to 8 percent slopes (NfC).—This soil has stronger slopes and a thicker surface layer than Norfolk loamy sand, 2 to 5 percent slopes. The surface layer is 18 to 30 inches thick.

This soil is not extensive, and most of it is in pines. It has good tilth and is suited to a fairly wide range of crops. Crop yields are generally low, however, because of the moderately low available moisture capacity. When this soil is cultivated, the hazard of erosion is moderate to severe. Capability unit IIIe-5; woodland suitability group 1; wildlife group 1.

Figure 8.—**A stand of pines planted on Norfolk loamy sand, thick surface, 2 to 5 percent slopes. The pines are 7 years old.**

Plummer Series

The Plummer series consists of soils that are poorly drained. The soils developed in thick beds of acid sands over finer textured sediments of the Coastal Plain. They have a surface layer of dark-gray sand overlying very light gray sand. The depth to heavier textured material ranges from 3 to 4 feet. The slope ranges from 0 to 5 percent.

These soils are low in natural fertility and in organic matter. They are strongly acid.

The Plummer soils occur in low, flat areas around the heads of streams and along small branches. In most places they are adjacent to poorly drained Alluvial land of the larger drainageways and to the moderately well drained to somewhat poorly drained Klej soils on the lower flats. The Plummer soils are more poorly drained than the Lynchburg soils, and the lower part of their subsoil is more sandy. Their drainage and the color of their surface layer are similiar to those of the Rains soils, but the Plummer soils are more sandy and are deeper over fine-textured material.

The Plummer soils occur in scattered areas throughout the county. The natural vegetation is mixed pines, scattered hardwoods, and an understory of gallberry bushes, myrtle, pitcherplants, and many other shrubs and grasses that tolerate water. Most of the acreage is in trees. The common trees are slash and loblolly pines, blackgum, poplar, water oak, and cypress. These soils are generally unsuitable for cultivation, because of poor drainage. An occasional small area where the soils are drier than normal may be cultivated with the adjacent soils.

Plummer sand, 0 to 2 percent slopes (PeA).—This poorly drained, sandy soil has a thin, dark-gray surface layer overlying sandy material. The following describes a typical profile of this soil:

- 0 to 4 inches, dark-gray sand.
- 4 to 38 inches, light-gray to white sand.
- 38 to 60 inches +, light-gray, friable sandy loam that has distinct mottles of yellowish brown and contains lenses of sand.

The surface layer ranges from light gray to black in color and from 1 to 6 inches in thickness. In some areas the texture of the surface layer is loamy sand. The subsoil ranges from sand to fine sand in texture. Depth to mottling ranges from 36 to 48 inches.

This soil is low in natural fertility and in organic matter. It is strongly acid.

Because of its low position and poor drainage, most of the acreage is not suited to cultivation. In some small areas, however, where simple drainage is feasible, truck crops and sugarcane are grown and forage crops are grown in improved pastures. This soil is well suited to slash pine. Capability unit Vw–2; woodland suitability group 4; wildlife group 5.

Plummer sand, 2 to 5 percent slopes (PeB).—This soil has stronger slopes than Plummer sand, 0 to 2 percent slopes, and depth to mottled, sandy material is somewhat less. In some areas the subsoil is very faintly mottled, and in other areas it contains lenses of sandy clay or clay. This soil receives seepage water from the surrounding uplands. During periods that are alternately wet and dry, the water table fluctuates markedly.

This soil is not suited to crops that require cultivation. Improved pastures could be established if it were economically feasible to provide water control. The soil is well suited to pines. All the acreage is in trees. Capability unit Vw–2; woodland suitability group 4; wildlife group 5.

Rains Series

The Rains series consists of soils that are poorly drained. These soils developed in wet areas in thick beds of acid sandy loam over sandy clay loam of the Coastal Plain. The color of their surface layer ranges from very dark gray to gray. Mottled material is at a depth of 24 to 30 inches. The slope ranges from 2 to 5 percent.

These soils are low in natural fertility. In some areas there is an appreciable amount of organic matter in their surface layer. These soils are strongly acid.

The Rains soils occur at the heads of small streams, along the sides of small streams, and in slightly depressed areas. They are in positions similar to those occupied by the Plummer soils, but they are less sandy than the Plummer soils. In some places the Rains soils are in flat areas adjacent to the somewhat poorly drained Lynchburg soils. The Rains soils are more poorly drained than the Lynchburg soils, and their subsoil is less yellowish, but more grayish, than that of the Lynchburg soils.

The Rains soils are scattered throughout the county. Almost all the acreage is in trees. The natural vegetation is mixed pines, sweetgum, blackgum, maple, water oak, live oak, and an understory of gallberry bushes. The suitability of these soils for cultivation is limited by their poor drainage.

Rains sandy loam, thick surface, 2 to 5 percent slopes (ReB).—This is the only Rains soil mapped in the county. It is poorly drained and is in low areas. The surface layer is thick and consists of dark-gray sandy loam. The subsoil is gray sandy clay loam. The following describes a typical profile of this soil:

0 to 4 inches, dark-gray, very friable sandy loam that contains little organic matter.

4 to 26 inches, gray sandy loam with few, faint featherings of yellowish brown.

26 to 46 inches, gray sandy clay loam that has mottles of yellowish brown and strong brown in the upper part and mottles of brown and red in the lower part.

The color of the surface layer ranges from gray to very dark gray. The texture of the subsoil ranges from sandy loam to sandy clay loam, and the thickness of the subsoil, from 6 to 16 inches. Mottled material is at a depth of 24 to 30 inches.

Mapped with this soil are small areas of Alluvial land, of Plummer soils, and of a soil that has a surface layer of loamy fine sand.

Rains sandy loam, thick surface, 2 to 5 percent slopes, is strongly acid. It is low in natural fertility.

The capability of this soil is severely limited by poor drainage. Generally, this soil is in areas that are difficult to drain. Where drainage is economically feasible, however, garden vegetables and forage crops for improved pasture can be grown with moderate success. This soil is well suited to pines. Capability unit IVw–2; woodland suitability group 4; wildlife group 5.

Sandy and Clayey Land

This miscellaneous land type is made up of soil material of mixed origin, and of small areas of various soils. The areas of different soils are so intricately mixed that it is not feasible to show the soils separately on the soil map.

Sandy and clayey land (8 to 17 percent slopes) (SkE).—This miscellaneous land type occurs throughout the county on narrow, steep breaks adjacent to streams. Some of the soils in it developed in sandy material, and the Gilead, Cuthbert, and Sunsweet soils developed in compact sandy clay. The Susquehanna and Boswell soils developed in more clayey material than the other soils. Profiles of the various soils can be identified in some small areas, but they vary greatly from place to place. The profiles generally differ from a typical profile of the same kind of soil. Rock outcrops are common in some areas.

All of this land type is in trees. The native vegetation consists of pines and scattered scrub oaks. The suitability of the land is severely limited for cultivation by the strong slopes and variability of the soil material. The areas are probably best used to grow pines. Capability unit VIe–2; woodland suitability group 3; wildlife group 4.

Sawyer Series

The Sawyer series consists of moderately well drained soils of the uplands. The soils developed in acid, clayey material of the Coastal Plain. Where erosion has not taken place, the surface layer is dark grayish-brown loamy sand. Below the surface layer is yellowish-brown sandy clay loam. The slope ranges from 2 to 12 percent.

These soils are low in natural fertility and in organic matter. They are strongly acid.

The Sawyer soils occur with the Norfolk and Cuthbert soils, and in places they are adjacent to the Susquehanna and Boswell soils. Their subsoil is finer textured and thinner that that of the Norfolk soils. Generally, they contain fewer quartz pebbles than the Cuthbert soils, and their profile is free of mottles. The Sawyer soils have a thin, well-developed subsoil that is lacking in the Susquehanna soils. They resemble the Boswell soils, but their subsoil is yellowish brown instead of red. They are less sandy than the Lakeland soils.

The Sawyer soils are scattered throughout the county. Much of the acreage is in trees. The natural vegetation is mainly mixed pines, scattered hardwoods, and an understory of wiregrass. Abandoned fields that once were under cultivation have commonly reverted to slash, loblolly, and longleaf pines.

The Sawyer soils are not mapped separately in this county but are mapped in undifferentiated units with the Norfolk and Cuthbert soils.

Sawyer, Norfolk, and Cuthbert loamy sands, 2 to 5 percent slopes (SlB).—Because they occur in a mixed pattern, have a somewhat similar profile, and in many places have a thick cover of trees, it was impractical to map these three soils separately. All of these soils developed in thick beds of Coastal Plain sediments. The Sawyer, Norfolk, and Cuthbert soils have a surface layer that is similar. The Sawyer and Norfolk soils, however, have a yellowish-brown subsoil that is free of mottles, and the Cuthbert soil has a subsoil that is mottled. The Sawyer and Cuthbert soils are moderately well drained, and the Norfolk soil is well drained. The Cuthbert soil has more quartz pebbles in the profile than the other soils.

The Sawyer soil makes up about 40 percent of this mapping unit; the Norfolk soil, about 35 percent; and the Cuthbert soil, about 25 percent. Some areas consist only of the Sawyer soil, some consist only of the Norfolk soil, and still others consist only of the Cuthbert soil. Most areas contain all three soils.

The following describes a typical profile of a Sawyer loamy sand:

0 to 12 inches, dark grayish-brown, grading to light yellowish-brown, very friable loamy sand.

12 to 20 inches, yellowish-brown sandy clay loam that has a few, prominent mottles of yellowish red in the lower part; medium, subangular blocky structure.

20 to 48 inches, strong-brown clay that has many, coarse, prominent mottles of light gray and yellowish red; moderate, medium, angular blocky structure.

A typical profile of a Norfolk soil is described under Norfolk loamy sand, 2 to 5 percent slopes, in the Norfolk series. A typical profile of a Cuthbert soil is described under the undifferentiated mapping unit of Gilead, Lakeland, and Cuthbert sands, 2 to 5 percent slopes, in the Gilead series.

The soils of this mapping unit are strongly acid. They are low in organic matter and in natural fertility. The soils respond well to good management, however, especially to additions of fertilizer and organic matter. Tilth is good, and the soils can be worked within a wide range of moisture content. There is a slight to moderate hazard of erosion in areas that are cultivated. The root zone is shallow in much of the acreage, but it ranges to moderately deep in the Norfolk soils. Water soaks into the soils at a moderately rapid rate. Permeability, however, ranges from slow in the Sawyer and Cuthbert soils to moderately rapid in the Norfolk soils.

This mapping unit is extensive, and much of the acreage is cultivated. Some of it is in improved pasture, and some is in pines. Capability unit IIe-3; woodland suitability group 3; wildlife group 1.

Sawyer, Norfolk, and Cuthbert loamy sands, 2 to 5 percent slopes, eroded (SlB2).—Erosion has caused the surface layer of these soils to be thinner than those of Sawyer, Norfolk, and Cuthbert loamy sands, 2 to 5 percent slopes. Also, depth to mottled clay is less and the rate of infiltration is slower. The surface layer is commonly light yellowish-brown loamy sand and is 6 to 10 inches thick. The subsoil is exposed in some places, and shallow gullies are common. Most of the acreage has been cultivated. Where the soil is not protected, the hazard of erosion is increased considerably. Much of this mapping unit is in improved pasture or in planted pines. Capability unit IIe-3; woodland suitability group 3; wildlife group 1.

Sawyer, Norfolk, and Cuthbert loamy sands, 5 to 8 percent slopes (SlC).—In many places these soils have a surface layer that is thicker and slightly coarser textured than those of Sawyer, Norfolk, and Cuthbert loamy sands, 2 to 5 percent slopes. Small quartz pebbles are on the surface and throughout the profile in some areas.

These soils have good tilth. They are suited to a fairly large number of crops, but because of the moderately low available moisture capacity, yields are generally low. If these soils are cultivated, the hazard of erosion is moderate to severe. Most of the acreage is in pines. Capability unit IIIe-3; woodland suitability group 3; wildlife group 1.

Sawyer, Norfolk, and Cuthbert loamy sands, 5 to 8 percent slopes, eroded (SlC2).—The surface layer of the soils in this mapping unit is thinner than that of Sawyer, Norfolk, and Cuthbert loamy sands, 2 to 5 percent slopes, and mottled clay is nearer the surface. The rate of infiltration is also slower. The surface layer is commonly light yellowish-brown loamy sand that is 4 to 8 inches thick, but in places it is sand. The subsoil is exposed in many places, and shallow gullies are common.

This mapping unit is extensive, and most of the acreage has been cultivated. Where the soils are not protected, the hazard of erosion is increased considerably. Much of the acreage is in improved pasture or in pines. Capability unit IIIe-3; woodland suitability group 3; wildlife group 1.

Sunsweet Series

The Sunsweet series consists of well-drained soils developed in acid sandy clays on uplands of the Coastal Plain. The soils have a surface layer of brown sandy loam and a subsoil of yellowish-red, firm sandy clay. There are few to many, brown iron concretions in the profile. Normally, mottles are at a depth of 4 to 12 inches. The slope ranges from 2 to 12 percent.

These soils are low in natural fertility and in organic matter. They are strongly acid.

The Sunsweet soils are generally on the abrupt breaks of slopes and on narrow ridgetops. They are near the Tifton soils, which are on the broad ridges, and near the Gilead soils, which are in areas that are very gently undulating to undulating. The Sunsweet soils also occur near the Susquehanna soils, which are on breaks on the lower parts of slopes, and near the Rains soils, which are in low drainage areas. They have a thinner surface layer and subsoil than the Tifton soils, and their surface layer rests directly on the substratum in many places. In some places all of their surface layer has been lost through erosion. The Sunsweet soils contain more iron concretions than the Tifton soils, and the iron concretions are larger. They also contain more iron concretions than the Gilead soils, and their solum is thinner and less well developed. The Sunsweet soils are coarser textured throughout than the Susquehanna soils, and in places their subsoil is thinner

The Sunsweet soils are mainly in small areas scattered throughout the county. The natural vegetation is chiefly pines, widely scattered hardwoods, and an understory of wiregrass. Most of the acreage is wooded. The common trees are scrub oaks and longleaf, shortleaf, and loblolly pines. Because firm sandy clay is near the surface and the hazard of erosion is severe, these soils are unsuited to cultivation.

Sunsweet sandy loam, 5 to 12 percent slopes, eroded (ShD2).—This is the only Sunsweet soil mapped in the county. It is a well-drained soil of the uplands and has a subsoil of compact clay. The following describes a typical profile of this soil:

0 to 3 inches, brown, very friable sandy loam that contains numerous iron concretions.
3 to 8 inches, yellowish-red, firm sandy clay that contains numerous iron concretions.
8 to 72 inches, mottled red, strong-brown, and pale-yellow, firm sandy clay.

The texture of the surface layer ranges from sandy loam to loamy sand, and that of the subsoil, from firm sandy clay to clay. The subsoil is 4 to 6 inches thick. Depth to mottles ranges from 4 to 12 inches.

Mapped with these soils are some areas where the slopes are 2 to 5 percent. Also included are a few severely eroded areas where the surface layer is yellowish-red sandy clay. These areas are too small to be mapped separately.

Sunsweet sandy loam, 5 to 12 percent slopes, eroded, is low in natural fertility and in organic matter. It is strongly acid.

Response of this soil to good management is slow. The soil has moderate available moisture capacity. The surface layer normally has moderately poor tilth. The subsoil is slowly permeable. The suitability of this soil for cultivation is greatly limited by the slow permeability of the subsoil, the shallow root zone, rapid surface runoff, and severe hazard of erosion. Generally, the soil is unsuited to cultivation, but it can be used for improved permanent pasture and pines. Capability unit VIe–2; woodland suitability group 6; wildlife group 4.

Susquehanna Series

The Susquehanna series consists of somewhat poorly drained soils developed in acid clays and sandy clays on uplands of the Coastal Plain. Where erosion has not occurred, these soils have a surface layer of dark-gray sandy loam. Prominently mottled, dense, plastic clay is at a depth of about 12 inches. The slope ranges from 2 to 8 percent.

These soils are low in natural fertility and contain little organic matter. They are strongly acid. In some places the Susquehanna soils are adjacent to areas of very gently undulating to undulating Boswell and Gilead soils. They are also near the Sawyer soils, which are in slight depressions in the uplands. The Susquehanna soils are more poorly drained than any of these soils, and they have a much finer textured and more plastic subsoil.

The Susquehanna soils occur in small areas. They are mainly in the northern part of the county, but some small, scattered areas are in other parts. The natural vegetation is mainly pines, a few widely scattered hardwoods, and an understory of gallberry bushes and wiregrass. Most of the acreage is in trees. The common trees are longleaf, slash, and loblolly pines, sweetgum, blackgum, and some scrub oak. The dense, plastic clay near the surface limits the suitability of these soils for cultivation.

Susquehanna sandy loam, 2 to 5 percent slopes (SiB).—This somewhat poorly drained soil of the uplands has a subsoil of mottled, plastic, dense clay. The following describes a typical profile of this soil:

0 to 12 inches, dark-gray, friable sandy loam.
12 to 30 inches, prominently mottled, dusky-red, gray, and pale-brown, plastic, dense clay that has blocky structure.
30 to 46 inches, gray, plastic, dense clay that has a few mottles of yellowish brown; specked with dusky red.

In some areas the texture of the surface layer is loamy fine sand. Depth to mottled, plastic clay ranges from 6 to 16 inches.

This soil is low in natural fertility and in organic matter. It is strongly acid.

The surface layer has good tilth. The subsoil of slowly permeable clay is very sticky and plastic when wet, but it hardens and cracks when dry. This layer restricts the depth to which roots and water can penetrate. As a result, the moisture available to plants is limited. When this soil is cultivated, there is a decided hazard of erosion because of the slow permeability of the subsoil, the fairly strong slope, and rapid surface runoff. The shallow root zone also limits the suitability of this soil for cultivation. This soil is better suited to trees and permanent pasture than to cultivated crops. Capability unit IVe–3; woodland suitability group 6; wildlife group 4.

Susquehanna sandy loam, 2 to 5 percent slopes, eroded (SiB2).—This soil has a surface layer that is about 3 to 6 inches thinner than that of Susquehanna sandy loam, 2 to 5 percent slopes. The surface layer is also slightly finer textured. Where mottled clay is exposed, shallow washes occur. This soil has a slow rate of infiltration, slow permeability, and rapid surface runoff. Tilth is generally poor.

There is a severe hazard of erosion on areas that have a sparse cover of plants. This soil is not well suited to cultivation, and yields are moderately low. Most of the acreage is in pines. Capability unit IVe–3; woodland suitability group 6; wildlife group 4.

Susquehanna sandy loam, 5 to 8 percent slopes (SiC).—The surface layer of this soil is grayish brown. Mottled, plastic clay lies about 12 inches beneath the surface. Because of the strong slope, shallow root zone, and slow permeability, there is a very severe hazard of erosion. This soil is not suited to cultivation. Most of the acreage is in pines. Capability unit VIe–2; woodland suitability group 6; wildlife group 4.

Susquehanna sandy loam, 5 to 8 percent slopes, eroded (SiC2).—The surface layer of this soil is brownish gray. It is somewhat finer textured than that of Susquehanna sandy loam, 2 to 5 percent slopes. Mottled dusky-red, yellowish-brown, and light-gray, plastic clay is at a depth of about 4 to 6 inches. In the more eroded areas, the mottled clay is at the surface. Shallow gullies occur in some areas.

This soil has poor tilth. Permeability and the rate of infiltration are very slow. Where this soil has only a sparse cover of plants, surface runoff is rapid, and erosion is serious. This soil is not suited to cultivation. Most of the acreage is in pines (fig. 9). Capability unit VIe–2; woodland suitability group 6; wildlife group 4.

Swamp

Swamp consists of naturally wooded areas. All or most of the areas are covered by water much of the time.

Swamp (0 to 2 percent slopes) (Swa).—This land type consists of undifferentiated, very poorly drained, alluvial material of mixed origin. The color of the soil material ranges from black to very light gray. Some areas consist of a black, moderately thick layer of organic matter underlain by light-gray sand or clay. The texture of the soil material ranges from clay to coarse sand.

Swamp consists of small islands and hammocks that are flooded when the water is high. Most areas remain under water for long periods.

Swamp occurs in a complex pattern of colors and textures along the low flood plains of creeks and the larger streams. Some of the common plants that grow on the areas are sweetgum, blackgum, bay, cypress, juniper, and an understory of a jointed, hollowstem tallgrass (locally called reed-cone), bamboo, and many other shrubs and grasses that tolerate water. All the acreage is in trees. Capability unit VIIw–1; wildlife group 5.

Figure 9.—**An area of Susquehanna sandy loam, 5 to 8 percent slopes, eroded, that has a scattered stand of young pines, an understory of native wiregrass, and scattered gallberry bushes. In the lower right foreground is a light-colored area of rock outcrop.**

Tifton Series

The Tifton series consists of well-drained soils developed in acid sandy loam to sandy clay on uplands of the Coastal Plain. In the less eroded areas, the surface layer consists of grayish-brown loamy sand that is about 12 inches thick. The subsoil is yellowish-brown sandy clay loam that grades to mottled sandy clay at a depth of about 32 inches. Many, small, round iron concretions and pebbles about 1/4 inch to 3/4 inch in diameter are on and in the soils. The slope ranges from 0 to 8 percent.

The Tifton soils commonly are adjacent to or near the Norfolk, Gilead, and Sunsweet soils. The Tifton and Norfolk soils are on the less sloping parts of the uplands, and the Gilead and Sunsweet soils are on the more sloping parts. The Tifton soils have more distinct horizons than the Sunsweet soils. They contain more pebbles than the Norfolk soils, and their surface layer is darker colored and their subsoil finer textured. They have a thicker subsoil and lack the numerous small quartz pebbles that are common in the Gilead soils.

The Tifton soils occur throughout the county in areas of variable size. The native vegetation is mainly mixed pines, widely scattered hardwoods, and an understory of wiregrass. These soils are well suited to cultivation and are used extensively for cultivated crops. Some of the acreage that was formerly cultivated has been planted to slash pine, however, and a part is in improved pasture.

Tifton loamy sand, 2 to 5 percent slopes (TqB).—This well-drained soil of the uplands has a thick subsoil of yellowish-brown, friable clay loam. Small, brown pebbles are common throughout the profile. The following describes a typical profile of this soil:

- 0 to 12 inches, grayish-brown, very friable loamy sand that contains many, small iron concretions.
- 12 to 32 inches, yellowish-brown, friable sandy clay loam that has subangular blocky structure; contains many, small, iron concretions.
- 32 to 46 inches, mottled yellowish-brown, strong-brown, and yellowish-red, firm sandy clay.

In cultivated areas the color of the plow layer is light brownish gray. The color of the subsoil ranges from yellowish brown to strong brown. The texture ranges from sandy clay loam to sandy clay, and the thickness, from 18 to 26 inches. The depth to mottling ranges from about 24 to 36 inches.

Mapped with this soil are some areas in which the texture of the surface layer ranges to fine sandy loam.

Tifton loamy sand, 2 to 5 percent slopes, is moderately low in natural fertility and low in organic matter. It is strongly acid.

Except in a few severely eroded areas, this soil has a thick root zone, is permeable to a considerable depth, and has a moderately high capacity for available moisture. The surface layer has good tilth, but some areas contain numerous pebbles that interfere with tillage. This soil is responsive to good management. It is highly prized for growing crops and is well suited to intensive use. Good yields can be expected from all the crops normally grown in the county. There is a slight to moderate hazard of erosion. Capability unit IIe–2; woodland suitability group 1; wildlife group 1.

Tifton loamy sand, 0 to 2 percent slopes (TqA).—This soil has the smallest acreage of any of the Tifton soils. It occurs along ridgetops that are nearly level. The surface layer is about 12 inches thick, and mottling is at a depth of 28 to 32 inches. Roots can penetrate the subsoil readily.

This soil has good tilth. The rate of infiltration is moderately rapid, and the soil has moderately rapid permeability. It retains enough moisture to insure a partial crop during periods of drought. This soil is suited to a large number of crops and responds well to good management. It is well suited to intensive cultivation, and nearly all the acreage is cultivated. The soil has moderately high available moisture capacity. Capability unit I–2; woodland suitability group 1; wildlife group 1.

Tifton loamy sand, 2 to 5 percent slopes, eroded (TqB2).—This soil has a surface layer that is 4 to 8 inches thinner than that of Tifton loamy sand, 2 to 5 percent slopes. In cultivated areas the color of the surface layer is yellowish brown. Some small patches are severely eroded. Here, the former subsoil is exposed, the rate of infiltration is slower than in the less eroded soils, and tilth is poorer. In places the surface layer forms a crust when it is wet, and this causes the stands of crops to be poor.

This soil responds well to good management. When the soil is cultivated, the hazard of erosion is slight to moderate. Most of the acreage is cultivated or is in improved pasture. Capability unit IIe–2; woodland suitability group 1; wildlife group 1.

Tifton loamy sand, 5 to 8 percent slopes, eroded (TqC2).—In this soil the surface layer consists of yellowish-brown loamy sand that is 4 to 8 inches thick. This soil occupies a narrow band between ridgetops and drainageways that are less sloping. Where it occurs as the outer border of nearly level areas, severe erosion is caused by water that concentrates during heavy summer storms. In many places there are gullies. In areas that are cultivated, the surface layer is somewhat finer textured than in areas that have not been disturbed. In places the former subsoil is exposed. Depth to the mottled clay ranges from 24 to 28 inches. The rate of infiltration is lower than in the Tifton soils that are not eroded.

This soil is suited to about the same crops as Tifton loamy sand, 2 to 5 percent slopes, but more intensive management is required to keep it productive. Some of the acreage is still cultivated, but most of it has been planted to improved pasture and pines. The soil has moderately good tilth. Its root zone is moderately deep, and it is moderately permeable. Runoff causes a moderate to severe hazard of erosion. Capability unit IIIe–2; woodland suitability group 1; wildlife group 1.

Tifton loamy sand, thick surface, 2 to 5 percent slopes (TrB).—This soil has a surface layer of loamy sand that ranges from 18 to 30 inches in thickness. Mottling is at a depth of 34 to 42 inches. Because of the thick surface layer, the moderately rapid rate of infiltration, and the slow runoff, this soil is subject to only a slight hazard of erosion. It is well drained to somewhat excessively drained. The available moisture capacity is moderately low, and crops are likely to be damaged during short periods of drought. The amount of gravel varies, but, in general, this soil contains more gravel than Tifton loamy sand, 2 to 5 percent slopes. In some areas the gravel interferes with cultivation.

This soil responds well to good management. Generally, tilth is good. Most of the acreage has been cultivated, but some of it has reverted to pines or is in improved pasture. This soil is slightly limited for cultivation. If it is used for cultivated crops, crop residues ought to be turned under to supply organic matter, and a cover crop should be included in the cropping system. Capability unit IIs–1; woodland suitability group 1; wildlife group 1.

Tifton sandy loam, thin solum, 2 to 5 percent slopes, eroded (TsB2).—This soil has a surface layer that is less sandy and is 4 to 8 inches thinner than that of Tifton loamy sand, 2 to 5 percent slopes. It also has a thinner subsoil. Generally, the color of the surface layer is more brownish, and the texture of the surface layer is more clayey than that of Tifton loamy sand, 2 to 5 percent slopes. The lower part of the subsoil is also firmer, and runoff is more rapid. The depth to mottling ranges from 14 to 24 inches. In many areas this soil resembles the Gilead soils, but the compact subsoil and numerous, quartz fragments common in the Gilead soils are absent in this soil.

Mapped with this soil are some severely eroded areas. Here, the former subsoil of sandy clay loam is exposed, the rate of infiltration is slow, and tilth is only fair. These areas are too small to be mapped separately.

Because it has a shallow root zone, Tifton sandy loam, thin solum, 2 to 5 percent slopes, eroded, is less productive than Tifton loamy sand, 2 to 5 percent slopes. This soil is suited to moderately intensive use, and some of the acreage is in cultivated crops. A larger acreage has reverted to pines or is in improved pasture. Capability unit IIIe–4; woodland suitability group 3; wildlife group 1.

Tifton sandy loam, thin solum, 5 to 8 percent slopes, eroded (TsC2).—This soil commonly forms an outer border or narrow band between ridgetops and drainageways that are less sloping. The surface layer is thinner than that of Tifton loamy sand, 2 to 5 percent slopes, because of the strong slopes and more rapid runoff. In some areas shallow gullies have cut down to the mottled subsoil, which is at a depth of 14 to 24 inches.

This soil is limited for cultivation because of the moderately low available moisture capacity, the strong hazard of erosion, and the rapid runoff. Most of the acreage has reverted to permanent pasture and pines. Capability unit IVe–4; woodland suitability group 3; wildlife group 1.

Wahee Series

The Wahee series consists of moderately well drained to somewhat poorly drained soils on old stream terraces. These soils have a surface layer of light-gray fine sandy loam and a subsoil of yellowish-brown, firm silty clay. Depth to mottled, plastic clay is about 15 inches. The slope ranges from 0 to 2 percent.

These soils are low in natural fertility and in organic matter. They are strongly acid.

The Wahee soils occur with the Izagora soils on the outer edges of stream terraces. In slightly depressed areas adjacent to the Wahee soils are the poorly drained Myatt soils. The Wahee soils are finer textured than the Izagora and Myatt soils, and their subsoil is less grayish than that of the Myatt soils.

The Wahee soils are on stream terraces along the Ohoopee and Oconee Rivers. All of the acreage is wooded. Some of the common trees are sweetgum, shortleaf pine, longleaf pine, white oak, and red oak. The understory is gallberry bushes. The Wahee soils are subject to occasional flooding. The suitability of these soils for cultivation is limited by their location and slowly permeable subsoil.

Wahee fine sandy loam (0 to 2 percent slopes) (Waf).—This is the only Wahee soil mapped in the county. The soil is moderately well drained to somewhat poorly drained and is on stream terraces. It has a subsoil of mottled silty clay. The following describes a typical profile of this soil:

0 to 15 inches, light-gray to grayish-brown, very friable fine sandy loam.

15 to 24 inches, yellowish-brown, firm silty clay with many, prominent mottles of light gray and pale yellow.

24 to 36 inches +, gray, very heavy clay with many coarse mottles of yellowish brown.

The color of the surface layer ranges from light gray to yellowish brown. In places the texture of the surface layer is silt loam. The color of the subsoil ranges from pale yellow to brownish yellow, and the texture, from sandy clay loam to silty clay. The subsoil is 10 to 18 inches thick. Depth to mottled clay ranges from 18 to 22 inches.

This soil is moderately low in natural fertility and in organic matter. It is strongly acid.

The surface layer has good tilth. The subsoil is clayey and is slowly permeable. It is very sticky when wet and hardens and cracks when dry. As a result, the moisture available to plants is limited because roots cannot penetrate the clayey subsoil. This soil is limited in its suitabilty for cultivation by its slow permeability and the occasional flooding. It is well suited to improved pasture and pines. Capability unit IIIw–2; woodland suitability group 2; wildlife group 3.

How to Use and Manage the Soils

This section first defines the system of capability grouping used by the Soil Conservation Service and describes the use and management of the soils in each capability unit. Then it gives some basic practices of management for soils used for cultivated crops and gives the estimated average acre yields of the principal crops. Finally, it describes the use and management of the soils for woodland and wildlife and gives facts about engineering uses of the soils.

Capability Groups of Soils

The capability classification is a grouping of soils that shows, in a general way, how suitable the soils are for most kinds of farming. It is a practical grouping based on limitations of the soils, the risk of damage when they are used, and the way they respond to treatment.

In this system all the kinds of soil are grouped at three levels, the capability class, subclass, and unit. The eight capability classes in the broadest grouping 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, shallow, or otherwise limited that they do not produce worthwhile yields of crops, forage, or wood products.

The subclasses indicate major kinds of limitations within the classes. Within most of the classes, there can be as many as four subclasses. The subclass is indicated 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 a close-growing plant cover is maintained; *w* means that water in or on the soil will interfere with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage) ; *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the country, indicates that the chief limitation is a climate that is too cold or too dry.

In class I there are no subclasses, because the soils of this class have few or no limitations. Class V can contain, at the most, only subclasses *w*, *s*, and *c* because the soils in it have little or no susceptibilty to erosion but have other limitations that limit their use largely to pasture, range, woodland, or wildlife.

Within the subclasses are the capability units, groups of soils 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 identified by numbers assigned locally, for example, IIe–1 or IIIe–2. The capability units are not numbered consecutively in Treutlen County, because not all of the capability units used in Georgia are in this county.

Soils are classified in capability classes, subclasses, and units in accordance with the degree and kind of their permanent limitations; but without consideration of major and generally expensive landforming that would change the slope, depth, or other characteristics of the soil; and without consideration of possible, but unlikely, major reclamation projects.

The eight classes in the capability system, and the subclasses, and units in this county are described in the list that follows.

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

(No subclasses)

Unit I–1: Deep, well-drained soil that has a surface layer of loamy sand and a thick subsoil of friable sandy clay loam that roots can penetrate readily.

Unit I–2: Deep, well-drained soil that has a surface layer of pebbly loamy sand and a thick subsoil of friable sandy clay loam that roots can penetrate readily.

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

Subclasses IIe: Soils subject to moderate erosion if they are not protected.

Unit IIe–1: Deep, well-drained, gently sloping soils that have a surface layer of loamy sand and a thick subsoil of friable sandy clay loam.

Unit IIe–2: Deep, well-drained, gently sloping soils that have a surface layer of pebbly loamy sand and a thick subsoil of friable, pebbly sandy clay loam.

Unit IIe-3: Moderately well drained and somewhat poorly drained, gently sloping soils that have a surface layer of loamy sand and a subsoil of sandy clay loam to clay.

Unit IIe-4: Chiefly well drained to somewhat excessively drained, very gently sloping soils that have a sandy surface layer and a moderately thin subsoil of firm, compact sandy clay or clay.

Subclass IIw: Soils that have moderate limitations because of excess water.

Unit IIw-2: Deep, moderately well drained and somewhat poorly drained, nearly level soils that have a subsoil of friable sandy clay loam.

Subclass IIs: Soils that have moderate limitations of moisture capacity or tilth.

Unit IIs-1: Well-drained, nearly level or very gently sloping soils that have a surface layer of loamy sand that is 18 to 30 inches thick and a subsoil of friable sandy clay loam through which water moves freely.

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

Subclass IIIe: Soils subject to severe erosion if they are cultivated and not protected.

Unit IIIe-1: Well-drained, gently sloping, eroded soil that has a surface layer of loamy sand and a moderately thick subsoil of friable sandy clay loam.

Unit IIIe-2: Well-drained, gently sloping, eroded soil that has a surface layer of pebbly loamy sand and a subsoil of friable sandy clay loam.

Unit IIIe-3: Moderately well drained and well drained, very gently sloping soils that have a surface layer of sandy loam or loamy sand and a subsoil that is clayey.

Unit IIIe-4: Moderately well drained to somewhat excessively drained, very gently sloping or gently sloping soils that have a surface layer of sand or sandy loam and a subsoil that is chiefly firm, compact sandy clay loam.

Unit IIIe-5: Well-drained, deep, gently sloping soil that has a surface layer of loamy sand that is 18 to 30 inches thick and a subsoil of friable sandy clay loam.

Subclass IIIw: Soils that have severe limitations because of excess water.

Unit IIIw-1: Moderately well drained to somewhat poorly drained, nearly level soil that has a surface layer of deep loamy fine sand and is at the foot of very gently sloping uplands.

Unit IIIw-2: Moderately well drained or somewhat poorly drained soils on flood plains; the soils have a surface layer of silt loam or fine sandy loam and a subsoil of firm silty clay or firm silty clay loam.

Subclass IIIs: Soils that have severe limitations of moisture capacity or tilth.

Unit IIIs-1: Moderately well drained to somewhat excessively drained, very gently sloping soils that have a surface layer of loamy sand or coarse sand that is 30 to 42 inches thick, and a subsoil of sandy loam to sandy clay.

Class IV: Soils that have very severe limitations that restrict the choice of plants, require very careful management, or both.

Subclass IVe: Soils subject to very severe erosion if they are cultivated and not protected.

Unit IVe-3: Moderately well drained and somewhat poorly drained, gently sloping and very gently sloping soils that have a surface layer of sandy loam and a subsoil of plastic, clayey material.

Unit IVe-4: Gently sloping, eroded soils that have a surface layer of sand or sandy loam and a subsoil that is mainly firm and compact.

Subclass IVw: Soils that have very severe limitations for cultivation because of excess water.

Unit IVw-2: Somewhat poorly drained and poorly drained soils that have a surface layer of fine sandy loam to sand and a subsoil of sand to clay.

Subclass IVs: Soils that have very severe limitations of stoniness, low moisture capacity, or other soil features.

Unit IVs-1: Nearly level to gently sloping, moderately well drained to somewhat excessively drained soils that have a surface layer of sand or coarse sand.

Class V: Soils not likely to erode but that have other limitations, impractical to remove, that limit their use largely to pasture or range, woodland, or wildlife food and cover.

Subclass Vw: Soils too wet for cultivation; drainage or protection not feasible.

Unit Vw-2: Deep, poorly drained soils that have a surface layer of sand and occur in depressions and small drainageways in the uplands.

Class VI: Soils that have severe limitations that make them generally unsuitable for cultivation and that limit their use largely to pasture or range, woodland, or wildlife food and cover.

Subclass VIe: Soils severely limited, chiefly by risk of erosion if protective cover is not maintained.

Unit VIe-2: Gently sloping to sloping, eroded, variable soils that have a surface layer of sandy loam to coarse sand and a subsoil that is clayey.

Subclass VIs: Soils generally unsuitable for cultivation and limited for other use by their moisture capacity, stones, or other features.

Unit VIs-2: Very gently sloping to sloping, very droughty soils that have a surface layer of sand.

Class VII: Soils that have very severe limitations that make them unsuited to cultivation and that restrict their use largely to woodland, grazing, or wildlife.

Subclass VIIw: Soils very severely limited by excess water.

Unit VIIw-1: Very poorly drained, swampy land that is frequently flooded.

Subclass VIIs: Soils very severely limited by moisture capacity, stones, or other soil features.

Unit VIIs-1: Excessively drained, droughty soil that has a surface layer of coarse sand and a subsoil of coarse sand several feet thick that occupies sloping ridges that resemble dunes.

Class VIII: Soils or landforms that have limitations that preclude their use for commercial production of plants, and that restrict their use to recreation, wildlife, water supply, or esthetic purposes. (None in this county)

Management by capability units

The soils in one capability unit have about the same limitations and similar risks of damage. The soils in one unit, therefore, need about the same kind of management, though they may have formed from different kinds of parent material and in different ways. The capability units are described in the following pages, and management is suggested for the soils of each unit.

CAPABILITY UNIT I-1

Only one soil, Norfolk loamy sand, 0 to 2 percent slopes, is in this capability unit. This deep, well-drained soil is on uplands. It has a surface layer of very friable loamy sand that is 12 to 18 inches thick. The subsoil is thick and consists of friable sandy clay loam that plant roots can penetrate readily.

This soil has good tilth and can be tilled within a wide range of moisture content. It has a thick, friable root zone, but the capacity for available moisture is only moderate. Water moves into and through the soil at a moderately rapid rate. The soil is low in natural fertility, contains little organic matter, and is strongly acid. It responds well to good management, especially to fertilization.

This soil occupies less than 1 percent of the county, and nearly all the acreage is cultivated. It is suited to cotton, corn, small grains, and many other different crops. The soil is especially well suited to peanuts, tobacco, vegetables, and truck crops. Some of the pasture and hay plants to which it is well suited are Coastal bermudagrass, bahiagrass, lupines, vetch, sericea lespedeza, millet, and crimson clover.

This soil has no special limitations. It can be used to grow row crops year after year, but growing the row crops in short rotations may be desirable on some farms. Turning under crop residues and green-manure crops helps to supply organic matter and to maintain favorable tilth and good structure if row crops are grown year after year. Phosphorus, potassium, and lime are required for high yields of most cultivated crops and pasture plants, and nitrogen is required for all nonlegumes.

Cultivated fields may require row direction to take care of excess water in spring. This soil is well suited to sprinkler irrigation.

CAPABILITY UNIT I-2

Only one soil, Tifton loamy sand, 0 to 2 percent slopes, is in this capability unit. This deep, well-drained soil is on uplands. Its surface layer is very friable, pebbly loamy sand that is 12 to 18 inches thick. The subsoil is thick and consists of friable sandy clay loam that roots can penetrate readily. Many pebbles or small, hard, rounded iron concretions are on the surface and in the surface layer and the upper part of the subsoil. There are softer concretions in the lower part of the subsoil.

This soil has a thick root zone and moderately rapid permeability. It is strongly acid and is low in natural fertility and in content of organic matter. This soil is slightly finer textured and has slightly higher available moisture capacity than the soil in capability unit I-1, and it makes slightly better response to fertilizer. Most of this soil has good tilth, but the tilth is less favorable in some areas where there are numerous iron concretions. In areas where peanuts are grown, small iron concretions are sometimes mixed with the peanuts that are harvested.

This soil occupies less than 1 percent of the county, and nearly all the acreage is cultivated. It is well suited to many different crops, including corn, cotton, peanuts, tobacco, vegetables, and truck crops. This soil is especially well suited to corn, cotton, and small grains.

Row crops can be grown on this soil year after year if crop residues and cover crops are turned under. The crop residues or cover crops supply organic matter and help to maintain favorable tilth and good structure.

For high yields of cultivated crops and pasture, annual applications of phosphate and potash are required and lime should be added occasionally. Nonlegumes require one or more applications of nitrogen annually unless they are followed by legumes or are grown with legumes.

This soil does not require special tillage practices or practices to control water. Some areas, however, require row direction to take care of excess water during periods of high rainfall. The soil has few limitations to the use of farm machinery. It is well suited to sprinkler irrigation.

CAPABILITY UNIT IIe-1

This capability unit consists of deep, well-drained soils that are gently sloping. The soils are on uplands. Their surface layer is very friable loamy sand that ranges from 5 inches in thickness in the eroded areas to 18 inches in the uneroded areas. The soils have a thick subsoil of friable sandy clay loam. The following soils are in this capability unit:

Norfolk loamy sand, 2 to 5 percent slopes.
Norfolk loamy sand, 2 to 5 percent slopes, eroded.

Water moves into and through these soils at a moderately rapid rate. In areas that are not eroded, the root zone is thick, but it is thinner in some eroded areas. The available moisture capacity is moderate. These soils have good tilth and can be cultivated within a wide range of moisture content. They respond well to good management and are easy to cultivate.

The soils of this capability unit occupy about 7 percent of the county. About 62 percent of the acreage is used for cultivated crops, 2 percent is in pasture, and 36 percent is wooded. The soils are well suited to row crops, to pasture and hay crops, and to legumes and small grains. Among the row crops to which they are best suited are corn, cotton, peanuts, tobacco, and truck crops. The uneroded areas are especially well suited to tobacco and peanuts. Some of the well-suited pasture and hay plants are Coastal bermudagrass, bahiagrass, lupines, millet, soybeans, sericea lespedeza, vetch, and crimson clover.

These soils have gentle slopes and are susceptible to erosion. Because of the hazard of erosion, they need to be cultivated on the contour, and a system that includes vegetated outlets should be provided to dispose of excess water. A well-rounded cropping system is needed in which close-growing crops or crops that produce a large amount of residue are grown about 25 to 50 percent of the time. Such a cropping system protects the soils and maintains the supply of plant nutrients and good structure. It also helps maintain the supply of organic matter, which is depleted at a rapid rate. Among the most effective close-growing crops are bahiagrass and Coastal bermudagrass, especially when used in a rotation with other crops in the cropping system, or grown for pasture or hay. Small grains, millet, lupines, and other close-growing crops are also desirable in the cropping system. Excellent response to good management can be expected from these soils.

A complete fertilizer and lime are required for high yields of all crops grown on the soils of this capability unit. Good tilth is easy to maintain, except where the plow layer has been eroded and now consists mostly of material that was formerly part of the subsoil. These soils are well suited to sprinkler irrigation.

CAPABILITY UNIT IIe-2

This capability unit consists of deep, well-drained soils that are gently sloping. These soils are on uplands. Their surface layer is loamy sand that ranges from about 4 inches in thickness in the eroded areas to about 18 inches in the uneroded areas (fig. 10). The soils have a thick subsoil of friable sandy clay loam. Numerous pebbles or hard iron concretions are on the surface and in the upper part of the subsoil. There are softer concretions in the lower part of the subsoil. The following soils are in this unit:

Tifton loamy sand, 2 to 5 percent slopes.
Tifton loamy sand, 2 to 5 percent slopes, eroded.

Water moves into and through these soils at a moderately rapid rate. In areas that are not eroded, the root zone is thick, but it is thin in some eroded areas. These soils have good tilth and can be cultivated within a wide range of moisture content. They are strongly acid, low in natural fertility, and contain little organic matter. These soils respond well to good management, especially to additions of fertilizer.

The soils of this capability unit occupy about 10 percent of the county. About 75 percent of the acreage is used for cultivated crops, 5 percent is in pasture, and 20 percent is in trees. The soils are suited to many different crops, such as corn, cotton, tobacco, peanuts, millet, and small grains, and they are especially well suited to corn and cotton. The soils are somewhat better suited to peach trees and pecan trees than the soils of unit IIe-1. Some of the pasture and hay plants to which these soils are well suited are Coastal bermudagrass, bahiagrass, lupines, vetch, sericea lespedeza, and crimson clover. The soils are slightly better suited to crimson clover, small grains, cotton, and corn than the soils of unit IIe-1, but they are somewhat less suited to tobacco.

Figure 10.—**A field of Tifton loamy sand, 2 to 5 percent slopes, where severe erosion by wind and water occurred during a 12-hour period early in spring. The white streak in the background is soil material that is being blown from this field.**

These soils contain more iron concretions, have a slightly finer textured subsoil, and are more susceptible to erosion than the soils in unit IIe-1, but they can be used and managed in about the same way. A good supply of plant nutrients is easier to maintain in these soils than in the soils of unit IIe-1, and yields may be slightly higher.

The soils in capability unit IIe-2 require moderate practices to protect them from erosion. They need to be cultivated on the contour, and terraces and vegetated outlets are needed to protect them from erosion caused by runoff. The cropping system should include close-growing crops or crops that produce a large amount of residue so that the soils will be covered during periods of critically high rainfall. Such crops also help to maintain the supply of organic matter, which is depleted at a rapid rate.

Among the close-growing crops that are the most effective for protecting the soils from erosion and for adding organic matter are bahiagrass and Coastal bermudagrass. These crops are especialy effective when grown for pasture or hay or when they are used in a grass-base cropping system. Small grains, millet, lupines, and other close-growing crops are also desirable in the cropping system. Excellent response to good management can be expected from these soils.

A complete fertilizer and lime are required for high yields of all crops and pastures on these soils. Even under the best management, the supply of organic matter is depleted rapidly. Turning under crop residues or including a cover crop in the cropping system helps to maintain the needed organic matter. Good tilth is easy to maintain, except where the soils are eroded and the plow layer consists of material that was formerly part of the subsoil. These soils are well suited to sprinkler irrigation.

CAPABILITY UNIT IIe-3

This capability unit consists chiefly of moderately well drained and somewhat poorly drained, gently sloping soils. The Lynchburg and Goldsboro soils have a surface layer of loamy sand that ranges from 18 to 30 inches in thickness. The Sawyer, Norfolk, and Cuthbert soils have a surface layer of loamy sand that ranges from 8 to 15 inches in thickness. The Sawyer and Cuthbert soils have a subsoil of clay, and the Norfolk soils have a subsoil of sandy clay loam. The following soils are in this capability unit:

Goldsboro loamy sand, thick surface, 2 to 5 percent slopes.
Lynchburg loamy sand, thick surface, 2 to 5 percent slopes.
Sawyer, Norfolk, and Cuthbert loamy sands, 2 to 5 percent slopes.
Sawyer, Norfolk, and Cuthbert loamy sands, 2 to 5 percent slopes, eroded.

Water moves into and through the Goldsboro, Lynchburg, and Norfolk soils at a moderately rapid rate. The movement of water is restricted in the lower part of the profile of the Sawyer and Cuthbert soils, however, because of the clay. The Goldsboro and Lynchburg soils receive seepage water from the surrounding uplands, and, as a result, they are wet in spring. All of these soils, except the Norfolk, are somewhat limited for cultivation by excess moisture. The Goldsboro, Lynchburg, and Norfolk soils have a thick root zone and moderate available moisture capacity, but the Sawyer soils have a somewhat limited root zone and moderately low available moisture capacity. All of the soils of this unit are low in natural fertility and contain little organic matter. They are strongly acid.

The soils of this capability unit occupy about 3 percent of the county. About 75 percent of the acreage is wooded, 20 percent is in cultivated crops, and 5 percent is in pasture. To some extent, the suitability of these soils for cultivation is limited by excess water early in spring. In years of normal rainfall, however, these soils dry out fairly early in spring and excellent yields are obtained from the crops that are grown on them. The excess water also limits the kinds of plants that can be grown. The soils are better suited to corn, tobacco, truck crops, and vegetable crops than to other row crops. Some of the pasture and hay plants to which they are best suited are bahiagrass, Coastal bermudagrass, lespedeza, and whiteclover.

These soils are subject to erosion caused by runoff. In addition, the Goldsboro and Lynchburg soils are wet because they receive runoff from the surrounding uplands. Most areas of the Goldsboro and Lynchburg soils can be protected by diversion ditches, which move the excess water from the surrounding uplands into natural drainageways.

Phosphorus, potassium, and lime are required for high yields of cultivated crops and pasture plants grown on these soils. Nitrogen is required for all nonlegumes.

CAPABILITY UNIT IIe–4

Only Gilead, Lakeland, and Cuthbert sands, 2 to 5 percent slopes, is in this capability unit. The soils of this mapping unit are very gently sloping and are well drained to somewhat excessively drained. They are sandy and occur on uplands. The Gilead soil has a surface layer that is sandy and is 10 to 16 inches thick. Its subsoil is moderately thin and is compact sandy clay. The Lakeland soil is sandy to a depth of 40 to 72 inches. The small areas of Cuthbert soil have a sandy surface layer and a moderately thin, clayey subsoil.

Water moves rapidly into and through the surface layer of these soils, and very rapidly through the lower part of the profile in the Lakeland soil. It moves slowly through the compact subsoil of the Gilead soil and through the clayey subsoil of the Cuthbert soil. All of these soils have good tilth and can be cultivated within a wide range of moisture content. Because of the shallow root zone of the Gilead and Cuthbert soils, however, plants are likely to be damaged in dry seasons by lack of moisture. The Lakeland soil has a thick root zone, but it is low in available moisture capacity, and in dry seasons it retains little moisture for plants to use. All of these soils are low in natural fertility and contain little organic matter. They are strongly acid.

Figure 11.—**Firebreak in a stand of pines on Gilead, Lakeland, and Cuthbert sands, 2 to 5 percent slopes. The trees have been cupped for turpentine.**

These soils occupy about 2 percent of the county. About 80 percent of the acreage is wooded (fig. 11), and 20 percent is used for cultivated crops and pasture.

The soils of this unit are moderately well suited to many different crops. Yields are moderately low, however, because of the shallow root zone of the Gilead and Cuthbert soils and the sandy texture and the low available moisture capacity of the soils. Yields can be increased decidely by turning under crop residues and including a cover crop in the cropping system. The crop residues and the cover crop increase the water-holding capacity of the soils.

These soils are suited to corn, cotton, tobacco, soybeans, and peanuts, but they are better suited to plants grown for pasture or hay. Such plants include bahiagrass, Coastal bermudagrass, lupines, millet, and small grains.

A cropping system that includes close-growing crops or high-residue crops helps to protect the soils from erosion and supplies the needed organic matter, which is depleted at a rapid rate. A well-managed cropping system that includes bahiagrass or Coastal bermudagrass is the most effective. These grasses may be grown for pasture or hay, or they may be used in a grass-base rotation with row crops.

If these soils are cultivated, they are highly susceptible to erosion. Practices to conserve water and to protect the soils from erosion consist of plowing on the contour or installing a terrace system that includes vegetated outlets. These soils respond well to fertilizer. When they are cultivated or used for pasture or hay, a complete fertilizer and lime are needed.

CAPABILITY UNIT IIw–2

This capability unit consists of deep, nearly level, moderately well drained and somewhat poorly drained soils. These soils occupy moderately low areas at the foot of very gently sloping uplands. Some areas are also adjacent to poorly drained natural drainageways, and others are on nearly level stream terraces. The surface layer is chiefly friable loamy sand that is 10 to 30 inches thick.

The subsoil is friable sandy clay loam. The following soils are in this unit:

Izagora soils.
Lynchburg loamy sand, thick surface, 0 to 2 percent slopes.

Water moves into and through the surface layer and the upper part of the subsoil at a moderate rate, but its movement is somewhat restricted in the lower part of the subsoil. Because the soils are nearly level, have slow runoff, and are slowly permeable in the lower part of the subsoil, drainage is impeded. These soils are wet and are somewhat slow to dry out in spring. They have a moderately thick root zone and moderate to low available moisture capacity. The content of organic matter is low to medium, and the soils are strongly acid and low in natural fertility. These soils have good tilth and can be cultivated within a fairly wide range of moisture content. They respond well to good management, especially to fertilizer.

The soils of this capability unit occupy less than 1 percent of the county. About 90 percent of the acreage is wooded. The suitability of these soils for row crops is somewhat limited by excess water. Among the crops to which the soils are best suited are corn, tobacco, sorghum, soybeans, and truck crops grown in summer. The pasture and hay plants to which the soils are best suited are bahiagrass, lespedeza, whiteclover, millet, and Coastal bermudagrass.

These soils are very productive if they are adequately drained. A drainage system should be established if the soils are to be used for pasture or for row crops. In most places adequate drainage can be provided by bedding and row direction with shallow, open ditches at the edges of the fields. Land leveling and shaping to eliminate the slight depressions will improve some areas. A complete fertilizer and lime are required for high yields of most cultivated crops and pasture plants. Nitrogen is needed for nonlegumes.

CAPABILITY UNIT IIs-1

This unit consists of well-drained soils that are nearly level or very gently sloping. The soils are on uplands. Their surface layer is friable loamy sand that ranges from 18 to 30 inches in thickness. Their subsoil is friable sandy clay loam through which water moves freely. The Tifton soil has many hard iron concretions on the surface and in the surface layer and subsoil. The concretions in the lower part of the subsoil are softer than those in the upper part. The following soils are in this unit:

Norfolk loamy sand, thick surface, 0 to 2 percent slopes.
Norfolk loamy sand, thick surface, 2 to 5 percent slopes.
Tifton loamy sand, thick surface, 2 to 5 percent slopes.

Water moves into and through these soils at a moderately rapid rate. The soils have good tilth and can be cultivated within a wide range of moisture content. They have a thick, friable root zone, but the available moisture capacity is moderately low. During short, dry periods, plants are likely to be damaged by lack of moisture. These soils are strongly acid, low in natural fertility, and contain little organic matter. They respond well to good management, especially if fertilizer and organic matter are added.

The soils of this capability unit occupy about 14 percent of the county. About 45 percent of the acreage is used for cultivated crops, 5 percent is in pasture, and 50 percent is wooded (fig. 12).

Figure 12.—**Pine trees on Norfolk loamy sand, thick surface, 2 to 5 percent slopes. The trees have been cupped selectively for turpentine.**

These soils are slightly droughty, which limits their suitability for crops to some extent. Among the plants to which the soils are best suited are peanuts, corn, tobacco, millet, grain sorghum, and sweetpotatoes. The soils are also well suited to pasture and hay plants, such as bahiagrass, Coastal bermudagrass, lupines, sericea lespedeza, and small grains.

The hazard of erosion is normally slight on these soils. Good management is needed to maintain the content of organic matter, which is depleted at a rapid rate. The organic matter helps to increase the moisture-holding capacity of the soils. In large, open areas it helps to prevent loose particles of soil material from being blown about by wind. Windblown particles sometimes damage young plants during the critical part of their growth.

A well-rounded cropping system that includes close-growing crops helps to maintain the needed organic matter in these soils. Among the close-growing crops that are the most effective in supplying organic matter are bahiagrass and Coastal bermudagrass. These crops can be used in a grass-base rotation or for pasture or hay. Other effective and useful close-growing crops are small grains, millet, and lupines.

Lime and a complete fertilizer are required for high yields of all crops grown on these soils. The soils are suited to sprinkler irrigation.

CAPABILITY UNIT IIIe-1

Only one soil, Norfolk loamy sand, 5 to 8 percent slopes, eroded, is in this capability unit. This eroded, well-drained soil is on uplands. It has a surface layer of very friable loamy sand that ranges from about 5 to 12 inches in thickness. The subsoil is moderately thick and is a friable sandy clay loam.

Water moves into and through this soil at a moderate rate. The soil has a moderately thick, friable root zone that has moderate available moisture capacity. This soil can be cultivated within a fairly wide range of moisture content. It is strongly acid, low in natural fertility, and contains little organic matter. The soil responds well to good management, especially to fertilizer and moisture-conserving practices. Tilth is good, except in small areas where the former subsoil has been exposed by erosion.

This soil occupies less than 1 percent of the county. About 60 percent of the acreage is wooded. The soil is suited to many different crops. Among the row crops to which it is best suited are corn, cotton, soybeans, millet, and grain sorghum. The soil is also well suited to Coastal bermudagrass, bahiagrass, lupines, vetch, and sericea lespedeza grown for pasture or hay.

This soil has stronger slopes than the soils of unit IIe–1, and the hazard of erosion is greater. Tilling on the contour and constructing terraces that have vegetated outlets help to control erosion. Including close-growing crops in the cropping system or crops that produce a large amount of residue is also helpful. Such crops help to maintain the fertility, good structure, and productivity of the soils, and they supply organic matter, which is depleted at a rapid rate. Among the close-growing plants that are the most effective for these purposes are bahiagrass and Coastal bermudagrass grown for pasture or hay or in a grass-base rotation with row crops. Other useful close-growing crops that could be included in the cropping system are small grains, millet, and lupines. A complete fertilizer and lime are required for high yields of all crops. The kinds and amounts of fertilizer to use should be determined with the aid of soil tests.

CAPABILITY UNIT IIIe–2

Only one soil, Tifton loamy sand, 5 to 8 percent slopes, eroded, is in this capability unit. This eroded, gently sloping, well-drained soil is on the uplands. Its surface layer is pebbly, very friable loamy sand that is 5 to 12 inches thick. The subsoil consists of friable sandy clay loam. Many pebbles or hard iron concretions are on the surface and in the surface layer and subsoil. The concretions on the surface, in the surface layer, and in the upper part of the subsoil are hard, but those in the lower part of the subsoil are softer.

Water moves into this soil at a moderate rate. The soil has a moderately friable root zone, but the available moisture capacity is only moderate. The soil has good tilth, except in small areas where erosion has exposed the former subsoil. It can be cultivated within a moderately wide range of moisture content. The soil is strongly acid, is low in natural fertility, and contains little organic matter.

This soil occupies less than 1 percent of the county. About 80 percent of the acreage is cultivated. The soil is suited to many different crops, including cotton, corn, soybeans, and grain sorghum. Among the best suited pasture and hay plants are Coastal bermudagrass, bahiagrass, lupines, vetch, sericea lespedeza, millet, crimson clover, and small grains.

In use and management this soil is similar to the soil in capability unit IIIe–1, but yields are generally slightly higher. The soil also contains more iron concretions and has a subsoil that is slightly finer textured. In some areas the tilth has been made less favorable by the concretions.

A complete system for disposing of excess water helps to curb erosion caused by runoff on this soil. Such a system should include terraces and vegetated outlets. A cropping system is also needed in which close-growing crops or crops that produce a large amount of residue are grown a large part of the time. These crops provide adequate cover for the soil and help to maintain its fertility, good tilth, good structure, and productivity. They also supply organic matter, which is depleted at a rapid rate. Among the most effective close-growing crops are bahiagrass and Coastal bermudagrass, especially when grown for pasture or hay or used in a grass-base rotation with row crops. Small grains, millet, lupines, and other close-growing crops are also desirable to help protect this soil from erosion caused by runoff. A complete fertilizer and lime are required for high yields of all crops and pasture plants. The kinds and amounts of fertilizer to use should be determined with the aid of soil tests.

CAPABILITY UNIT IIIe–3

This capability unit consists of moderately well drained and well drained, very gently sloping soils. These soils are on ridges and side slopes in the uplands. The surface layer of the Boswell soils is very friable sandy loam that is 4 to 16 inches thick. The surface layer of the Sawyer, Norfolk, and Cuthbert soils is very friable loamy sand. The Boswell, Sawyer, and Cuthbert soils have a more clayey subsoil than the Norfolk soils, which have a subsoil of sandy clay loam. The following soils are in this unit:

Boswell sandy loam, 2 to 5 percent slopes.
Boswell sandy loam, 2 to 5 percent slopes, eroded.
Sawyer, Norfolk, and Cuthbert loamy sands, 5 to 8 percent slopes.
Sawyer, Norfolk, and Cuthbert loamy sands, 5 to 8 percent slopes, eroded.

Water moves into and through the surface layer of these soils at a moderately rapid rate. The movement of water is impeded in the subsoil of the Boswell, Sawyer, and Cuthbert soils, however, by the clayey texture of the soil material. The restricted movement of water in the clayey subsoil limits the range for cultivated crops in all of these soils except the Norfolk. The Norfolk soils have a thick root zone, but the Boswell, Cuthbert, and Sawyer soils have a shallow root zone because of the clayey subsoil.

In areas that are not eroded, the soils of this unit have good tilth, but the tilth is somewhat poorer and the surface runoff is more rapid in the eroded areas. These soils are low in natural fertility and contain little organic matter. They are strongly acid.

The soils of this capability unit occupy about 2 percent of the county. About 70 percent of the acreage is wooded, 5 percent is in improved pasture, and 25 percent is in cultivated crops. The range of suitability for plants is limited by the hazard of erosion, the clayey subsoil, and the limited root zone. These soils are better suited to pasture and hay than to cultivated crops, and they are also better suited to trees. Yields of cotton, corn, peanuts, small grains, and truck crops are low to moderate. Some of the suitable pasture plants are bahiagrass, Coastal bermudagrass, sericea lespedeza, and crimson clover. Pines grow well on these soils.

Tilling on the contour and providing a system of terraces with vegetated outlets help to curb surface runoff and to prevent further erosion. The cropping system should include close-growing crops or crops that produce a large amount of residue. These help control erosion and supply organic matter, which is depleted rapidly in these soils. The organic matter helps to increase the moisture-holding capacity of the soils and improves their structure, tilth, and fertility. Coastal bermudagrass, small grains, millet, and lupines are also desirable in the cropping system. A complete fertilizer and lime are required for maximum yields of all crops and pasture plants. Nonlegumes generally require one or more applications of nitrogen unless they follow or are grown with legumes. The kinds and amounts of fertilizer to use, however, should be determined with the aid of soil tests.

CAPABILITY UNIT IIIe-4

This capability unit consists of moderately well drained to somewhat excessively drained, very gently sloping or gently sloping soils on ridgetops and side slopes in the uplands. The Gilead and Cuthbert soils have a surface layer of sand that is 4 to 16 inches thick. The Tifton soil has a surface layer of sandy loam that contains many small iron concretions and is 4 to 12 inches thick. The Lakeland soils are sandy to a depth of 40 to 72 inches. The Gilead subsoil is compact sandy clay loam, but the Cuthbert subsoil is more clayey. The following soils are in this unit:

Gilead, Lakeland, and Cuthbert sands, 2 to 5 percent slopes, eroded.
Gilead, Lakeland, and Cuthbert sands, 5 to 8 percent slopes.
Tifton sandy loam, thin solum, 2 to 5 percent slopes, eroded.

In the Gilead soils the movement of water is impeded to some extent by the compact subsoil. In the Tifton and Cuthbert soils, it is impeded by the clayey material in the subsoil. All of these soils can be cultivated within a wide range of moisture content. Because of the moderately shallow root zone of the Gilead, Cuthbert, and Tifton soils, however, lack of moisture is likely to damage plants during dry periods. The Lakeland soils have a thick root zone, but their available moisture capacity is low because of the sandy texture of the soil material.

In areas that are not eroded, all soils of this capability unit have good tilth. In areas that are eroded, however, runoff is rapid, the present surface layer consists of material that was formerly part of the subsoil, and tilth is poorer. These soils are low in natural fertility, and they contain little organic matter. They are strongly acid.

The soils of this capability unit occupy about 4 percent of the county. About 70 percent of the acreage is wooded, 25 percent is in cultivated crops, and 5 percent is in improved pasture. The soils are suited to many different crops, but yields are moderately low because of the shallow root zone, the sandy texture in some areas, and the low available moisture capacity. Yields can be increased decidedly, however, if organic matter is built up by turning under crop residues and cover crops. Some of the crops to which these soils are well suited are corn, cotton, soybeans, peanuts, and small grains. Among the better suited plants for pasture and hay are Coastal bermudagrass, bahiagrass, lupines, sericea lespedeza, and crimson clover.

These soils require intensive practices that protect them from further erosion and that increase their intake of water. A complete system of terraces with vegetated outlets helps to control erosion. In addition, the soils should be tilled on the contour and a cropping system used that consists mainly of cover crops grown both in winter and in summer.

A cropping system that includes close-growing crops or crops that produce a large amount of residue helps to provide adequate cover for protection during critical periods of heavy rainfall. It also helps to maintain or improve the fertility, tilth, structure, and productivity of the soils. Among the close-growing plants that are the most effective for these purposes are bahiagrass and Coastal bermudagrass. These plants are especially effective when grown for pasture or hay or used in a grass-base rotation with row crops. Small grains, millet, lupines, and other close-growing crops are also desirable.

A complete fertilizer and lime are generally required for maximum yields of all crops and pasture and hay plants. The proper kinds and amounts of fertilizer should be determined with the aid of soil tests. These soils are suited to sprinkler irrigation for row crops if an adequate system of terraces and vegetated outlets is used to control surface runoff.

CAPABILITY UNIT IIIe-5

Only one soil, Norfolk loamy sand, thick surface, 5 to 8 percent slopes, is in this capability unit. This deep, well-drained, gently sloping, sandy soil is on the uplands. It has a surface layer of very friable loamy sand that is 18 to 30 inches thick. Its subsoil is friable sandy clay loam.

Water moves into and through this soil at a moderately rapid rate. The soil has good tilth and can be tilled within a wide range of moisture content. The root zone is thick, but because of the sandy texture of the subsoil, the available moisture capacity is moderately low. This soil is low in natural fertility and contains little organic matter. It is strongly acid.

This soil occupies about 1 percent of the county. About 90 percent of its acreage is wooded. The suitability of this soil for plants is limited by its sandy texture and susceptibility to erosion. The soil is not suitable for regular cultivation, but it can be used occasionally for row crops. Among the row crops to which it is best suited are peanuts, watermelons, sweetpotatoes, early maturing truck crops, corn, and soybeans. Some of the better suited pasture and hay plants are bahiagrass, Coastal bermudagrass, lupines, sericea lespedeza, and small grains.

If this soil is cultivated, practices should be used to help control erosion. Such practices include tilling on the contour, stripcropping, and planting close-growing crops or crops that produce a large amount of residue. These practices also provide organic matter, which is depleted rapidly in this soil.

Bahiagrass, Coastal bermudagrass, and other deep-rooted plants are especially well suited to these soils, whether used in a rotation with row crops or for pasture or hay.

A complete fertilizer and lime are required for the maximum yields of all field crops and pasture plants grown on this soil. The kinds and amounts of fertilizer should be determined with the aid of soil tests. Nonlegumes require one or more applications of nitrogen, unless they follow or are grown with legumes.

CAPABILITY UNIT IIIw-1

Only one soil, Klej loamy fine sand, 0 to 2 percent slopes, is in this capability unit. This nearly level, moderately well drained to somewhat poorly drained, sandy soil is at the foot of very gently sloping uplands and is adjacent to alluvial soils that are along streams. The surface layer is deep, very friable loamy fine sand that is 18 to 30 inches thick. Below the surface layer is sandy material that extends to a depth of several feet.

Water moves into and through this soil at a moderately rapid rate. The soil has good tilth, a thick root zone, and moderate to low available moisture capacity. It is strongly acid, low in natural fertility, and contains little organic matter. This soil responds well to good management, especially if fertilizer is applied frequently, organic matter is added, and drainage is provided.

This soil occupies less than 1 percent of the county, and about 90 percent of its acreage is wooded. The soil is suited to many different plants. Among the row crops to which it is best suited are tobacco, to which it is especially well suited, and corn, grain sorghum, soybeans, and truck crops. Some of the better suited pasture and hay plants are bahiagrass, Coastal bermudagrass, whiteclover, lupines, lespedeza, and small grains. Row crops can be grown on this soil year after year, but it may be desirable to grow them in short rotations. Turning under crop residues and green-manure crops helps to supply organic matter and to maintain favorable tilth and good structure if row crops are grown year after year.

Planting is sometimes delayed on this soil because of excess moisture. Yields are reduced in wet years. If this soil is cultivated, it can be bedded by plowing. Shallow ditches around the boundaries of the fields will provide a place for runoff water to collect. Land leveling and shaping to eliminate depressions will improve drainage in some areas. These simple drainage practices are necessary during the growing season to protect the soils from runoff that collects during long periods of heavy, intensive rainfall.

Lime and a complete fertilizer in frequent applications are necessary for maximum yields on this soil. The kinds and amounts of fertilizer should be determined with the aid of soil tests. Crops on this soil respond well to sprinkler irrigation.

CAPABILITY UNIT IIIw-2

This capability unit consists of moderately well drained or somewhat poorly drained soils that are nearly level. The soils are on the flood plains of the Oconee River. Their surface layer ranges from very friable silt loam to fine sandy loam that is 10 to 18 inches thick. Their subsoil is firm silty clay or firm silty clay loam that is several feet thick. The following soils are in this unit:

Chewacla silt loam.
Wahee fine sandy loam.

Water moves into and through these soils at a moderately slow rate. The soils have a moderately deep root zone, and their available moisture capacity is moderately high. They are strongly acid, moderately low in natural fertility, and contain little organic matter. These soils respond well to good management, especially if surface drainage is provided and fertilizer is added.

The soils of this capability unit occupy less than 1 percent of the county. All the acreage is wooded. The soils are limited in their suitability for plants by their slow internal drainage. Among the row crops to which they are best suited are corn, grain sorghum, and truck crops. The pasture and hay plants to which they are best suited are bahiagrass, dallisgrass, tall fescue, most whiteclovers, and lespedeza.

Excess moisture limits the suitability of these soils for plants. The soils are subject to overflow during exceptionally high floods, and the floodwaters remain for long periods. If the soils are cleared and are cultivated or used for pasture, the floodwaters can be expected to damage some crops and pasture plants. Some surface drainage, as well as drainage through the profile, is required if the soils are cultivated or are used for pasture. Where it would be economically feasible to clear the areas, however, yields of cultivated crops are likely to be high. These soils respond well to good management, especially to additions of fertilizer.

Row crops could be grown year after year on these soils, but it is better to grow them in short rotations. Cover crops should be turned under to supply organic matter and to maintain favorable tilth and good structure. A complete fertilizer and lime are required for high yields of cultivated crops and for pasture or hay. The proper kinds and amounts of fertilizer can be determined with the aid of soil tests.

CAPABILITY UNIT IIIs-1

This capability unit consists of moderately well drained to somewhat excessively drained, sandy soils that are very gently sloping. The soils are on uplands. Their surface layer ranges from a loamy sand in the Lakeland soil to a coarse sand in the Gilead, Lakeland, and Cuthbert soils. The surface layer of most of these soils is 30 to 72 inches thick, but that of the Lakeland coarse sand is 40 to 72 inches thick. The texture of the subsoil ranges from sandy loam to sandy clay. The subsoil of the Gilead soil is compact sandy clay loam, but that of the Cuthbert soil is more clayey. The Lakeland soil has a subsoil of friable sandy clay loam. The following soils are in this unit:

Gilead, Lakeland, and Cuthbert coarse sands, 2 to 5 percent slopes.
Lakeland loamy sand, shallow, 2 to 5 percent slopes.

Water moves into and through the Lakeland soils at a very rapid date. The movement of water is impeded in the Gilead and Cuthbert soils, however, by the compact subsoil.

The soils of this capability unit have good tilth. All of them can be cultivated within a wide range of moisture content. Lack of moisture is likely to damage plants during short, dry periods, however, because of the shallow root zone of the Gilead and Cuthbert soils and the sandy texture of the Lakeland soils. These soils are low in natural fertility and contain little organic matter. They are strongly acid.

The soils of this capability unit occupy about 3 percent of the county. About 75 percent of the acreage is wooded, 20 percent is in cultivated crops, and 5 percent is in improved pasture. The sandy texture of the soils limits their suitability for plants. The soils are moderately well suited to corn, tobacco, peanuts, watermelons, sweetpotatoes, early maturing truck crops, and grain sorghum. Among the pasture and hay plants to which they are best suited are bahiagrass, Coastal bermudagrass, sericea lespedeza, lupines, and millet.

These soils are only slightly eroded, but intensive practices are necessary to maintain adequate water-holding capacity, to protect the soils from further erosion, and to obtain high yields. The cropping system should include cover crops that produce a large amount of residue. The residue provides an adequate supply of organic matter, which improves the water-holding capacity. A large amount of organic matter also helps prevent windblown sand from damaging young plants in spring. The organic matter is depleted in these soils at a rapid rate. Bahiagrass or Coastal bermudagrass, included in the rotation as a mulch, helps to provide a constant supply of organic matter.

A complete fertilizer and lime are required for all plants grown on these soils. For maximum yields, at least two applications of nitrogen are required for all nonlegumes. The proper kinds and amounts of fertilizer, however, should be determined with the aid of soil tests. These soils are suited to sprinkler irrigation, especially for tobacco and early maturing truck crops.

CAPABILITY UNIT IVe-3

This capability unit consists of moderately well drained and somewhat poorly drained, gently sloping and very gently sloping soils. These soils are on ridges and side slopes in the uplands. The surface layer is very friable sandy loam that is about 3 to 12 inches thick. The subsoil is plastic, clayey material that is several feet thick. The following soils are in this unit:

Boswell sandy loam, 5 to 8 percent slopes, eroded.
Susquehanna sandy loam, 2 to 5 percent slopes.
Susquehanna sandy loam, 2 to 5 percent slopes, eroded.

In areas of these soils that are not eroded, water moves into the surface layer at a moderate rate, but in eroded areas it moves somewhat slowly. The movement of water through the underlying dense clay is very slow. Because the clayey material is near the surface, these soils have a shallow root zone. Their available moisture capacity is low. In areas that are not eroded, these soils have fair to good tilth, but tilth is very poor and runoff is rapid in the eroded areas. The soils can be cultivated only within a narrow range of moisture content. They are low in natural fertility, contain little organic matter, and are strongly acid.

The soils of this capability unit occupy about 1 percent of the county. About 90 percent of the acreage is in trees. The suitability of the soils for cultivation is limited by the nearly impervious, clayey subsoil, the rapid surface runoff, and the limited available moisture capacity. The soils are better suited to pasture, hay, and trees than to cultivated crops. Yields of cotton, corn, peanuts, small grains, and truck crops are low to moderate. Among the pasture and hay plants to which the soils are best suited are bahiagrass, Coastal bermudagrass, and lespedeza.

These soils should be tilled on the contour. They also need a water-disposal system that includes vegetated outlets to help curb surface runoff. The cropping system should include close-growing crops or crops that produce a large amount of residue to protect the soils from erosion and to provide organic matter, which is depleted at a rapid rate. A good supply of organic matter improves the moisture-holding capacity and makes the soils more porous. It also improves their tilth, fertility, and productivity. Among the most effective close-growing crops to use in rotation with row crops are Coastal bermudagrass and bahiagrass. Small grains, millet, lupines, and other close-growing crops are also desirable in the cropping system. A complete fertilizer and lime are required for the maximum yields of all crops.

CAPABILITY UNIT IVe-4

This capability unit consists of moderately well drained to somewhat excessively drained, gently sloping, eroded soils that are on ridges and side slopes. The Gilead, Cuthbert, and Tifton soils have a surface layer of sand or sandy loam that is 14 to 16 inches thick. Many small iron concretions are on the surface of the Tifton soil. The Lakeland soil is sandy to a depth ranging from 30 to 72 inches. The subsoil of the Gilead and Tifton soils is firm sandy clay loam to sandy clay, but that of the Cuthbert soil is more clayey. The following soils are in this unit:

Gilead, Lakeland, and Cuthbert sands, 5 to 8 percent slopes, eroded.
Tifton sandy loam, thin solum, 5 to 8 percent slopes, eroded.

Water moves into these soils at a moderately rapid to rapid rate. The downward movement of water is impeded in the Gilead soil, however, by the compact subsoil, and in the Tifton and Cuthbert soils, by clayey material. During dry periods, lack of moisture is likely to damage crops grown on the Gilead, Cuthbert, and Tifton soils because of the moderately shallow root zone. The Lakeland soil has a thick root zone, but its sandy texture causes it to have low available moisture capacity. In most areas of these soils, tilth is good, but in small, severely eroded areas where the former subsoil is exposed, tilth is poor. The soils are low in natural fertility and contain little organic matter. They are strongly acid.

The soils of this capability unit occupy approximately 4 percent of the county. About 9 percent of the acreage is in cultivated crops, 1 percent is in pasture, and 90 percent is in trees. The soils are suited to many different plants. Yields are moderately low, however, because of the shallow root zone, the sandy texture in some areas, and the low available moisture capacity. Among the crops to which these soils are best suited are corn, small grains, peanuts, vegetables, and truck crops. Some of the pasture and hay crops that are best suited are Coastal bermudagrass, bahiagrass, vetch, and sericea lespedeza.

These soils are droughty and subject to severe erosion. To help control surface runoff, tillage ought to be on the contour and a system provided to dispose of excess water. This system should include vegetated outlets. If the soils are cultivated, the cropping system should include, at least 75 percent of the time, close-growing crops and crops that produce a large amount of residue. The close-growing crops and crop residues will help to control erosion and to maintain the content of organic matter. A complete fertilizer and lime are required for maximum yields of all crops. The kinds and amounts of fertilizer to use should be determined with the aid of soil tests. If sprinkler irrigation is used, the water should be applied carefully. An improperly used system could be harmful.

CAPABILITY UNIT IVw-2

This capability unit consists of somewhat poorly drained and poorly drained soils on the flood plains of streams. The surface layer of these soils varies widely in texture and in thickness. The surface layer of Alluvial land ranges from silt loam to sand in texture and from a few inches to several feet in thickness. The Leaf and Myatt soils have a friable surface layer that is 10 to 16 inches thick. The surface layer of the Rains soil is very friable and is 24 to 30 inches thick. The soil material in the lower part of Alluvial land is sand to sandy clay loam. The following soils are in this unit:

Alluvial land.
Leaf fine sandy loam.
Myatt sandy loam.
Rains sandy loam, thick surface, 2 to 5 percent slopes.

Except in the uppermost few inches of the surface layer, these strongly acid soils are moderately low in natural fertility and they contain little organic matter. The water table is high, and the soils receive seepage water and runoff from the surrounding uplands. They are flooded frequently. The Leaf and Myatt soils are chiefly in low, wet areas where water is ponded on them for long periods. Alluvial land and the Rains soil are along intermittent, small streams and in drainageways.

These soils occupy about 20 percent of the county. All the acreage is in forest that consists chiefly of hardwoods and pines. There is also a vigorous growth of shrubs and grasses that tolerate water. These soils are not used for cultivated crops. Some areas that would be economically feasible to drain, however, could be used to grow vegetables and pasture plants, such as bahiagrass, dallisgrass, and most whiteclovers. Probably the best use of these soils would be to grow trees under good management that includes improved drainage and control of hardwoods. These soils are well suited to growing pines for lumber, pulpwood, and naval stores.

CAPABILITY UNIT IVs-1

This capability unit consists of nearly level to gently sloping, moderately well drained to somewhat excessively drained, sandy soils on ridges in the uplands. The Lakeland soils are sandy to a depth of 40 to more than 72 inches. The Gilead soil has a surface layer of coarse sand over a subsoil of compact sandy clay loam. The Cuthbert soil occurs in small patches. It has a surface layer of coarse sand and a clayey subsoil. The following soils are in this unit:

Gilead, Lakeland, and Cuthbert coarse sands, 5 to 8 percent slopes.
Lakeland sand, 0 to 5 percent slopes.
Lakeland sand, 5 to 8 percent slopes.

Water moves into and through the Lakeland soils at a very rapid rate. The movement of water is impeded in the Gilead and Cuthbert soils by the compact subsoil. All of the soils can be cultivated within a wide range of moisture content. The Lakeland soils have a thick root zone, but because of their sandy texture, they have low available moisture capacity. The Gilead and Cuthbert soils have a shallow root zone. Therefore, lack of moisture is likely to damage plants during dry seasons.

The soils of this capability unit are low in natural fertility and contain little organic matter. They are strongly acid.

The soils of this capability unit occupy about 16 percent of the county. More than 90 percent of the acreage is in trees. Because these soils have a sandy texture and are droughty, their suitability for plants is greatly limited. These soils are not suited to regular cultivation, but they can be used occasionally for corn, peanuts, or other row crops. Among the deep-rooted plants to which these soils are best suited are Coastal bermudagrass and bahiagrass. Even under a good system of management, the organic matter in the soils is rapidly depleted. Turning under crop residues and green-manure crops is one way to add organic matter. Plant nutrients leach out rapidly from most of these soils, and frequent applications of fertilizer are required for best yields. The available moisture capacity, however, is too low for the soils to utilize efficiently a large amount of fertilizer.

CAPABILITY UNIT Vw-2

This capability unit consists of deep, poorly drained soils in depressions and in small drainageways in the uplands. The surface layer of these soils is dark-gray sand that is 6 to 12 inches thick. It is underlain by light-gray to white, loose sand. This layer of sand grades to sandy loam or sandy clay loam at a depth of 30 to 48 inches. The following soils are in this unit:

Plummer sand, 0 to 2 percent slopes.
Plummer sand, 2 to 5 percent slopes.

These soils have rapid permeability. They are subject to overflow during wet seasons, and for a long period of time, they receive seepage water from soils at higher elevations. These soils are low in natural fertility. Except for the dark-colored surface layer, they contain little organic matter. The soils are strongly acid.

These soils occupy about 3 percent of the county. Almost all of the acreage is wooded. The soils are not suited to cultivation, because of the hazard of flooding. Where the cost would be justified, the soils can be drained and used for pasture. Pasture plants that do not require a deep root zone are best suited. Pines grow well, and excellent yields of products for naval stores are obtained. Lime and a complete fertilizer are required for maximum yields of pasture.

CAPABILITY UNIT VIe-2

The soils of this capability unit vary widely in characteristics. They are gently sloping and sloping and are on uplands. The Gilead, Lakeland, and Cuthbert soils and Sandy and clayey land have a surface layer of sand to coarse sand that is 3 to 42 inches thick. The surface layer of these soils contains various amounts of rounded quartz pebbles, and some areas have outcrops of clay. Their subsoil is sandy clay loam and sandy clay that grades to dense clay. It is 4 to 18 inches thick. The Sunsweet and Susquehanna soils have a surface layer of very friable sandy loam that is 4 to 16 inches thick. Their subsoil is thin, discontinuous sandy clay, and they have a substratum of dense clay. In some places the surface layer contains varying amounts of iron concretions. In other places it contains small, rounded quartz pebbles. In still other places it contains both concretions and quartz pebbles, and in some places it contains no concretions or pebbles. The following soils are in this unit:

Gilead, Lakeland, and Cuthbert sands, 8 to 12 percent slopes, eroded.
Sandy and clayey land.
Sunsweet sandy loam, 5 to 12 percent slopes, eroded.
Susquehanna sandy loam, 5 to 8 percent slopes.
Susquehanna sandy loam, 5 to 8 percent slopes, eroded.

The movement of water through these soils is impeded by the subsoil and substratum of dense clay. The rate of infiltration ranges from slow to rapid, and lack of water during dry periods is likely to cause plants to be damaged. These strongly acid soils contain little organic matter and are low in natural fertility.

The soils of this capability unit occupy about 2 percent of the county. About 7 percent of the acreage is in pasture, and the rest is wooded. The soils have severe limitations that restrict their suitability for plants and make them generally unsuitable for cultivation. Their best use is probably for well-managed, permanent vegetation, such as pines, improved pasture plants, or cover for wildlife. The pasture plants to which these soils are best suited are Coastal bermudagrass, bahiagrass, and sericea lespedeza. Where pasture plants are established, a complete fertilizer and lime are required.

CAPABILITY UNIT VIs-2

This capability unit consists of somewhat excessively drained or excessively drained, very droughty soils. The soils are very gently sloping to sloping and are on ridgetops and side slopes. They have a surface layer of loose or very friable sand or coarse sand. The sand or coarse sand extends to a depth of 42 to more than 72 inches. The following soils are in this unit:

Lakeland sand, 8 to 12 percent slopes.
Lakeland coarse sand, deep, 2 to 5 percent slopes.

The soils of this capability unit have rapid to very rapid rates of permeability and infiltration. The available moisture capacity is low to very low. The soils are strongly acid and low in natural fertility. They contain little organic matter.

The soils of this unit occupy less than 1 percent of the county. All of the acreage is wooded. The soils have only a narrow range of suitability for plants because they are sandy and droughty. Yields of even the best suited pasture plants, such as Coastal bermudagrass, Suwannee bermudagrass, and bahiagrass, are moderately low. Probably the best use of these soils is as well-managed woodland.

CAPABILITY UNIT VIIw-1

Only one land type, Swamp, is in this capability unit. This land type is poorly drained, and it is on the flood plains of the larger streams, where it is flooded frequently. The floodwaters remain on the areas for long periods of time. This land type shows little profile development because it receives small deposits of soil material each time it is flooded. It is made up of alluvial soil material that has a texture ranging from mucky loam to coarse sand. The color and thickness of the soil material vary widely.

Swamp is difficult to drain. It occupies about 2 percent of the county, and all of the acreage is in trees. A vigorous growth of cypress and hardwoods that tolerate a large amount of water once grew on the areas, but most of the trees have been harvested. Now, only the smaller and less valuable trees remain. The timber can be harvested only in exceptionally dry periods, usually late in summer or in fall when the areas are least likely to be flooded.

CAPABILITY UNIT VIIs-1

Only one soil, Lakeland coarse sand, deep, 5 to 12 percent slopes, is in this capability unit. This gently sloping to sloping, excessively drained, sandy soil is on uplands and occupies ridges that resemble dunes. It is chiefly in a narrow strip on the eastern side of Pendleton Creek. The soil is droughty. Its surface layer is coarse sand, and it has a subsoil of loose coarse sand that extends to a depth of 6 feet or more.

This soil has very rapid permeability and a very rapid rate of infiltration. The available moisture capacity is very low. The soil is strongly acid and is low in natural fertility. The content of organic matter is low.

This soil occupies less than 1 percent of the county. All the acreage is in trees. Because of the very low available moisture capacity and low natural fertility, the soil supports only limited vegetation that consists chiefly of scattered scrub oaks and longleaf pines. This soil is probably best suited to trees. If feasible, the scrub oaks should be controlled so that pines can reseed. Because of the rounded and uniform size of the sand grains, this soil is of low value, even for construction purposes.

General Management of Cropland

Practices needed to grow crops and to protect the soils depend on the nature of the surface soil and subsoil and on the degree and shape of the slope. The surface soil is ordinarily that part of the soil material moved in tillage. In many places, especially in eroded areas, the surface soil is thin and includes some material from the subsoil. In other areas the surface layer is thick, and in those areas the needs of the soils differ from those of the eroded soils. The surface layer is the place where roots make most of their development, and it carries much of the available moisture and nutrients used by crops. It is moderately easy to change, both chemically and physically, by erosion, plowing, and adding fertilizer or organic matter. Soils should be managed so as to maintain good tilth and good structure in the surface layer.

The capability and productivity of a soil are determined, to a great extent, by the charactertistics of the subsoil. In general, the subsoil changes less readily than the surface soil, but its texture, water-holding capacity, and other properties have a direct influence on the suitability of the soil as a medium for the growth of plants.

A sloping soil that is subject to erosion needs to be protected from the action of running water. A system for disposing of excess water is essential for all soils on which runoff occurs. Such a system, if properly built and maintained, controls the flow of excess water. It thus protects the soil from erosion so that further deterioration or gullying does not occur. A water disposal system should include vegetated waterways and a collection area for excess water. It ought to be constructed so as to carry water away from the area at a velocity that will not cause erosion. This water that moves slowly does not cause gullies to form in the natural drainageways or in areas where water has accumulated.

Areas in which water accumulates and remains for long periods should be drained so that the aeration of the soils will be improved. In addition, a better relationship between soil and moisture content will be obtained and plants can make desirable growth. Simple surface drainage may be adequate; more intensive ditch drainage or tile drainage may be required, however, depending on the characteristics of the soils.

A suitable cropping system needs to be planned for each kind of soil or group of similar soils. Close-growing crops or crops that produce a large amount of residue should be grown to provide organic material and cover that will protect against erosion. Stalks, stubble, and other crop residues ought to be managed also to provide a cover for the soils.

Allowing livestock to harvest corn or grain sorghum is a good practice, but the animals should be removed after the grain has been consumed. If they are allowed to remain after that time, they will trample the soils, causing compaction and erosion. After the animals have been removed, the remaining residue ought to be mowed, preferably with a rotary mower. Tillage to prepare the seedbed, as well as subsequent cultivation, should be done in such a way that much of the crop residue is left on the surface. This practice increases the intake of water and the water-holding capacity of the soils, and it also decreases erosion from surface runoff and from high winds.

A liberal supply of fertilizer and lime should be applied to all crops. The rates need to be determined by soil tests, interpreted in relation to the history of the field and the other practices that are followed.

Many of the cultivated soils of Treutlen County have a sandy surface layer, are normally well drained, and are well aerated. They are friable and easily tilled, but they are susceptible to erosion. Many of them, however, are loose instead of friable and lack the capacity to absorb and hold enough moisture and nutrients for plants to grow well. Consequently, they are somewhat droughty and low in fertility. Generally, the most practical and economical method of improving such soils is to add organic matter and fertilizer.

Crop residues and animal manure are the most common sources of organic material. The organic matter is a temporary product. Crop residues and other materials that are composed chiefly of organic matter pass through several biological changes that eventually reduce them to carbon dioxide, water, and mineral compounds. The warm temperature and abundant rainfall in this county, as well as the aeration of the soil and frequent tillage all tend to make the decomposition of organic material a rapid process. New organic material needs to be added regularly to keep the soils in good condition.

Estimated Yields

Table 2 gives estimated average acre yields of the principal crops grown in the county for each of the soils. These estimates are based on two levels of management. In columns A are estimated yields to be expected under the management generally practiced in the county. These estimates are based chiefly on observations made by the soil scientists while they were making the survey; on interviews with farmers; on information obtained from other agricultural workers who have had experience with the soils and crops of the county; and on records, when available, of crop yields by kind of soil.

TABLE 2.—*Estimated acre yields of the principal crops grown under two levels of management*

[Columns A represent average yields obtained under average management practices; columns B represent average yields obtained under improved management practices. Absence of yield indicates crop is not commonly grown and the soil is not well suited to it under the management specified]

Soil	Corn		Cotton		Tobacco		Oats		Coastal bermudagrass				Bahiagrass grown for pasture	
									Grown for hay		Grown for pasture			
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Lb.*	*Lb.*	*Lb.*	*Lb.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Lb.*[1]	*Lb.*[1]	*Lb.*[1]	*Lb.*[1]
Alluvial land														
Boswell sandy loam, 2 to 5 percent slopes	20	35	300	400	600	1,000	15	35	2	5	125	300	125	300
Boswell sandy loam, 2 to 5 percent slopes, eroded	20	35	200	300			15	35	2	5	125	300	125	300
Boswell sandy loam, 5 to 8 percent slopes, eroded	15	25	150	250			10	25	2	5	125	300	125	300
Chewacla silt loam	40	80											175	450
Gilead, Lakeland, and Cuthbert sands, 2 to 5 percent slopes	20	35	300	500	800	1,400	20	35	3	7	125	450	175	350
Gilead, Lakeland, and Cuthbert sands, 2 to 5 percent slopes, eroded	20	35	300	500			20	35	3	7	125	450	175	350
Gilead, Lakeland, and Cuthbert sands, 5 to 8 percent slopes	15	30	250	400	500	800	20	35	3	7	125	450	175	350
Gilead, Lakeland, and Cuthbert sands, 5 to 8 percent slopes, eroded	15	30	300	500			20	35	3	7	125	450	175	350
Gilead, Lakeland, and Cuthbert sands, 8 to 12 percent slopes, eroded									2	4	100	250	100	200
Gilead, Lakeland, and Cuthbert coarse sands, 2 to 5 percent slopes	15	30			500	800			2	3	100	200	175	350
Gilead, Lakeland, and Cuthbert coarse sands, 5 to 8 percent slopes									2	3	100	200	175	350
Goldsboro loamy sand, thick surface, 2 to 5 percent slopes	35	70	350	800	1,600	2,200	25	45	3	7	150	500	175	450
Izagora soils	20	50			800	1,600	20	45					175	400
Klej loamy fine sand, 0 to 2 percent slopes	20	50	200	400	1,200	2,200	20	45	3	7	125	450	175	400
Lakeland sand, 0 to 5 percent slopes	10	20			500	1,000	10	20	1	3	75	250	125	300

See footnote at end of table.

TABLE 2.—*Estimated acre yields of the principal crops grown under two levels of management*—Continued

Soil	Corn		Cotton		Tobacco		Oats		Coastal bermudagrass				Bahiagrass grown for pasture	
									Grown for hay		Grown for pasture			
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Lb.*	*Lb.*	*Lb.*	*Lb.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Lb.*[1]	*Lb.*[1]	*Lb.*[1]	*Lb.*[1]
Lakeland sand, 5 to 8 percent slopes	----	----	------	------	------	------	----	----	1	2	50	100	150	200
Lakeland sand, 8 to 12 percent slopes	----	----	------	------	------	------	----	----	1	2	50	100	150	200
Lakeland loamy sand, shallow, 2 to 5 percent slopes	15	30	150	300	1, 000	1, 600	15	25	2	4	125	300	150	350
Lakeland coarse sand, deep, 2 to 5 percent slopes	----	----	------	------	------	------	----	----	----	----	------	------	------	------
Lakeland coarse sand, deep, 5 to 12 percent slopes	----	----	------	------	------	------	----	----	----	----	------	------	------	------
Leaf fine sandy loam	----	----	------	------	------	------	----	----	----	----	------	------	125	300
Lynchburg loamy sand, thick surface, 0 to 2 percent slopes	25	60	------	------	1, 600	2, 200	20	50	3	7	150	500	175	425
Lynchburg loamy sand, thick surface, 2 to 5 percent slopes	25	60	------	------	1, 600	2, 200	20	50	3	7	150	500	175	425
Myatt sandy loam	----	----	------	------	------	------	----	----	----	----	------	------	125	300
Norfolk loamy sand, 0 to 2 percent slopes	35	70	500	1, 000	1, 400	2, 000	30	65	4	8	200	600	175	400
Norfolk loamy sand, 2 to 5 percent slopes	35	70	500	1, 000	1, 400	2, 000	30	65	4	8	200	600	175	400
Norfolk loamy sand, 2 to 5 percent slopes, eroded	25	50	300	500	800	1, 200	25	50	3	7	150	500	175	400
Norfolk loamy sand, 5 to 8 percent slopes, eroded	20	45	300	500	800	1, 200	25	50	3	7	150	500	175	400
Norfolk loamy sand, thick surface, 0 to 2 percent slopes	25	60	350	600	1, 400	2, 000	25	50	3	7	150	500	175	400
Norfolk loamy sand, thick surface, 2 to 5 percent slopes	25	60	350	600	1, 400	2, 000	25	50	3	7	150	500	175	400
Norfolk loamy sand, thick surface, 5 to 8 percent slopes	20	50	300	500	1, 200	1, 600	25	50	3	7	150	500	175	400
Plummer sand, 0 to 2 percent slopes	----	----	------	------	------	------	----	----	----	----	------	------	150	300
Plummer sand, 2 to 5 percent slopes	----	----	------	------	------	------	----	----	----	----	------	------	150	300
Rains sandy loam, thick surface, 2 to 5 percent slopes	----	----	------	------	------	------	----	----	----	----	------	------	150	300
Sandy and clayey land	----	----	------	------	------	------	----	----	----	----	------	------	------	------
Sawyer, Norfolk, and Cuthbert loamy sands, 2 to 5 percent slopes	20	35	250	400	800	1, 600	20	35	3	7	150	500	150	400
Sawyer, Norfolk, and Cuthbert loamy sands, 2 to 5 percent slopes, eroded	20	35	200	350	------	------	20	35	3	6	150	450	150	400
Sawyer, Norfolk, and Cuthbert loamy sands, 5 to 8 percent slopes	15	30	200	350	------	------	15	25	2	5	125	425	150	350
Sawyer, Norfolk, and Cuthbert loamy sands, 5 to 8 percent slopes, eroded	15	30	150	300	------	------	15	25	2	5	100	400	150	350
Sunsweet sandy loam, 5 to 12 percent slopes, eroded	----	----	------	------	------	------	----	----	2	3	100	250	125	200
Susquehanna sandy loam, 2 to 5 percent slopes	----	----	------	------	------	------	----	----	1	2	100	200	125	175
Susquehanna sandy loam, 2 to 5 percent slopes, eroded	----	----	------	------	------	------	----	----	1	2	100	200	125	175
Susquehanna sandy loam, 5 to 8 percent slopes	----	----	------	------	------	------	----	----	1	2	100	200	125	175
Susquehanna sandy loam, 5 to 8 percent slopes, eroded	----	----	------	------	------	------	----	----	1	2	100	200	125	175
Swamp	----	----	------	------	------	------	----	----	----	----	------	------	------	------
Tifton loamy sand, 0 to 2 percent slopes	35	70	500	1, 000	1, 200	2, 000	30	65	4	9	200	650	250	450
Tifton loamy sand, 2 to 5 percent slopes	35	70	500	1, 000	1, 200	2, 000	30	65	4	9	200	650	250	450
Tifton loamy sand, 2 to 5 percent slopes, eroded	30	65	450	800	800	1, 400	25	60	3	7	150	550	225	425
Tifton loamy sand, 5 to 8 percent slopes, eroded	20	45	300	500	------	------	20	50	3	7	150	550	225	425
Tifton loamy sand, thick surface, 2 to 5 percent slopes	25	60	300	500	1, 200	2, 000	20	50	4	8	150	600	200	450
Tifton sandy loam, thin solum, 2 to 5 percent slopes, eroded	15	35	300	400	------	------	20	35	3	6	125	400	200	400
Tifton sandy loam, thin solum, 5 to 8 percent slopes, eroded	10	30	250	300	------	------	15	30	3	6	125	400	200	400
Wahee fine sandy loam	15	35	150	200	------	------	15	30	3	5	125	400	175	425

[1] Pounds of beef gains per acre per year.

In columns B the estimates indicate the average yields to be expected under the best known practical management. Such management consists of the following practices: (1) Growing crops on soils that are suited to them; (2) rotating crops; (3) tilling on the contour; (4) using mechanical means of controlling water; (5) growing cover crops; (6) managing crop residues efficiently; (7) controlling weeds; (8) adding fertilizer, lime, and minor soil elements according to the needs indicated by soil tests; (9) draining the soils, where needed; (10) using suitable varieties of seeds or plants; and (11) controlling diseases and insects effectively.

The estimates given in columns B take into consideration the known deficiencies of the soils and the increase in yields that can be expected when these deficiencies are corrected within practical limits. Irrigation is not included.

The yields given in table 2 are estimated average yields for the entire county, not for any particular farm or tract. They indicate, however, the response to be expected when reasonably intensive management is practiced.

The following are the general management practices assumed to have been used to obtain the estimated yields in columns A of table 2. The rates given for plant nutrients are on a per acre basis.

Corn receives 15 to 30 pounds each of nitrogen (N), phosphoric acid (P_2O_5), and potash (K_2O). The stand contains 5,000 to 8,000 plants per acre.

Cotton receives 15 to 35 pounds each of nitrogen (N), phosphoric acid (P_2O_5), and potash (K_2O). The stand contains 12,000 to 18,000 plants per acre. In addition, the farm operator has a program for controlling insects.

Tobacco receives from 30 to 50 pounds of nitrogen (N) and 90 to 150 pounds each of phosphoric acid (P_2O_5) and potash (K_2O). (Note that low yields are commonly caused by adding too much fertilizer.) The stand contains 7,000 to 8,000 plants per acre. In addition, the farm operator has a program for controlling insects and diseases.

Oats receive 8 to 16 pounds of nitrogen (N) and 25 to 50 pounds each of phosphoric acid (P_2O_5) and potash (K_2O) at the time of planting. An additional 15 to 30 pounds of nitrogen is applied as a topdressing late in winter.

Coastal bermudagrass grown for hay or pasture receives 25 to 40 pounds each of nitrogen (N), phosphoric acid (P_2O_5), and potash (K_2O) applied early in spring. Every 3 to 6 years, 1 ton of lime is added.

Bahiagrass grown for hay or pasture receives 20 to 30 pounds of nitrogen (N) and 25 to 40 pounds each of phosphoric acid (P_2O_5) and potash (K_2O) applied as a topdressing early in spring. Every 3 to 6 years, 1 ton of lime is added.

The following are the management practices assumed to have been used to obtain the estimated yields in columns B of table 2. The rates given for plant nutrients are on a per acre basis.

Corn receives 60 to 80 pounds each of nitrogen (N), phosphoric acid (P_2O_5), and potash (K_2O). The stand contains 9,000 to 10,000 plants per acre. All crop residues and a winter cover crop are returned to the soil.

Cotton receives 50 to 80 pounds each of nitrogen (N), phosphoric acid (P_2O_5), and potash (K_2O). The stand contains 15,000 to 25,000 plants per acre. The farm operator has an effective program for controlling insects and diseases.

Tobacco receives 30 to 50 pounds of nitrogen (N) and 75 to 150 pounds each of phosphoric acid (P_2O_5) and potash (K_2O). The crop is grown on a suitable soil, and fertilizer is added in split applications. The farm operator has an effective program for controlling insects and diseases. The stand contains 7,000 to 8,000 plants per acre. A suitable crop rotation is used.

Oats receive 15 to 25 pounds of nitrogen (N) and 50 to 75 pounds each of phosphoric acid (P_2O_5) and potash (K_2O) at the time of planting. An additional 30 to 65 pounds of nitrogen is applied late in winter.

Coastal bermudagrass grown for hay or pasture receives 25 to 50 pounds of nitrogen (N) and 60 to 100 pounds each of phosphoric acid (P_2O_5) and potash (K_2O) applied early in spring. An additional 50 to 100 pounds of nitrogen is applied early in summer. Every 3 to 5 years, 1 ton of lime is added or lime is applied according to the needs indicated by soil tests. The grass is grazed or mowed for hay at regular intervals to control excessive growth.

Bahiagrass grown for hay or pasture receives 25 to 50 pounds of nitrogen (N) and 60 to 100 pounds each of phosphoric acid (P_2O_5) and potash (K_2O) applied late in winter. An additional 50 to 75 pounds of nitrogen is applied early in summer. Every 3 to 5 years, 1 ton of lime is added or lime is applied according to the needs indicated by soil tests. The grass is grazed or mowed for hay at regular intervals to control excessive growth.

Use of Soils for Woodland[1]

The uplands of Treutlen County were originally covered by stands of longleaf and loblolly pine. Slash pine grew mainly in areas near ponds and in areas adjacent to bottom lands. Yellow-poplar, maple, sweetgum, blackgum, and cypress were along streams and on bottom lands.

By 1900, most of the original timber had been cut and the uplands had reseeded mainly to longleaf pine. Loblolly pine was nearly eliminated because of its low value for naval stores. Wildfire and other burning associated with the production of naval stores confined slash pine to wet areas because of the inability of that species to withstand fire.

Since the late 1920's and the early 1930's, slash pine has reseeded on many sites in the uplands. The stands of second-growth pine were cut heavily in the 1930's and 1940's. High-grade hardwoods have been harvested periodically from most stands since 1900. Now, stands of hardwoods are made up primarily of low-grade, nonmarketable hardwoods. The chief products from the wooded areas are naval stores, sawlogs, poles, and wood for the pulp and paper industry.

About 65 percent of the total land area of Treutlen County is woodland. About 10 percent of the acreage in forest is owned by industrial firms; the other 90 percent is owned by farmers and other individuals.

[1] Prepared with the assistance of NORMAN E. SANDS, forester, Soil Conservation Service, Waycross, Ga.

Woodland suitability grouping

The management of woodland can be planned more effectively if the soils are grouped according to those characteristics that affect the growth of trees and the management of the stands. For this reason, the soils of Treutlen County have been placed in seven woodland suitability groups. Each group consists of soils that have about the same suitability for wood crops, that require about the same management, and that have about the same potential productivity.

Listed in table 3 and later described in the text are the seven woodland suitability groups in this county. In table 3 site indexes are given for loblolly, slash, and longleaf pines growing on the soils of each suitability group. Also given are figures that show the approximate annual growth of the principal commercial trees, shown in cords of rough wood per acre. These yields are based on figures given in USDA Miscellaneous Publication 50 (*6*).[2] The hazards and limitations that affect the management of the soils in each group are described. In the following pages the terms used in this table are explained.

The potential productivity of a soil for a specified kind of tree is expressed as a *site index*. A site index for a given soil is the average height, in feet, that a specified kind of tree growing on that soil will reach in 50 years. The site index of a soil is determined mainly by the capacity of the soil to provide moisture and growing space for tree roots.

The soils in each woodland suitability group have, in varying degree, limitations that affect their management. Some of these limitations are expressed in the relative terms—*slight*, *moderate*, or *severe*. The relative term ex-

[2] Italic numbers in parentheses refer to Literature Cited, page 76.

TABLE 3.—*Productivity, hazards, and management for woodland suitability groups*

Woodland suitability groups and mapping unit symbols	Commercial trees	Potential soil productivity, site index [1]	Approximate annual growth [2]	Hazards and management
			Cords of rough wood per acre	
Group 1: Deep, well-drained soils that have a moderately permeable subsoil— NfA, NfB, NfC, NhA, NhB, NhB2, NhC2, TqA, TqB, TqB2, TqC2, TrB.	Loblolly pine Slash pine Longleaf pine	80 to 85 83 to 88 68 to 73	1.3 1.6 .9	Desirable seedlings may need release from cull trees and shrubs.
Group 2: Deep, moderately well drained or somewhat poorly drained soils that have moderate to moderately slow permeability in the subsoil— GnB, Izs, LzA, LzB, Waf.	Loblolly pine Slash pine Longleaf pine	87 to 92 87 to 92 73 to 77	1.5 1.7 1.0	Desirable seedlings may need release from cull trees and shrubs.
Group 3: Moderately deep soils that have a fine-textured subsoil— BqB, BqB2, BqC2, GAB, GAB2, GAC, GAC2, GAD2, GBB, GBC, SkE, SIB, SIB2, SIC, SIC2, TsB2, TsC2.	Loblolly pine Slash pine Longleaf pine	83 to 88 83 to 88 78 to 73	1.4 .6 .9	Severe limitations in the use of equipment and a severe hazard of erosion on slopes of more than 8 percent.
Group 4: Mainly poorly drained and poorly drained soils that have a coarse-textured to fine-textured subsoil— Acn, Csl, Lea, Mya, PeA, PeB, ReB.	Loblolly pine Slash pine Longleaf pine	93 to 98 85 to 90 85 to 90	1.7 1.6 1.4	Areas that are waterlogged need to be drained so that desirable trees reseed and grow. Severe competition may be expected from cull trees, shrubs, and vines. Frequent and extended overflow restricts the regeneration and growth of desirable trees. The use of equipment is restricted 3 years out of 5.
Group 5: Deep coarse-textured, very droughty soils— LoB, LpB, LpC, LpD, LwB, LwD.	Loblolly pine Slash pine Longleaf pine	68 to 73 73 to 78 68 to 73	1.1 1.4 .9	Seedling mortality is severe. Natural reseeding is not reliable. Equipment limitations are severe on the steeper slopes. The hazard of erosion is severe on slopes of more than 12 percent. The hazard of drought is severe on these soils.
Group 6: Soils that have a weakly developed profile and that have a slowly permeable, clayey subsoil— ShD2, SiB, SiB2, SiC, SiC2.	Loblolly pine Slash pine Longleaf pine	73 to 78 58 to 63 53 to 58	1.2 1.0 .5	Desirable seedlings may need release from cull trees and shrubs. Natural reseeding cannot be relied upon to establish a satisfactory stand. The hazard of erosion is moderate.
Group 7: Moderately well drained to somewhat poorly drained soil that has moderate to rapid permeability— KgA.	Loblolly pine Slash pine Longleaf pine	78 to 83 78 to 83 68 to 73	1.3 1.5 .9	Competition from other plants is severe. Seedlings will need release from cull trees, vines, and shrubs.

[1] Average height of dominant trees in stand at 50 years of age.
[2] Average yearly growth per acre in rough cords to age 35, adapted from USDA Miscellaneous Publication 50 (*6*).

presses the degree of limitation, as explained in the following pages.

Plant competition: When woodland is disturbed by fire, cutting, grazing, or some other means, undesirable brush, trees, and other plants may invade. The plants that invade compete with the desirable trees and hinder their establishment and growth.

Competition is *slight* if unwanted plants are no special problem. It is *moderate* if the invaders delay, but do not prevent, a normal, fully stocked stand from becoming established. Where competition from other plants is moderate, preparation of the seedbed is generally not needed and simple methods can be used to prevent undesirable plants from invading. Competition is *severe* if trees cannot regenerate naturally. Where competition is severe, prepare the site carefully and use management that includes controlled burning, spraying with chemicals, and girdling.

Equipment limitation: Drainage, slope, stoniness, soil texture, or other soil characteristics may restrict or prohibit the use of ordinary equipment for pruning, thinning, harvesting, or other woodland management. Different soils may require different kinds of equipment or methods of operation, and it may be necessary to use the equipment in different seasons.

The limitation is *slight* if there are no restrictions on the type of equipment or on the time of year that the equipment can be used. It is *moderate* if the slopes are moderately steep, if the use of heavy equipment is restricted by wetness in winter and early in spring, or if the use of equipment damages the tree roots to some extent. The limitation is *severe* if only a few types of equipment can be used, if the time that equipment cannot be used is more than 3 months a year, and if the use of equipment severely damages the roots of trees and the structure and stability of the soils. The limitation is severe on moderately steep and steep soils that are stony and have rock outcrops. It is also severe on wet bottom lands and on low terraces in winter or early in spring.

Seedling mortality: Even when healthy seedlings of a suitable kind of tree are planted correctly or occur naturally in adequate numbers, some of the seedlings will not survive if the characteristics of the soils are unfavorable.

Mortality is *slight* if not more than 25 percent of the planted seedlings die, or if trees ordinarily do not regenerate naturally in places where there are enough seeds. It is *moderate* if 25 to 50 percent of the seedlings die, or if trees do not regenerate naturally in numbers needed for adequate restocking. In some places replanting to fill open spaces will be necessary. Mortality is *severe* if not more than 50 percent of the planted seedlings die, or if trees do not ordinarily reseed naturally in places where there are enough seeds. If mortality is severe, seedlings should be planted where the seeds do not grow, special seedbeds should be prepared, and good methods of planting should be used to secure a full stand of trees.

Windthrow hazard: Soil characteristics affect the development of tree roots and the firmness with which the roots anchor the tree in the soil so that it resists the force of the wind. The development of roots may be prevented by a high water table or by a layer that is nearly impermeable. The protection of surrounding trees also affects the hazard of windthrow. Knowing the degree of this hazard is important when choosing trees for planting and when planning release cuttings or harvest cuttings.

The hazard of windthrow is *slight* if roots hold the tree firmly against a normal wind. Individual trees are likely to remain standing if protective trees on all sides are removed. The hazard is *moderate* if the roots develop enough to hold the tree firmly, except when the soil is excessively wet and the velocity of the wind is high. It is *severe* if rooting is not deep enough to give adequate stability. Individual trees are likely to be blown over if they are released on all sides.

Erosion hazard: Woodland can be protected from erosion by choosing the kinds of trees, by adjusting the rotation age and cutting cycles, by using special techniques in management, and by carefully constructing and maintaining roads, trails, and landings.

The hazard of erosion is rated according to the risk of erosion on well-managed woodland that is not protected by special practices. It is *slight* where a small loss of soil is expected. Generally, erosion is slight if slopes are between 0 and 2 percent and runoff is slow or very slow. The hazard of erosion is *moderate* if there is a moderate loss of soil where runoff is not controlled and the vegetation is not adequate for protection. It is *severe* where steep slopes, rapid runoff, slow infiltration and permeability, and past erosion make the soil susceptible to severe erosion.

The following describes the seven woodland suitability groups in this county and the soils in each group. Because not enough data were available, the land type Swamp was not placed in a woodland suitability group.

WOODLAND SUITABILITY GROUP 1

This group consists of deep, well-drained soils that have a moderately permeable subsoil. The following soils are in this group:

(Nfa)	Norfolk loamy sand, thick surface, 0 to 2 percent slopes.
(NfB)	Norfolk loamy sand, thick surface, 2 to 5 percent slopes.
(NfC)	Norfolk loamy sand, thick surface, 5 to 8 percent slopes.
(NhA)	Norfolk loamy sand, 0 to 2 percent slopes.
(NhB)	Norfolk loamy sand, 2 to 5 percent slopes.
(NhB2)	Norfolk loamy sand, 2 to 5 percent slopes, eroded.
(NhC2)	Norfolk loamy sand, 5 to 8 percent slopes, eroded.
(TqA)	Tifton loamy sand, 0 to 2 percent slopes.
(TqB)	Tifton loamy sand, 2 to 5 percent slopes.
(TqB2)	Tifton loamy sand, 2 to 5 percent slopes, eroded.
(TqC2)	Tifton loamy sand, 5 to 8 percent slopes, eroded.
(TrB)	Tifton loamy sand, thick surface, 2 to 5 percent slopes.

Loblolly pine that grows on these soils has an average site index of 83; slash pine, an average site index of 86; and longleaf pine, an average site index of 70. If the overstory has been removed, competition from other plants is not serious enough to prevent adequate restocking of desirable species. It is suggested, however, that the seedbed be prepared and that other simple management techniques be applied. Seedling mortality is not a problem in planting on this group of soils.

The hazard of erosion, chiefly gullying, is moderate on slopes of 5 to 8 percent. The hazard of windthrow is slight. Equipment limitations are slight on the nearly level soils and moderate on the sloping soils.

WOODLAND SUITABILITY GROUP 2

This group consists of deep, medium-textured, moderately well drained or somewhat poorly drained soils. Permeability in the subsoil is moderate to moderately slow. The following soils are in this group:

- (GnB) Goldsboro loamy sand, thick surface, 2 to 5 percent slopes.
- (Izs) Izagora soils.
- (LzA) Lynchburg loamy sand, thick surface, 0 to 2 percent slopes.
- (LzB) Lynchburg loamy sand, thick surface, 2 to 5 percent slopes.
- (Waf) Wahee fine sandy loam.

Loblolly and slash pines that grow on these soils have an average site index of 90, and longleaf pine has an average site index of 75. Moderate competition from other plants results, in part, from the long period when moisture is abundant for the growth of plants. Ordinarily competition will not prevent adequate restocking of the desired species, but establishment of the desired species may be delayed and the initial rate of growth may be slower than on areas of other soils. It is usually necessary to release the seedlings of desirable trees so that they will attain normal development and growth. The hazard of seedling mortality is slight. There are no special problems of soil erosion or hazard of windthrow on this group of soils.

WOODLAND SUITABILITY GROUP 3

This group consists of moderately deep soils that have a fine-textured subsoil. The following soils are in this group:

- (BqB) Boswell sandy loam, 2 to 5 percent slopes.
- (BqB2) Boswell sandy loam, 2 to 5 percent slopes, eroded.
- (BqC2) Boswell sandy loam, 5 to 8 percent slopes, eroded.
- (GAB) Gilead, Lakeland, and Cuthbert sands, 2 to 5 percent slopes.
- (GAB2) Gilead, Lakeland, and Cuthbert sands, 2 to 5 percent slopes, eroded.
- (GAC) Gilead, Lakeland, and Cuthbert sands, 5 to 8 percent slopes.
- (GAC2) Gilead, Lakeland, and Cuthbert sands, 5 to 8 percent slopes, eroded.
- (GAD2) Gilead, Lakeland, and Cuthbert sands, 8 to 12 percent slopes, eroded.
- (GBB) Gilead, Lakeland, and Cuthbert coarse sands, 2 to 5 percent slopes.
- (GBC) Gilead, Lakeland, and Cuthbert coarse sands, 5 to 8 percent slopes.
- (SkE) Sandy and clayey land.
- (SlB) Sawyer, Norfolk, and Cuthbert loamy sands, 2 to 5 percent slopes.
- (SlB2) Sawyer, Norfolk, and Cuthbert loamy sands, 2 to 5 percent slopes, eroded.
- (SlC) Sawyer, Norfolk, and Cuthbert loamy sands, 5 to 8 percent slopes.
- (SlC2) Sawyer, Norfolk, and Cuthbert loamy sands, 5 to 8 percent slopes, eroded.
- (TsB2) Tifton sandy loam, thin solum, 2 to 5 percent slopes, eroded.
- (TsC2) Tifton sandy loam, thin solum, 5 to 8 percent slopes, eroded.

The loblolly and slash pines that grow on these soils have an average site index of 86, and longleaf pine has an average site index of 71. If the overstory is removed, competition from other plants is moderate. The natural regeneration of longleaf pine cannot always be relied upon to get a good stand of trees.

The hazard of erosion is moderate to severe, and gullying is likely to occur on unprotected slopes of more than 8 percent. The hazard of windthrow is moderate. Because of this hazard, care is necessary to control the density of the stand when the trees are thinned or release cutting is done. Equipment limitations are severe on slopes of more than 8 percent, but on milder slopes this limitation is moderate. There is no particular hazard of drought.

WOODLAND SUITABILITY GROUP 4

This group consists mainly of poorly drained soils that have a coarse-textured to fine-textured subsoil. The following soils are in this group:

- (Acn) Alluvial land.
- (Csl) Chewacla silt loam.
- (Lea) Leaf fine sandy loam.
- (Mya) Myatt sandy loam.
- (PeA) Plummer sand, 0 to 2 percent slopes.
- (PeB) Plummer sand, 2 to 5 percent slopes.
- (ReB) Rains sandy loam, thick surface, 2 to 5 percent slopes.

Loblolly pine that grows on these soils has an average site index of 96; slash pine, an average site index of 88; and longleaf pine, an average site index of 87. If the overstory is removed, competition from other plants is severe because unwanted trees, shrubs, and vines invade.

Surface drainage is commonly necessary for pines and the more desirable hardwoods to regenerate. For 3 years out of 5, water on the surface and moisture in the soils restrict the use of equipment, including the use of logging equipment. Regeneration and management operations are restricted by frequent and extended overflows.

WOODLAND SUITABILITY GROUP 5

This group consists of deep, coarse-textured, very droughty soils. The following soils are in this group:

- (LwB) Lakeland coarse sand, deep, 2 to 5 percent slopes.
- (LwD) Lakeland coarse sand, deep, 5 to 12 percent slopes.
- (LoB) Lakeland loamy sand, shallow, 2 to 5 percent slopes.
- (LpB) Lakeland sand, 0 to 5 percent slopes.
- (LpC) Lakeland sand, 5 to 8 percent slopes.
- (LpD) Lakeland sand, 8 to 12 percent slopes.

Loblolly pine that grows on these soils has an average site index of 70; slash pine, an average site index of 75; and longleaf pine, an average site index of 70. Competition from other plants is not a special problem. Seedling mortality is severe, and natural reseeding cannot be relied upon (fig. 13) to obtain a satisfactory stand. Planting and replanting are needed for adequate stocking.

The hazard of erosion increases as the slope increases. In small areas where the slope is greater than 12 percent, the hazard of erosion is severe. Equipment limitations are moderate on slopes of 8 percent or less, but they are severe on slopes of more than 8 percent.

WOODLAND SUITABILITY GROUP 6

This group consists of soils that have a weakly developed profile and a slowly permeable, clayey subsoil. The following soils are in this group:

- (ShD2) Sunsweet sandy loam, 5 to 12 percent slopes, eroded.
- (SiB) Susquehanna sandy loam, 2 to 5 percent slopes
- (SiB2) Susquehanna sandy loam, 2 to 5 percent slopes, eroded.
- (SiC) Susquehanna sandy loam, 5 to 8 percent slopes.
- (SiC2) Susquehanna sandy loam, 5 to 8 percent slopes, eroded.

Figure 13.—**Widely scattered pines and scrub oaks growing on Lakeland sand, 0 to 5 percent slopes. This area will be cleared and planted to pines.**

Loblolly pine that grows on these soils has an average site index of 75; slash pine, an average site index of 60; and longleaf pine, an average site index of 55. Competition from other plants is moderate. It may retard the growth of desirable trees, but ordinarily it will not prevent a stand of desirable trees from becoming established.

Seedling mortality ranges from moderate to severe. Natural reseeding of desirable species cannot be relied upon to obtain a good stand. Planting and replanting are necessary for full stocking of the stand.

Equipment limitations range from moderate to severe, chiefly because of the plastic, clayey soil material and the strong slope of some of the soils. The hazards of erosion and windthrow are moderate. There is no hazard of drought.

WOODLAND SUITABILITY GROUP 7

Only one soil, Klej loamy fine sand, 0 to 2 percent slopes (KgA), is in this group. This moderately well drained or somewhat poorly drained soil has moderate to rapid permeability.

Loblolly and slash pines that grow on this soil have an average site index of 80, and longleaf pine has an average site index of 70. Competition from other plants is severe. Undesirable trees, shrubs, and vines should be controlled if adequate stands of pine are to be established.

The hazards of erosion and windthrow do not present any special problem. Equipment limitations are moderate. During rainy seasons, this soil may be excessively wet for as long as 3 months.

Protective practices

Grazing, fire, insects, and diseases damage or destroy trees and reduce the amount of wood products harvested.

Protection from grazing: Areas that are wooded ought to be protected from heavy grazing. Heavy grazing not only destroys seedlings and damages trees, but it also makes the soils more susceptible to erosion and less likely to take in and store water for trees. Grazing that is not controlled is particularly harmful on woodland that is steep or eroded. Where some grazing is necessary, the livestock should be distributed so that not more than 40 percent of the low-growing cover is grazed. Grazing is less harmful to woodland in April, May, and June than it is at other times because more forage is available in those months. There is generally less damage to trees from cattle than from other grazing animals.

Protection from fire: Fire kills seedlings, young trees, and some of the larger trees. Because it also destroys humus and litter, the hazard of erosion is increased. Firebreaks help protect wooded areas by checking or stopping fires. A firebreak may be a road in the woods or a plowed or disked fire lane. At a firebreak, the firefighters can start a backfire, which is a fire set to counter an advancing fire. Firebreaks should lead to a stream, a pond, a public road, a utility right-of-way, or some other barrier.

Protection from insects and disease: Serious losses from disease and insects are not likely in woodland in Treutlen County. To avoid damage from insects, cuttings should be made in fall or winter. Log the woodland with care so that the trees left standing are not scarred and made more susceptible to disease.

Wildlife and Fish [3]

The suitability of different areas of Treutlen County for wildlife and fish is discussed in this section. Most of the soils in the county are suited to some kind of wildlife and support one or more species. Some species spend most or all of their time in wooded areas. Other species prosper in open farmlands, and still other species, such as fish, muskrat, beaver, and duck, require water for their habitat. Some species of wildlife eat nothing but insects, others eat nothing but vegetation, still others eat both.

Bobwhite, mourning dove, rabbits, squirrels, and many nongame birds are common throughout the county. Most farms have sites that are suitable for fishponds. Deer and wild turkey require extensive areas of woodland that are amply watered. Such areas are the flood plains of the Oconee River in the western part of the county and the flood plains of the Ohoopee River in the northeastern part, which provide a suitable habitat. Long, broad areas of bottom lands along streams are well distributed throughout the county. They are well suited to wild duck and beaver. Dams are made by beaver in some areas.

Table 4 lists the more significant plants that wildlife use for food and gives them a rating of *choice*, *fair*, or *unimportant* for each species of wildlife. The same plants furnish some of the cover needed. Plant cover is generally abundant or excessive, however, in the humid climate that is typical in this county, or cover can be grown readily where needed.

The following is a brief summary of the needs of the more important wildlife species in the county:

Beaver.—This animal obtains all its food from plants. Its food is mainly bark, roots, and green plants. The tender bark of alder, ash, birch, cottonwood, hornbeam, maple, pine, sweetgum, and willow are the tree foods most eaten. In addition, beaver eat the tender shoots of elder, honeysuckle, grass, and weeds. Acorns and corn are also choice foods. The chief feeding areas are within 150 feet of water.

[3] Prepared with the assistance of VERNE E. DAVISON, biologist, Soil Conservation Service, Athens, Ga.

Bobwhite.—Choice foods of the bobwhite are acorns, beechnuts, blackberries, blueberries, browntopmillet, corn, cowpeas, dewberries, annual and bicolor lespedezas, mulberries, partridgepeas, pecan, common ragweed, tick-clover, and the seeds of wild black cherry, flowering dogwood, pines, and sweetgum. Quail also eat many insects. Their food must be close to sheltering vegetation that will protect them from predators, the sun, and bad weather.

Deer.—Choice foods of this animal are acorns, bahiagrass, blueberries, clovers, cowpeas, greenbrier, honeysuckle, annual and bicolor lespedezas, oats, rescuegrass, ryegrass, and wheat. For adequate cover, deer generally require wooded areas 500 acres or more in size.

Duck.—Choice foods of duck, are acorns, beechnuts, browntopmillet, corn, Japanese millet, and the seeds of smartweed. These foods must be covered with water to be readily available to ducks, though ducks will feed occasionally on acorns and corn on dryland.

Fish.—The choice foods of bluegills are mostly aquatic worms, insects, and insect larvae. Bass and channel catfish use small fish for food. The amount of food is directly related to the fertility of the water, the kinds of soils in the watershed and, to some extent, to the soils at the bottom of the pond. Because fertility is low and the soils at the bottom of the ponds are acid, most ponds need fertilizer and lime. The fertilizer and lime encourage the growth of microscopic algae, which provide food for worms that will be used as food by fish.

Mourning dove.—Choice foods of the mourning dove are browntopmillet, corn, Japanese millet, common ragweed, and the seeds of pine and sweetgum. Doves do not eat insects, green leaves, or fruit. They require water daily.

Rabbits.—Cover, such as that provided by a blackberry thicket or plum thicket, is an outstanding requirement in the habitat of rabbits. Their choice foods, for example, clovers, winter grasses, and other succulent vegetation, are usually available.

Squirrels.—Choice foods of these woodland game animals are acorns, beechnuts, corn, hickory nuts, mulberries, pecans, and the seeds of blackgum, black cherry, flowering dogwood, and pine.

Wild turkeys.—These birds survive only in wooded areas that are generally 1,000 acres or more in size. Turkeys need surface water to drink each day, and they often roost in large trees over or near water. Choice foods are insects (fig. 14), acorns, the seeds of bahiagrass, beechnuts, blackberries, blueberries, dewberries, browntopmillet, the leaves of clover, corn, cowpeas, wild grapes, hackberries, mulberries, oats, wheat, pecans, the seeds of flowering dogwood and pines, and rescuegrass and ryegrass for forage.

Nongame birds.—The many species of nongame birds vary greatly in the foods they choose. Several species eat nothing but insects. A few eat insects or a combination of insects, nuts, and fruits. The rating of the foods in table 4 for nongame birds is, therefore, a general one, and there are many exceptions to the list.

Wildlife suitability groups

Most species of wildlife cannot be related directly to the soils of the county. Instead, each species is related to its choice food as shown in table 4. Each plant food, in turn, is related directly to the group of soils on which it makes the best growth. This relationship is shown in table 5. Table 5 lists alphabetically the names of the same plants that are listed in table 4. In table 5, however, the suitability of each kind of plant for the soils in each of the five wildlife groups is indicated by the words *suited*, *marginal*, and *poorly suited* or *unsuited*. The suitability of each kind of plant for a particular kind of soil, and therefore, for a specific kind of wildlife, can be determined by studying the tables. The following describes the five groups of soils mentioned in table 5. The main characteristics of the soils in each group are described, and these descriptions are followed by an alphabetical listing of the mapping units.

Figure 14.—Wild turkeys hunting insects in a field of Coastal bermudagrass.

WILDLIFE GROUP 1

This wildlife group consists of well drained and moderately well drained, strongly acid soils of uplands. The surface layer of the soils ranges from sandy loam to sand in texture. In areas that are not eroded, it is 12 to 30 inches thick, but in some eroded areas it is only 8 to 12 inches thick. The subsoil throughout most of the acreage is moderately permeable sandy clay to sandy clay loam.

These soils have moderate available moisture capacity. They are easily worked and can be cultivated within a wide range of moisture content. The slopes range from 0 to 8 percent.

These soils occupy about 50 percent of the county, and they make up most of the acreage used for farming. The soils are suited to many plants that provide choice food for several species of wildlife. Because of their position and slope, these soils are generally not suited to flooding for duck fields. Many intermittent streams throughout the areas provide favorable sites for ponds. The following soils are in this group:

Boswell sandy loam, 2 to 5 percent slopes.
Boswell sandy loam, 2 to 5 percent slopes, eroded.
Gilead, Lakeland, and Cuthbert sands, 2 to 5 percent slopes.
Gilead, Lakeland, and Cuthbert sands, 2 to 5 percent slopes, eroded.
Gilead, Lakeland, and Cuthbert sands, 5 to 8 percent slopes.
Gilead, Lakeland, and Cuthbert sands, 5 to 8 percent slopes, eroded.
Norfolk loamy sand, 0 to 2 percent slopes.
Norfolk loamy sand, 2 to 5 percent slopes.
Norfolk loamy sand, 2 to 5 percent slopes, eroded.
Norfolk loamy sand, 5 to 8 percent slopes, eroded.
Norfolk loamy sand, thick surface, 0 to 2 percent slopes.
Norfolk loamy sand, thick surface, 2 to 5 percent slopes.

TABLE 4.—*Suitability of various*

Kind of plant	Part of plant eaten	Bobwhite	Deer	Dove	Duck
Bahiagrass	Forage Seed	Unimportant Fair	Choice Unimportant	Unimportant Fair	Unimportant Unimportant
Beech	Nuts	Choice	Fair	Unimportant	Choice
Blackberry	Fruit Forage	Choice Unimportant	Unimportant Fair	Unimportant Unimportant	Unimportant Unimportant
Blueberry	Fruit Forage	Choice Unimportant	Choice Choice	Unimportant Unimportant	Fair Unimportant
Blackgum	Fruit	Fair	Unimportant	Unimportant	Unimportant
Browntopmillet	Seed	Choice	Unimportant	Choice	Choice
Buttonclover	Forage	Fair	Choice	Unimportant	Unimportant
Cherry, black	Fruit	Choice	Unimportant	Unimportant	Unimportant
Chufa	Nuts	Unimportant	Unimportant	Unimportant	Choice
Corn	Seed	Choice	Choice	Choice	Choice
Cowpeas	Seed	Choice	Choice	Fair	Unimportant
Crimson clover	Forage	Fair	Choice	Unimportant	Unimportant
Dewberry	Fruit	Choice	Unimportant	Unimportant	Unimportant
Grapes, wild	Fruit	Unimportant	Unimportant	Unimportant	Unimportant
Greenbrier	Forage	Unimportant	Choice	Unimportant	Unimportant
Hackberry	Fruit	Fair	Unimportant	Unimportant	Unimportant
Hickory	Nuts	Unimportant	Unimportant	Unimportant	Unimportant
Honeysuckle	Forage	Unimportant	Choice	Unimportant	Unimportant
Japanese millet	Seed	Choice	Unimportant	Choice	Choice
Lespedeza, annual	Forage Seed	Unimportant Choice	Choice Unimportant	Unimportant Fair	Unimportant Unimportant
Lespedeza, bicolor	Forage Seed	Unimportant Choice	Choice Unimportant	Unimportant Unimportant	Unimportant Unimportant
Lespedeza, sericea	Seed	Unimportant	Unimportant	Unimportant	Unimportant
Mulberry	Fruit	Choice	Fair	Unimportant	Unimportant
Oaks	Acorns	Choice	Choice	Unimportant	Choice
Oats	Forage	Unimportant	Choice	Unimportant	Unimportant
Pecan	Nuts	Choice	Fair	Unimportant	Unimportant
Pines	Seed	Choice	Unimportant	Choice	Unimportant
Partridgepea	Seed	Choice	Unimportant	Unimportant	Unimportant
Ragweed, common	Seed	Choice	Unimportant	Choice	Unimportant
Rescuegrass	Forage	Unimportant	Choice	Unimportant	Unimportant
Ryegrass	Forage	Unimportant	Choice	Unimportant	Unimportant
Smartweeds	Seed	Unimportant	Unimportant	Unimportant	Choice
Sorghum, grain [5]	Seed	Choice	Choice	Choice	Choice
Sweetgum	Seed	Choice	Unimportant	Choice	Unimportant
Tickclover (beggarlice)	Seed	Choice	Unimportant	Unimportant	Unimportant
Wheat	Forage Seed	Unimportant Choice	Choice Unimportant	Unimportant Choice	Unimportant Choice
Whiteclover	Forage	Fair	Choice	Unimportant	Unimportant

[1] Beaver are not included in this table, because their food is mainly bark, roots, and green plants.
[2] Birds that eat fruit include the bluebird, catbird, mockingbird, and waxwing.
[3] Birds that eat grain and seed include the blackbird, cardinal, meadowlark, sparrow, and towhee.

food plants for species of wildlife [1]

Rabbit	Squirrel	Turkey	Nongame birds: Birds that eat fruit [2]	Nongame birds: Birds that eat grain and seed [3]	Nongame birds: Birds that eat nuts and acorns [4]
Unimportant	Unimportant	Unimportant	Unimportant	Unimportant	Unimportant.
Unimportant	Unimportant	Choice	Unimportant	Fair	Unimportant.
Unimportant	Choice	Choice	Unimportant	Unimportant	Choice.
Unimportant	Fair	Choice	Choice	Unimportant	Unimportant.
Unimportant	Unimportant	Unimportant	Unimportant	Unimportant	Unimportant.
Choice	Fair	Choice	Choice	Unimportant	Unimportant.
Unimportant	Unimportant	Fair	Unimportant	Unimportant	Unimportant.
Unimportant	Choice	Fair	Choice	Unimportant	Fair.
Unimportant	Unimportant	Choice	Unimportant	Choice	Unimportant
Choice	Unimportant	Choice	Unimportant	Unimportant	Unimportant.
Unimportant	Choice	Fair	Choice	Unimportant	Fair.
Unimportant	Choice	Choice	Unimportant	Unimportant	Unimportant.
Choice	Choice	Choice	Unimportant	Choice	Fair.
Choice	Unimportant	Choice	Unimportant	Choice	Unimportant.
Choice	Unimportant	Choice	Unimportant	Unimportant	Unimportant.
Fair	Fair	Choice	Choice	Unimportant	Unimportant.
Unimportant	Fair	Choice	Choice	Unimportant	Unimportant.
Choice	Unimportant	Unimportant	Unimportant	Unimportant	Unimportant.
Unimportant	Fair	Choice	Choice	Unimportant	Unimportant.
Unimportant	Choice	Fair	Unimportant	Unimportant	Choice.
Fair	Unimportant	Unimportant	Unimportant	Unimportant	Unimportant.
Unimportant	Unimportant	Fair	Unimportant	Choice	Unimportant.
Fair	Unimportant	Unimportant	Unimportant	Unimportant	Unimportant.
Unimportant	Unimportant	Fair	Unimportant	Unimportant	Unimportant.
Fair	Unimportant	Unimportant	Unimportant	Unimportant	Unimportant.
Unimportant	Unimportant	Unimportant	Unimportant	Unimportant	Unimportant.
Unimportant	Unimportant	Unimportant	Unimportant	Unimportant	Unimportant.
Unimportant	Choice	Choice	Choice	Unimportant	Unimportant.
Unimportant	Choice	Choice	Unimportant	Unimportant	Choice.
Choice	Unimportant	Choice	Unimportant	Unimportant	Unimportant.
Unimportant	Choice	Choice	Unimportant	Unimportant	Choice.
Unimportant	Choice	Choice	Unimportant	Choice	Choice.
Unimportant	Unimportant	Unimportant	Unimportant	Fair	Unimportant.
Unimportant	Unimportant	Unimportant	Unimportant	Choice	Unimportant.
Choice	Unimportant	Choice	Unimportant	Unimportant	Unimportant.
Choice	Unimportant	Choice	Unimportant	Unimportant	Unimportant.
Unimportant	Unimportant	Unimportant	Unimportant	Unimportant	Unimportant.
Choice	Choice	Choice	Unimportant	Choice	Unimportant.
Unimportant	Fair	Fair	Unimportant	Choice	Unimportant.
Unimportant	Unimportant	Fair	Unimportant	Unimportant	Unimportant.
Choice	Unimportant	Choice	Unimportant	Unimportant	Unimportant.
Choice	Choice	Choice	Unimportant	Choice	Unimportant.
Choice	Unimportant	Choice	Unimportant	Unimportant	Unimportant.

[4] Birds that eat nuts and acorns include the chickadee, grackle, bluejay, titmouse, and woodpecker.

[5] Grain sorghum is a choice food of most birds that eat grain, but the blackbird, cowbird, and sparrow rob the game species of most of the seed, or the humid climate causes the seed to deteriorate.

Norfolk loamy sand, thick surface, 5 to 8 percent slopes.
Sawyer, Norfolk, and Cuthbert loamy sands, 2 to 5 percent slopes.
Sawyer, Norfolk, and Cuthbert loamy sands, 2 to 5 percent slopes, eroded.
Sawyer, Norfolk, and Cuthbert loamy sands, 5 to 8 percent slopes.
Sawyer, Norfolk, and Cuthbert loamy sands, 5 to 8 percent slopes, eroded.
Tifton loamy sand, 0 to 2 percent slopes.
Tifton loamy sand, 2 to 5 percent slopes.
Tifton loamy sand, 2 to 5 percent slopes, eroded.
Tifton loamy sand, 5 to 8 percent slopes, eroded.
Tifton loamy sand, thick surface, 2 to 5 percent slopes.
Tifton loamy sand, thick surface, 2 to 5 percent slopes, eroded.
Tifton sandy loam, thin solum, 2 to 5 percent slopes, eroded.
Tifton sandy loam, thin solum, 5 to 8 percent slopes, eroded.

WILDLIFE GROUP 2

This wildlife group consists chiefly of somewhat excessively drained, sandy soils of uplands. At a depth of 30 to 72 inches is loamy sand, sand, or coarse sand that is underlain by permeable sandy clay loam.

These soils are low in available moisture capacity. Their slopes range from 0 to 8 percent.

These soils occupy about 15 percent of the county, and most of the acreage is wooded. The soils are limited in their suitability for plants because of their sandy texture and their low water-holding capacity. They are not suited to flooding for duck fields, and they do not provide suitable sites for ponds, because of their sandy texture. The following soils are in this group:

Gilead, Lakeland, and Cuthbert coarse sands, 2 to 5 percent slopes.
Gilead, Lakeland, and Cuthbert coarse sands, 5 to 8 percent slopes.
Lakeland loamy sand, shallow, 2 to 5 percent slopes.
Lakeland sand, 0 to 5 percent slopes.
Lakeland sand, 5 to 8 percent slopes.

WILDLIFE GROUP 3

This wildlife group consists of moderately well drained or somewhat poorly drained soils. The soils are along the outer borders of flood plains, in low, flat areas between

TABLE 5.—*Suitability of various food plants for the soils in the different wildlife groups*

Name of plant	Wildlife groups [1]				
	1	2	3	4	5
Bahiagrass	Suited	Suited	Suited	Marginal	Poorly suited or unsuited.
Beech	Poorly suited or unsuited.	Poorly suited or unsuited.	Suited	Poorly suited or unsuited.	Suited.
Blackberry	Suited	Marginal	Suited	Marginal	Poorly suited or unsuited.
Blackgum	Marginal	Poorly suited or unsuited.	Marginal	Marginal	Suited.
Blueberry	Marginal	Marginal	Suited	Poorly suited or unsuited.	Suited.
Browntopmillet	Suited	Marginal	Marginal	Poorly suited or unsuited.	Suited.
Buttonclover	Suited	Poorly suited or unsuited.	Suited	Poorly suited or unsuited.	Poorly suited or unsuited.
Cherry, black (wild)	Suited	Marginal	Poorly suited or unsuited.	Poorly suited or unsuited.	Poorly suited or unsuited.
Chufa	Suited	Marginal	Marginal	Poorly suited or unsuited.	Poorly suited or unsuited.
Corn	Suited	Marginal	Suited	Poorly suited or unsuited.	Poorly suited or unsuited.
Cowpeas	Suited	Marginal	Marginal	Poorly suited or unsuited.	Poorly suited or unsuited.
Crimson clover	Suited	Poorly suited or unsuited.	Marginal	Poorly suited or unsuited.	Poorly suited or unsuited.
Dewberry	Suited	Marginal	Suited	Marginal	Poorly suited or unsuited.
Dogwood, flowering	Suited	Suited	Marginal	Poorly suited or unsuited.	Suited.
Grapes, wild	Suited	Marginal	Marginal	Marginal	Suited.
Greenbrier	Suited	Marginal	Marginal	Poorly suited or unsuited.	Suited.
Hackberry	Suited	Poorly suited or unsuited.	Poorly suited or unsuited.	Poorly suited or unsuited.	Poorly suited or unsuited.
Hickory	Marginal	Poorly suited or unsuited.	Suited	Poorly suited or unsuited.	Poorly suited or unsuited.
Honeysuckle	Suited	Poorly suited or unsuited.	Suited	Marginal	Marginal.
Japanese millet	Suited	Poorly suited or unsuited.	Suited	Poorly suited or unsuited.	Suited.
Lespedeza, annual	Marginal	Poorly suited or unsuited.	Suited	Marginal	Suited.
Lespedeza, bicolor	Suited	Marginal	Poorly suited or unsuited.	Marginal	Poorly suited or unsuited.

See footnotes at end of table.

TABLE 5.—*Suitabilty of various food plants for the soils in the different wildlife groups*—Continued

Name of plant	Wildlife groups [1]				
	1	2	3	4	5
Lespedeza, sericea	Suited	Marginal	Poorly suited or unsuited.	Marginal	Poorly suited or unsuited.
Mulberry	Suited	Marginal	Marginal	Marginal	Poorly suited or unsuited.
Oaks [2]	Suited	Poorly suited or unsuited.	Poorly suited or unsuited.	Marginal	Suited.
Oats (forage)	Suited	Suited	Suited	Marginal	Poorly suited or unsuited.
Pecan	Suited	Poorly suited or unsuited.	Marginal	Poorly suited or unsuited.	Poorly suited or unsuited.
Pine	Suited	Marginal	Marginal	Marginal	Suited.
Ragweed, common	Suited	Suited	Suited	Suited	Poorly suited or unsuited.
Rescuegrass	Suited	Poorly suited or unsuited.	Marginal	Poorly suited or unsuited.	Poorly suited or unsuited.
Rye	Suited	Marginal	Suited	Poorly suited or unsuited.	Poorly suited or unsuited.
Ryegrass	Suited	Marginal	Suited	Poorly suited or unsuited.	Poorly suited or unsuited.
Smartweed	Poorly suited or unsuited.	Poorly suited or unsuited.	Suited	Poorly suited or unsuited.	Suited.
Sorghum, grain [3]	Poorly suited or unsuited.	Poorly suited or unsuited.	Poorly suited or unsuited.	Poorly suited or unsuited.	Poorly suited or unsuited.
Sweetgum	Marginal	Poorly suited or unsuited.	Suited	Poorly suited or unsuited.	Suited.
Tickclover (beggarlice).	Suited	Marginal	Suited	Marginal	Poorly suited or unsuited.
Wheat (forage)	Suited	Poorly suited or unsuited.	Marginal	Poorly suited or unsuited.	Marginal.
Whiteclover	Poorly suited or unsuited.	Poorly suited or unsuited.	Suited	Poorly suited or unsuited.	Suited.

[1] The soils in each wildlife group are named and described in the pages that follow.
[2] Includes black, blackjack, live, pin, post, sawtooth, scarlet, Shumard, water, white, and willow oaks.
[3] Grain sorghum can be grown on many of these soils for the commercial production of seed, but it is given a rating of *poorly suited* because it attracts flocks of blackbirds, sparrows, and other birds that are undesirable. In addition, it deteriorates rapidly because of the humid climate.

streams, and on low slopes around the heads of streams. Their surface layer ranges from silt loam to loamy sand in texture and is 12 to 30 inches thick. Almost every year much of the acreage is flooded for periods that last from 1 to 10 days. The Leaf and Chewacla soils, which border the Oconee River, are sometimes flooded for slightly longer periods.

The soils in this group are very productive when they are adequately drained, limed, and fertilized. Most of them are somewhat slow to dry out in spring, and, as a result, planting is often delayed.

These soils occupy about 10 percent of the county, and much of the acreage is in trees. Only a limited number of plants suitable for wildlife grow on these soils because of the somewhat poor drainage, the moderately high water table, and the hazard of flooding. Some of the plants to which these soils are best suited are bahiagrass, whiteclover, annual lespedeza, ryegrass, browntopmillet, and smartweed. Many areas can be flooded for duck fields. Water can be impounded on these soils, or ponds can be dug. The following soils are in this group:

Chewacla silt loam.
Goldsboro loamy sand, thick surface, 2 to 5 percent slopes.
Izagora soils.
Klej loamy fine sand, 0 to 2 percent slopes.
Leaf fine sandy loam.
Lynchburg loamy sand, thick surface, 0 to 2 percent slopes.
Lynchburg loamy sand, thick surface, 2 to 5 percent slopes.
Wahee fine sandy loam.

WILDLIFE GROUP 4

This wildlife group consists of excessively drained, deep sands or coarse sands, moderately well drained sandy loams, and somewhat poorly drained soils that are clayey. The soils are on uplands. Their surface layer varies in thickness. In the soils that have a clayey subsoil, the surface layer ranges from sandy loam to sand and is 4 to 6 inches thick. In the soils that have a sandy subsoil, the surface layer is sand or coarse sand, and fine-textured material is at a depth of 30 to 72 inches.

These soils occupy about 10 percent of the county. Nearly all the acreage is wooded, but some small areas are in pasture. The soils are not suited to cultivated crops. The soils that have a clayey subsoil have strong slopes, and there is a severe hazard of erosion if these soils are cultivated. The sandy soils are too droughty for crops. Scrub oak, pine, and a few choice food plants that grow on the areas are suited to wildlife. Many draws through these areas provide sites that are favorable for ponds, but some areas are not suited to ponds. A thorough investigation should be made when a site for a pond is to be selected on these soils. The following soils are in this group:

Boswell sandy loam, 5 to 8 percent slopes, eroded.
Gilead, Lakeland, and Cuthbert sands, 8 to 12 percent slopes, eroded.
Lakeland coarse sand, deep, 2 to 5 percent slopes.
Lakeland coarse sand, deep, 5 to 12 percent slopes.
Lakeland sand, 8 to 12 percent slopes.
Sandy and clayey land.
Sunsweet sandy loam, 5 to 12 percent slopes, eroded.
Susquehanna sandy loam, 2 to 5 percent slopes.
Susquehanna sandy loam, 2 to 5 percent slopes, eroded.
Susquehanna sandy loam, 5 to 8 percent slopes.
Susquehanna sandy loam, 5 to 8 percent slopes, eroded.

WILDLIFE GROUP 5

This wildlife group consists of somewhat poorly drained to very poorly drained soils on the flood plains of streams and around the heads of streams. It also includes poorly drained soils in depressions. The surface layer of these soils ranges from silt loam to sand in texture and from 18 to 42 inches in thickness. Beneath the surface layer is gray soil material that ranges from sand to sandy clay loam or clay in texture. These soils have a shallow root zone because of the high water table. The soils on flood plains are flooded for periods of a few days to several weeks each year. These soils are not suited to cultivated crops.

The kinds of plants that provide food and cover for wildlife are limited on these soils because of the poor drainage, the high water table, and the frequent flooding. Of the plants that grow on these areas, the choice food plants for wildlife are Japanese millet and smartweed for ducks, and pine, gum, small plants, and shrubs for deer and beaver. Some areas are suitable for flooding for duck fields, and there are many sites that are suitable for ponds. The following soils are in this group:

Alluvial land.
Myatt sandy loam.
Plummer sand, 0 to 2 percent slopes.
Plummer sand, 2 to 5 percent slopes.
Rains sandy loam, thick surface, 2 to 5 percent slopes.
Swamp.

Planning for wildlife

Help can be obtained in planning for wildlife by referring to the information given in the preceding pages of this section. In addition the county work unit of the Soil Conservation Service maintains specific, up-to-date technical guides for each important species of wildlife and each significant plant suitable for food or cover. It also has specifications for practices that will help to conserve soil and water and that are adapted to the various soils and surface waters in the county. Thus, any landowner can obtain practical help in planning and establishing habitats of good quality for a specific species of wildlife.

Engineering Uses of Soils [4]

Soil engineering is well established in engineering practice today. It is, in a broad sense, a subdivision of structural engineering because it deals with soils as the foundation material upon which structures rest or with the soils when they are used as structural material.

Soils, to the engineer, are natural materials that occur in great variety over the earth and that have various engineering properties. These properties may vary widely from place to place, even within the small area covered by a single project. A large part of soil-engineering practice consists of locating various soils, determining their engineering properties, correlating these properties with the requirements of the job, and selecting the best possible soil material for each requirement.

This soil survey report contains information about the soils that will be helpful to engineers. Special emphasis has been placed on engineering properties of the soils as they are related to agriculture.

The information in this report can be used to—

1. Make soil and land use studies that will aid in selecting and developing sites for industrial, business, residential, road, and recreational development.
2. Make preliminary estimates of the engineering properties of the soils in planning for agricultural drainage systems, farm ponds, irrigation systems, diversions and terraces, waterways, and septic tanks and drainage fields.
3. Make preliminary evalutions of soil and ground conditions that will aid in selecting sites for highways and in planning detailed investigations for the selected locations.
4. Locate sources of material for construction.
5. Correlate the performance of engineering structures with soil mapping units to obtain information useful for designing and maintaining the structures.
6. Determine the suitability of the soils for cross-country movements of vehicles and construction equipment.
7. Supplement information from other maps, reports, and aerial photographs for the purpose of making maps and reports that can be used readily by engineers.
8. Make the preliminary evaluation of the suitability of a particular area for construction purposes.

The mapping and the descriptive part of the report are somewhat generalized, however, and should be used only in planning more detailed field investigations to determine the condition of the soil, in place, at the site of the proposed engineering construction.

To make the best use of the soil map and the descriptive report, the engineer should understand the classification system used by soil scientists. He should also have knowledge of the physical properties of the soil material and the condition of the soil in place. Therefore, he should test the soil material and observe the behavior of the soils when they are used in engineering structures and foundations. The engineer can then develop criteria for the soil units delineated on the soil map.

This section contains three tables. The first is table 6, which gives engineering test data for soil samples taken from six soil profiles in the county. The second is table 7, which gives brief descriptions of the soils and their estimated physical properties. The last is table 8, which

[4] Prepared with the assistance of JACKSON W. PAYNE, area engineer, SCS, Soperton, Ga.

gives interpretations of the engineering properties of the soils.

In addition to the information given in this section, much additional information can be found in the rest of this report. The engineer may obtain helpful information by reading the section "How Soils are Named, Mapped, and Classified." He will find descriptions of the soil profiles in the section "Formation, Morphology, and Classification of Soils."

The terminology in this report is that used by soil scientists and agronomists. Some of the terms therefore may not be familiar to the engineer; other terms, though familiar, have special meaning in soil science or agronomy. Most of these terms are defined in the Glossary.

Engineering classification systems

Most highway engineers classify soil materials in accordance with the system approved by the American Association of State Highway Officials (*2*). In this system soil materials are classified in seven principal groups. The groups range from A–1, consisting of gravelly soils of high bearing capacity, to A–7, consisting of clay soils having low strength when wet. Within each group, the relative engineering value of the soil material is indicated by a group index number. Group indexes range from 0 for the best materials to 20 for the poorest. The group index number is shown in parentheses, following the soil group symbol, as shown in the next to last column of table 6.

Some engineers prefer to use the Unified soil classification system (*9*). In the Unified system, soil materials are identified as coarse grained (8 classes), fine grained (6 classes), or highly organic.

Engineering test data

To help evaluate the soils for engineering purposes, soil samples were taken to a depth of 6 feet from the principal soil types in two extensive series and were tested in accordance with standard procedures. The results of the tests are given in table 6. Although samples of the soils in each of these two soil series were taken in three different locations, and the test data show that the soils vary in some characteristics, the data probably do not show the maximum variations in the B and C horizons of the soils in these two soil series. The results of the tests include data obtained in moisture-density tests, mechanical analyses, and plasticity tests.

In the moisture-density, or compaction, test, a sample of the soil material is compacted several times using the same compactive effort each time but with a higher content of moisture. The dry density, or unit weight, of the soil material increases until the optimum moisture content is reached. After that, the dry density decreases as the content of moisture increases. The highest dry density obtained in the compaction tests is termed "maximum dry density." Moisture-density data are important in earthwork because, as a rule, optimum stability is obtained if the soil is compacted to about maximum dry density when it is at approximately the optimum moisture content.

The results of mechanical analyses, obtained by combined sieve and hydrometer methods, may be used to determine the relative proportions of the different size particles that make up the soil sample. The content of clay is measured by using the hydrometer method, which is the method generally used by engineers. The results of testing by the hydrometer method should not be used to name the textural classes of soils.

The value of the liquid limit and plasticity index indicates the effect of water on the consistence of the soil material. As the moisture content of a clayey soil increases from a very dry state, the material changes from a solid to a semisolid, or plastic, state. As 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 material passes from a solid to a plastic state. The liquid limit is the moisture content at which the material passes 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 soil material is in a plastic condition.

Table 6 also gives the two engineering classifications for each soil sample. These classifications are based on the results of mechanical analyses, the liquid limit, and the plasticity index.

Engineering properties of soils

Table 7 gives some of the soil characteristics that are significant in engineering. It also gives the engineering properties of the soil material that is in the principal horizons. The estimated physical properties are those of the average soil profile, which is divided into layers significant to engineering. Where test data are available, the average values from table 6 are shown. Where tests were not performed, the estimates shown are based on test data obtained when these soils were tested in other counties and on past experience in engineering construction.

Depth to a seasonally high water table, as shown in table 7, is based on field observations.

Permeability of the soil as it occurs in place was estimated. The estimates are based on the structure and consistence of the soils and on field observations. Only a limited amount of laboratory data on permeability is available.

Available water capacity in inches per inch of soil depth is the approximate amount of capillary water in the soil when wet to field capacity. When the soil is air dry, this same amount of water will wet the soil material to a depth of 1 inch without deeper percolation. To make reliable estimates, data on representative soils are needed from undisturbed soil samples or from field measurements.

The column on reaction shows that all the soils are acid.

The shrink-swell potential is an indication of the volume change to be expected when the content of moisture changes. It is estimated on the basis of the amount and type of clay in the soil layers. In general, soils classified as A–7 and CH have a high shrink-well potential. Clean sands and gravels (single-grain structure) and those having small amounts of nonplastic to slightly plastic fines, as well as most other nonplastic to slightly plastic soil material, have a low shrink-swell potential.

Depth to bedrock is not given in this table. In general, sandstone or limestone is at a depth of 100 feet or more. Thin, discontinuous strata of sandstone occur on or near the surface in areas that are widely scattered or isolated.

Soil features affecting engineering

Table 8 lists, for each mapping unit, specific features that favorably or unfavorably affect the construction of highways and work in soil and water conservation. These features are generally not apparent to the engineer, unless he has access to the results of field investigation. They are, however, significant enough to influence construction practices.

The location of highways in areas where the soils are sloping, moderately steep, or steep may be influenced by the depth to clay and by the type of clay. Highly plastic or plastic clays impede internal drainage and make a poor foundation for secondary roads or highways. The engineer should know of any poor soil material within or slightly below the subgrade.

In some places the clayey layer should be cut out and replaced with material that is more desirable. If this is not feasible or practical, as might be true in areas that are low, flat, or poorly drained, the roadway should be built well above the layer of plastic clay by using an embankment section. Some soils of the uplands, especially the Boswell, Cuthbert, Gilead, Sawyer, and Susquehanna soils, are likely to have a clayey layer.

The location of roads is affected by both poor drainage and flooding. An embankment section should be constructed to keep the roadway above the point reached by a seasonally high water table and by floodwaters. All low-

TABLE 6.—*Engineering test data* [1] *for*

Soil name and location	Parent material	Georgia report No. S-59-Ga-140	Depth	Horizon	Moisture-density [2]		Volume change [3]		
					Maximum dry density	Optimum moisture	Shrinkage	Swell	Total volume change
			Inches		*Lb. per cu. ft.*	*Percent*	*Percent*	*Percent*	*Percent*
Gilead sand:									
2.5 miles NE. of Soperton and 400 yards south of Harmony Baptist Church. (Modal profile.)	Sediments of the Coastal Plain.	3-1	0-7	Ap	121	10	1. 0	1. 3	2. 3
		3-4	19-25	B3	114	16	7. 4	1. 5	8. 9
		3-6	32-60	C2	117	15	2. 7	2. 9	5. 6
2.0 miles NE. of the Soperton-Swainsboro Road; 200 yards SW. of Harmony Baptist Church. (Grades toward soils of the Sawyer series.) [8]	Sediments of the Coastal Plain.	1-1	0-6	Ap	114	11	. 7	1. 9	2. 6
		1-4	13-20	B3	102	21	8. 6	4. 3	12. 9
		1-5	20-60	C	108	18	5. 8	2. 4	8. 2
Near city limits S. of Soperton on Georgia Highway 56. (Grades toward soils of the Norfolk series.)	Sediments of the Coastal Plain.	2-1	0-8	Ap	113	11	. 4	. 9	1. 3
		2-3	15-24	B2	120	13	1. 6	1. 1	2. 7
		2-5	30-60	C	110	18	3. 8	3. 1	6. 9
Sawyer loamy sand:									
6.0 miles NE. of Soperton; 0.6 mile north on Sand Hill Lake Road from Georgia Highway 86. (Modal profile.)	Sediments of the Coastal Plain.	4-2	4-12	A2	120	10	. 5	3. 5	4. 0
		4-4	14-20	B2	115	16	4. 8	1. 7	6. 5
		4-5	20-48	C	107	17	4. 9	6. 5	11. 4
6.0 miles NE. of Soperton; 3.0 miles south on Sand Hill Lake Road from Georgia Highway 86. (Grades toward soils of Gilead series.)	Sediments of the Coastal Plain.	5-2	7-15	A2	120	10	. 8	. 8	1. 6
		5-3	15-18	B2	116	13	3. 5	3. 9	7. 4
		5-5	21-48	C	99	22	8. 2	7. 2	15. 4
6.0 miles NE. of Soperton; 0.4 mile south on Sand Hill Lake Road from Georgia Highway 86. (Grades toward soils of Susquehanna series.)	Sediments of the Coastal Plain.	6-1	0-5	A1	113	12	1. 4	4. 4	5. 8
		6-3	9-12	B3	106	18	5. 1	4. 8	9. 9
		6-4	12-48	C	99	20	11. 5	6. 3	17. 8

[1] Tests performed by State Highway Department of Georgia in accordance with standard procedures of the American Association of State Highway Officials (AASHO), except as stated in footnote 3.

[2] Based on the Moisture-Density Relations of Soils Using a 5.5-lb. Rammer and a 12-inch Drop; AASHO Designation T 99-57, Method A or C (*2*). (Method A was used when the sample contained less than 5 percent of the particles retained on the No. 4 sieve; method C was used for other samples.)

[3] Based on "A System of Soil Classification" by W. F. Abercrombie, Proceedings, Highway Research Board, 1954 (*1*).

[4] Mechanical analyses according to the American Association of State Highway Officials Designation T 88. 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 AASHO procedure, the fine material is analyzed by the hydrometer method and the various grain-size fractions are cal-

lying soils in this county have a high water table, and most are subject to flooding. In most areas the amount of flooding depends on the size of the drainage area above the structure. Soils that have a high water table and that are subject to flooding are Alluvial land, Swamp, and the soils of the Chewacla, Izagora, Leaf, Lynchburg, Myatt, Plummer, Rains, and Wahee series.

In this county earthwork is difficult during prolonged wet periods. It is possible, however, to excavate, haul, and compact soil material from the better drained, coarse-grained soils. Silty or clayey soil material absorbs so much water during wet periods that it cannot be dried readily to the optimum moisture content that is most favorable for proper compaction.

A rating of the suitability of each soil for winter grading, road subgrade, and road fill is given in table 8. A rating is also given each soil as a source of topsoil and sand. Sand that is available in the county is generally not desirable building material, because it is poorly graded. The sediments do not have a uniform or equitable distribution of particles ranging from coarse to fine. The rating of sand under the heading "Suitability of Soil Material as Source of Sand" (table 8) is for mixing and using with other soil material in road subgrade and fills. This sand is not suitable for base course, bituminous or concrete mixtures based on gradation.

The suitability of the soil material for winter grading depends largely on its texture, its natural water content, and the depth to the water table in winter. Clay soils are difficult to handle when wet and must be dried to proper moisture content for compaction. Therefore, they are rated as *poor* for winter grading.

soil samples taken from six soil profiles

Mechanical analysis [4]										Liquid limit	Plasticity index	Classification	
Percentage passing sieve—						Percentage smaller than—						AASHO [5]	Unified [6]
¾-in.	⅜-in.	No. 4 (4.7 mm.)	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.				
100	96	90	85	55	15	9	7	4	2	(7)	(7)	A-2-4(0)	SM.
------	100	99	97	78	39	37	36	33	30	31	12	A-6(1)	SC.
------	100	97	93	70	30	28	27	26	25	34	15	A-2-6(1)	SC.
99	96	95	93	81	18	10	7	4	3	(7)	(7)	A-2-4(0)	SM.
------	100	99	96	88	55	44	43	39	37	38	20	A-6(8)	CL.
------	------	100	99	93	57	48	46	42	40	36	20	A-6(8)	CL.
100	99	98	97	76	12	7	6	3	2	(7)	(7)	A-2-4(0)	SP-SM.
------	------	100	98	79	29	24	24	21	20	25	10	A-2-4(0)	SC.
------	------	--------	100	79	40	34	34	32	31	42	22	A-7-6(4)	SC.
------	100	99	98	80	33	16	10	4	4	(7)	(7)	A-2-4(0)	SM.
------	100	99	97	85	47	41	38	32	30	28	13	A-6(3)	SC.
------	------	100	99	88	54	49	46	41	40	43	25	A-7-6(10)	CL.
------	100	99	97	76	19	12	10	4	4	(7)	(7)	A-2-4(0)	SM.
------	100	98	95	77	36	31	28	24	23	28	15	A-6(1)	SC.
------	------	100	97	87	74	57	54	50	48	46	17	A-7-6(12)	ML.
------	------	100	98	79	16	12	9	3	2	(7)	(7)	A-2-4(0)	SM.
------	100	99	98	89	49	45	42	40	36	30	13	A-6(4)	SC.
------	------	100	99	92	68	64	60	54	52	41	15	A-7-6(9)	ML-CL.

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

[5] Based on Standard Specifications for Highway Materials and Methods of Sampling and Testing (Pt. 1, Ed. 7): The Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes. AASHO Designation M 145-49 (*2*).

[6] Based on the Unified Soil Classification System. Tech. Memo. No. 3-357, v. 1, Waterways Expt. Sta., Corps of Engineers, March 1953.

[7] Nonplastic.

[8] In the second sample of Gilead sand, all the soil material at a depth between 0 and 6 inches passed a 1-inch sieve.

TABLE 7.—*Engineering descriptions of the*

[Dashes indicate information is not

Map symbol	Soil name	Depth to seasonally high water table [1]	Brief site and soil description	Depth from surface	Classification	
					USDA texture	Unified
		Feet		*Inches*		
Acn	Alluvial land (0 to 2 percent slopes).	0	Frequently flooded, wet, variable textured alluvium on first bottoms; the soil material varies from place to place and is generally stratified.	(2)	(2)	----------
BqB BqB2 BqC2	Boswell sandy loam, 2 to 5 percent slopes. Boswell sandy loam, 2 to 5 percent slopes, eroded. Boswell sandy loam, 5 to 8 percent slopes, eroded.	2	Moderately well drained soils on the uplands; the uppermost 6 to 8 inches of sandy loam overlies several feet of plastic clay or sandy clay.	0–8 8–16 16–36	Sandy loam Sandy clay to clay Clay	SM or ML SC or CL CH
Csl	Chewacla silt loam (0 to 2 percent slopes).	0	A moderately well drained to somewhat poorly drained soil formed in recent alluvium on first bottoms; the uppermost 6 to 12 inches of silt loam overlies more than 36 inches of silty clay loam to silty clay; subject to occasional overflow.	0–6 6–19 19–42	Silt loam Silty clay loam Silty clay	ML ML or MH CL or CH
GBB GBC	Gilead, Lakeland, and Cuthbert coarse sands, 2 to 5 percent slopes. Gilead, Lakeland, and Cuthbert coarse sands, 5 to 8 percent slopes.	3+	Moderately well drained to somewhat excessively drained soils that have a sandy surface layer; on narrow ridges and side slopes; at a depth of 10 to more than 36 inches is loamy sand or sand that overlies several feet of sandy clay loam to clay.[3]	0–30 30–54	Coarse sand Sandy clay loam	SP or SM SC or CL
GAB GAB2 GAC GAC2 GAD2	Gilead, Lakeland, and Cuthbert sands, 2 to 5 percent slopes. Gilead, Lakeland, and Cuthbert sands, 2 to 5 percent slopes, eroded. Gilead, Lakeland, and Cuthbert sands, 5 to 8 percent slopes. Gilead, Lakeland, and Cuthbert sands, 5 to 8 percent slopes, eroded. Gilead, Lakeland, and Cuthbert sands, 8 to 12 percent slopes, eroded.	3+		0–15 15–25 25–40	Sand Sandy clay loam Sandy clay	SM SC or CL SC or CL
GnB	Goldsboro loamy sand, thick surface, 2 to 5 percent slopes.	1	A moderately well drained soil at the foot of gentle slopes and flats; the uppermost 20 to 30 inches is loamy sand and overlies several feet of somewhat poorly drained sandy clay loam.	0–22 22–42+	Loamy sand Sandy clay loam	SM SC or CL

See footnotes at end of table.

soils and their estimated physical properties

available or is not applicable]

Classification—Con. AASHO	Percentage passing— No. 4 sieve (4.7 mm.)	No. 10 sieve (2.0 mm.)	No. 200 sieve (0.074 mm.)	Permeability	Structure	Available water capacity	Reaction	Shrink-well potential
	Percent	*Percent*	*Percent*	*Inches per hour* (2)		*Inches per inch* (2)	*pH* (2)	(2).
A-4	100	100	40-60	0. 80-2. 50	Granular	0. 06	5. 1-5. 5	Low.
A-6	100	100	45-65	0. 05-0. 20	Angular blocky	. 11	5. 1-5. 5	Moderate.
A-7	100	100	92-99	0. 05-0. 20	Angular blocky	. 12	5. 1-5. 5	High.
A-4	100	100	70-80	0. 80-2. 50	Weak, fine, granular	. 13	5. 1-6. 0	Low.
A-5 or A-7.	100	100	85-95	0. 30-0. 50	Subangular blocky	. 13	5. 1-6. 0	Moderate to high.
A-6 or A-7.	100	100	90-100	0. 02-0. 20	Massive	. 14	5. 1-5. 5	High.
A-3	95-100	75-85	5-10	10+	Structureless	. 04	4. 5-5. 5	Low.
A-4 or A-6.	95-100	80-90	40-60	0. 20-0. 50	Strong, coarse, subangular blocky	. 11	4. 5-5. 5	Moderate.
A-2	100	100	10-20	5-10+	Weak, granular	. 06	5. 1-5. 5	Low.
A-4 or A-6.	100	100	40-60	0. 05-0. 20	Subangular blocky	. 11	5. 1-5. 5	Moderate.
A-2 or A-6.	100	100	30-60	0. 05-0. 20	Subangular blocky	. 11	5. 1-5. 5	Moderate.
A-2	100	100	10-30	2. 5 -5	Weak, fine, granular	. 08	5. 1-5. 5	Low.
A-4 or A-6.	100	100	45-55	0. 05-0. 20	Subangular blocky	. 11	4. 5-5. 5	Moderate.

TABLE 7.—*Engineering descriptions of the*

Map symbol	Soil name	Depth to seasonally high water table [1]	Brief site and soil description	Depth from surface	Classification	
					USDA texture	Unified
		Feet		*Inches*		
Izs	Izagora soils (0 to 2 percent slopes).	0	Moderately well drained soils formed in old alluvium on the outer parts of flood plains along streams; the soils consist of 10 to 30 inches of sandy loam over a subsoil consisting of several feet of sandy clay; subject to occasional flooding.	0–10 10–28 28–42+	Sandy loam Sandy clay loam Sandy clay	SM or ML SC or CL SC or CL
KgA	Klej loamy fine sand, 0 to 2 percent slopes.	1	A moderately well drained to somewhat poorly drained soil at the foot of slopes and on flats; the uppermost 20 to 36 inches consists of loamy sand that overlies several feet of somewhat poorly drained sandy loam to sandy clay loam.	0–28 28–40 40–52	Loamy fine sand Loamy sand Sandy loam	SM SM SM or ML
LwB LwD	Lakeland coarse sand, deep, 2 to 5 percent slopes. Lakeland coarse sand, deep, 5 to 12 percent slopes.	6+	Excessively drained coarse sands on ridges in the uplands; the coarse sand extends to a depth of 6 to 30 feet.	0–72+	Coarse sand	SM or SP
LoB	Lakeland loamy sand, shallow, 2 to 5 percent slopes.	3+	A somewhat excessively drained loamy sand on uplands; the sandy material extends to a depth of 30 to 42 inches.	0–34 34–60	Loamy sand Sandy clay loam	SM SC or CL
LpB LpC LpD	Lakeland sand, 0 to 5 percent slopes. Lakeland sand, 5 to 8 percent slopes. Lakeland sand, 8 to 12 percent slopes.	5+	Somewhat excessively drained sands on uplands; the sand extends to a depth of 42 to 72 inches.	0–45 45–60+	Sand Sandy clay loam	SP–SM SC or CL
Lea	Leaf fine sandy loam (0 to 2 percent slopes).	0	A poorly drained soil formed in alluvium on first bottoms; it consists of 12 to 18 inches of fine sandy loam that is underlain by several feet of poorly drained, plastic clay alluvium; subject to frequent flooding.	0–12 12–48	Fine sandy loam Clay	SM or ML CH
LzA LzB	Lynchburg loamy sand, thick surface, 0 to 2 percent slopes. Lynchburg loamy sand, thick surface, 2 to 5 percent slopes.	0 0	Somewhat poorly drained soils on flats adjacent to ponded areas and drainageways; they consist of 18 to 30 inches of loamy sand over several feet of sandy clay loam to sandy clay.	0–17 17–24 24–40 40–48	Loamy sand Sandy loam Sandy clay loam Sandy clay	SM SM or ML SC or CL SC or CL
Mya	Myatt sandy loam (0 to 1 percent slopes).	0	A poorly drained soil in depressions on the larger flood plains along streams; it consists of 14 inches of sandy loam and several feet of poorly drained, firm sandy clay loam; subject to frequent flooding.	0–14 14–36 36–42+	Sandy loam Sandy clay loam Sandy loam	SM or ML SC or CL SM or ML

See footnotes at end of table.

soils and their estimated physical properties—Continued

Classification—Con. AASHO	Percentage passing— No. 4 sieve (4.7 mm.)	No. 10 sieve (2.0 mm.)	No. 200 sieve (0.074 mm.)	Permeability	Structure	Available water capacity	Reaction	Shrink-well potential
	Percent	*Percent*	*Percent*	*Inches per hour*		*Inches per inch*	*pH*	
A-4	100	100	40–55	0. 80–2. 50	Granular	0. 08	5. 1–6. 0	Low.
A-4 or A-6.	100	100	45–60	0. 05–0. 80	Subangular blocky	. 12	5. 1–5. 5	Moderate.
A-4 or A-6.	100	100	45–60	0. 05–0. 80	Blocky	. 12	5. 1–5. 5	Moderate.
A-2	100	100	20–30	0. 80–2. 50	Weak, granular	. 08	4. 5–5. 5	Low.
A-2	100	100	10–30	0. 70–1	Weak, granular	. 08	4. 5–5. 5	Low.
A-4	100	100	40–55	0. 05–0. 20	Medium, subangular blocky	. 11	4. 5–5. 5	Low.
A-3	100	70–80	0–10	10+	Single grain	. 04	4. 5–5. 5	Low.
A-2	100	100	10–30	5–10	Weak, granular	. 06	5. 1–5. 5	Low.
A-4 or A-6.	100	100	45–55	0. 05–0. 20	Subangular blocky	. 12	5. 1–6. 0	Moderate.
A-1 or A-3.	100	100	5–15	5–10+	Single grain	. 06	5. 1–5. 5	Low.
A-6	100	100	45–55	0. 05–0. 20	Subangular blocky	. 11	5. 1–5. 5	Moderate.
A-4	100	100	45–60	0. 80–1	Granular	. 11	5. 1–6. 0	Low.
A-7	100	100	70–80	0. 05–0. 20	Subangular blocky	. 12	5. 1–5. 5	High.
A-2	100	100	10–30	0. 80–2. 50	Weak, granular	. 08	5. 1–6. 0	Low.
A-4	100	100	40–55	0. 20–0. 80	Weak, granular	. 08	5. 1–5. 5	Low.
A-6	100	100	45–55	0. 20–2. 50	Subangular blocky	. 08	5. 1–5. 5	Moderate.
A-6	100	100	45–60	0. 05–0. 20	Subangular blocky	. 08	5. 1–5. 5	Moderate.
A-4	100	100	40–55	0. 80–2. 50	Fine, granular	. 06	5. 1–5. 5	Low.
A-6	100	100	45–55	0. 20–0. 80	Subangular blocky	. 08	5. 1–5. 5	Moderate.
A-4	100	100	40–60	0. 20–2. 50	Structureless	. 06	5. 1–5. 5	Low.

TABLE 7.—*Engineering descriptions of the*

Map symbol	Soil name	Depth to seasonally high water table [1]	Brief site and soil description	Depth from surface	Classification	
					USDA texture	Unified
		Feet		*Inches*		
NhA NhB NhB2 NhC2	Norfolk loamy sand, 0 to 2 percent slopes. Norfolk loamy sand, 2 to 5 percent slopes. Norfolk loamy sand, 2 to 5 percent slopes, eroded. Norfolk loamy sand, 5 to 8 percent slopes, eroded.	2	Well-drained soils on uplands that are very gently sloping; they consist of about 12 to 18 inches of loamy sand over several feet of friable sandy clay loam.	0–12 12–42 42–54+	Loamy sand Sandy clay loam Sandy clay loam	SM SC or CL SC or CL
NfA NfB NfC	Norfolk loamy sand, thick surface, 0 to 2 percent slopes. Norfolk loamy sand, thick surface, 2 to 5 percent slopes. Norfolk loamy sand, thick surface, 5 to 8 percent slopes.	2+	Well-drained soils on uplands that are very gently sloping; they consist of about 18 to 30 inches of loamy sand over several feet of friable sandy clay loam.	0–30 30–60+	Loamy sand Sandy clay loam	SM SC or CL
PeA PeB	Plummer sand, 0 to 2 percent slopes. Plummer sand, 2 to 5 percent slopes.	0	Poorly drained, sandy soils on flats and drainageways in the uplands; the uppermost 3 to 4 feet consists of sand and overlies poorly drained sandy clay loam containing lenses of sand; subject to frequent flooding.	0–38 38–60+	Sand Sandy loam	SP or SM SM or ML
ReB	Rains sandy loam, thick surface, 2 to 5 percent slopes.	0	Frequently flooded, poorly drained soils along the heads of streams and small drainageways; the uppermost 18 to 30 inches consists of sandy loam and overlies poorly drained sandy clay loam.	0–26 26–46	Sandy loam Sandy clay loam	SM or ML SC or CL
SkE	Sandy and clayey land (8 to 17 percent slopes).	3+	Well-drained to excessively drained, mixed soil material that ranges from clay to coarse gravelly sand in texture; has short, steep slopes, and outcrops of rock occur in some areas.	(2)	(2)	(2)
SlB SlB2 SlC SlC2	Sawyer, Norfolk, and Cuthbert loamy sands,[4] 2 to 5 percent slopes. Sawyer, Norfolk, and Cuthbert loamy sands, 2 to 5 percent slopes, eroded. Sawyer, Norfolk, and Cuthbert loamy sands, 5 to 8 percent slopes. Sawyer, Norfolk, and Cuthbert loamy sands, 5 to 8 percent slopes, eroded.	3+	Moderately well drained soils in depressions on narrow ridges and on side slopes; they consist of 10 to 18 inches of loamy sand over several feet of sandy clay loam to clay.	0–12 12–20 20–48	Loamy sand Sandy clay loam Clay	SM SC or CL ML or CL
ShD2	Sunsweet sandy loam, 5 to 12 percent slopes, eroded.	3+	A well-drained soil on narrow ridge crests and on steep, narrow breaks; it consists of 3 to 6 inches of sandy loam over several feet of firm sandy clay to clay.	0–3 3–8 8–72	Sandy loam Sandy clay Sandy clay	SM or ML SC or CL SC or CL

See footnotes at end of table.

soils and their estimated physical properties—Continued

Classification—Con.	Percentage passing—			Permeability	Structure	Available water capacity	Reaction	Shrink-well potential
AASHO	No. 4 sieve (4.7 mm.)	No. 10 sieve (2.0 mm.)	No. 200 sieve (0.074 mm.)					
	Percent	*Percent*	*Percent*	*Inches per hour*		*Inches per inch*	*pH*	
A-2	100	100	10-30	2. 5-10	Granular	0. 08	5. 1-6. 0	Low.
A-6	100	100	45-55	0. 80-2. 5	Subangular blocky	. 08	5. 1-6. 0	Moderate.
A-6	100	100	45-55	0. 80-2. 5	Subangular blocky	. 11	5. 1-6. 0	Moderate.
A-2	100	100	10-30	2. 5-10	Single grain	. 08	5. 1-6. 0	Low.
A-6	100	100	45-55	0. 80-2. 5	Subangular blocky	. 11	5. 1-6. 0	Low.
A-2	100	100	5-15	5. 0-10	Structureless	. 04	5. 1-5. 5	Low.
A-4	100	100	40-60	0. 8-2. 50	Structureless to subangular blocky	. 06	5. 1-5. 5	Low.
A-4	100	100	40-55	0. 80-2. 50	Fine, crumb	. 04	5. 1-6. 0	Low.
A-6	100	100	45-55	0. 05-0. 20	Subangular blocky	. 11	4. 5-5. 5	Moderate.
(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2).
A-2	100	100	10-30	2. 5-5. 0	Granular	. 06	5. 1-6. 0	Low.
A-4 or A-6.	100	100	45-55	0. 05-0. 80	Subangular blocky	. 10	5. 1-5. 5	Moderate.
A-7	100	100	90-100	0. 05-0. 20	Angular blocky	. 12	5. 1-5. 5	Moderate to high.
A-4	95-100	75-85	40-55	0. 80-2. 50	Granular	. 06	5. 1-5. 5	Low.
A-6	95-100	85-100	45-60	0. 05-0. 20	Subangular blocky	. 11	5. 1-5. 5	Moderate.
A-6	95-100	85-100	45-60	0. 05-0. 20	Angular blocky	. 12	5. 1-5. 5	Moderate.

TABLE 7.—*Engineering descriptions of the*

Map symbol	Soil name	Depth to seasonally high water table [1]	Brief site and soil description	Depth from surface	Classification	
					USDA texture	Unified
		Feet		*Inches*		
SiB SiB2 SiC SiC2	Susquehanna sandy loam, 2 to 5 percent slopes. Susquehanna sandy loam, 2 to 5 percent slopes, eroded. Susquehanna sandy loam, 5 to 8 percent slopes. Susquehanna sandy loam, 5 to 8 percent slopes, eroded.	1	Somewhat poorly drained soils of the uplands; they consist of 6 to 16 inches of sandy loam over several feet of heavy, dense, plastic clay.	0–6 6–46	Sandy loam Clay	SM or ML CH
Swa	Swamp.	0	Poorly drained to very poorly drained, mixed alluvium on first bottoms; the soil material is generally stratified, and the areas are flooded most of the time.	-------	-------	-------
TqA TqB TqB2 TqC2	Tifton loamy sand, 0 to 2 percent slopes. Tifton loamy sand, 2 to 5 percent slopes. Tifton loamy sand, 2 to 5 percent slopes, eroded. Tifton loamy sand, 5 to 8 percent slopes, eroded.	3+	Well-drained soils of the uplands on broad, very gently sloping ridges; they consist of 12 to 18 inches of loamy sand over several feet of friable sandy clay loam.	0–12 12–32 32–46	Loamy sand Sandy clay loam Sandy clay	SM SC or CL SC or CL
TrB	Tifton loamy sand, thick surface, 2 to 5 percent slopes.	3+	Well-drained soils of the uplands on broad, very gently sloping ridges; they consist of 18 to 30 inches of loamy sand over several feet of friable sandy clay loam.	0–30 30–55 55–67	Loamy sand Sandy clay loam Sandy clay	SM SC or CL SC or CL
TsB2 TsC2	Tifton sandy loam, thin solum, 2 to 5 percent slopes, eroded. Tifton sandy loam, thin solum, 5 to 8 percent slopes, eroded.	3+	Well-drained soils of the uplands on narrow ridges and side slopes; they consist of 8 to 12 inches of sandy loam over a thin layer of friable sandy clay loam.	0–8 8–24 24–42	Sandy loam Sandy clay loam Sandy clay	SM or ML SC or CL SC or CL
Waf	Wahee fine sandy loam (0 to 2 percent slopes).	0	Moderately well drained to somewhat poorly drained soil formed in alluvium on second bottoms; the uppermost 10 to 18 inches is fine sandy loam, and it overlies several feet of firm silty clay.	0–15 15–24 24+	Fine sandy loam Silty clay Clay	SM or ML CL CH

[1] Includes measurements taken in wet weather.
[2] Variable.
[3] Typical Gilead soil is described and rated in this table.

soils and their estimated physical properties—Continued

Classification—Con.	Percentage passing—			Permeability	Structure	Available water capacity	Reaction	Shrink-well potential
AASHO	No. 4 sieve (4.7 mm.)	No. 10 sieve (2.0 mm.)	No. 200 sieve (0.074 mm.)					
	Percent	*Percent*	*Percent*	*Inches per hour*		*Inches per inch*	*pH*	
A-4	100	100	40-55	0. 80-2. 50	Granular	0. 06	5. 1-5. 5	Low.
A-7	100	100	80-90	0. 05-0. 50	Angular blocky	. 12	5. 1-5. 5	High.
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A-2	95-100	90-100	10-30	2. 5-5	Granular	. 07	5. 1-6. 0	Low.
A-4 or A-6.	95-100	90-95	45-55	0. 80-2. 50	Subangular blocky	. 10	5. 1-5. 5	Moderate to low.
A-6	95-100	95-100	45-60	0. 20-0. 80	Subangular blocky	. 09	5. 1-5. 5	Moderate.
A-2	95-100	90-100	10-30	2. 5 -5	Granular	. 07	5. 1-6. 0	Low.
A-4 or A-6.	95-100	90-95	45-55	0. 80-2. 50	Subangular blocky	. 10	5. 1-5. 6	Moderate to low.
A-6	95-100	95-100	45-60	0. 20-0. 80	Subangular blocky	. 09	5. 1-5. 6	Moderate.
A-4	95-100	90-100	40-55	0. 8 -2. 50	Granular	. 12	5. 1-6. 0	Low.
A-4 or A-6.	95-100	90-95	45-55	0. 80-2. 50	Subangular blocky	. 10	5. 1-5. 5	Moderate to low.
A-6 or A-7.	95-100	95-100	45-60	0. 20-0. 80	Subangular blocky	. 09	5. 1-5. 5	Moderate.
A-4	100	100	40-55	0. 2 -0. 80	Granular	. 09	4. 5-5. 5	Low.
A-6 or A-7.	100	100	80-90	0. 05-0. 20	Blocky	. 10	4. 5-5. 5	Moderate.
A-7	100	100	90-100	(5)	Blocky	. 12	5. 1-5. 5	High.

[4] Typical Sawyer soil is described and rated in this table.
[5] Less than 0.05.

TABLE 8.—*Interpretations of*

Soil series and map symbols	Suitability of soil material for— Winter grading [1]	Road subgrade	Road fill	Features affecting the location of highways	Suitability of soil material as source of— Topsoil [2]	Sand
Alluvial land (Acn)	Variable	Variable	Variable	High water table; floods	Variable	Variable
Boswell sandy loam (BqB, BqB2, BqC2).	Fair; poor below a depth of 1 to 2 feet.	Poor	Fair to good; poor below a depth of 1 to 2 feet.	Highly plastic soil material; slopes easily eroded.	Fair	Unsuitable
Chewacla (Csl)	Poor	Poor	Poor	High water table; floods; highly plastic soil material.	Fair	Unsuitable
Gilead, Lakeland, and Cuthbert sands (GAB, GAB2, GAC, GAC2, GAD2).[4]	Good	Fair to good	Fair to good	Seepage areas; plastic soil material below a depth of 3 feet in some areas.	Fair	Good; poorly graded fine sands.[5]
Gilead, Lakeland, and Cuthbert coarse sands (GBB, GBC).[4]	Good	Fair to good	Fair to good	Seepage areas; plastic soil material below a depth of 3 feet in some areas.	Poor	Good; poorly graded coarse sands.[5]
Goldsboro (GnB)	Poor below a depth of 1 to 2 feet; fair above that depth.	Fair to good	Fair to good	Slopes easily eroded	Good	Good; poorly graded sands.[5]
Izagora (Izs)	Poor	Fair	Fair	High water table; floods; slopes easily eroded.	Fair	Unsuitable
Klej (KgA)	Fair	Fair	Fair	High water table; slopes easily eroded.	Fair	Good; poorly graded sands.[5]
Lakeland coarse sand, deep (LwB, LwD).	Good	Poor; good if confined.	Poor; good if stabilized.	Unstable slopes	Unsuitable	Good; poorly graded sands.[5]
Lakeland loamy sand, shallow (LoB).	Good	Poor; good if confined.	Fair	Unstable slopes	Poor	Good; poorly graded fine sands.[5]
Lakeland sand (LpB, LpC, LpD).	Good	Poor; good if confined.	Fair	Unstable slopes	Poor	Good; poorly graded fine sands.
Leaf (Lea)	Poor	Poor	Poor	High water table; floods; plastic clay.	Unsuitable	Unsuitable
Lynchburg (LzA, LzB)	Poor	Fair	Fair	High water table; slopes easily eroded.	Good	Good; poorly graded sands.[5]

See footnotes at end of table.

engineering properties of the soils

Features affecting soil for conservation work with—						Suitability for septic tanks and drainage fields
Farm ponds		Agricultural drainage	Irrigation	Terraces and diversions	Waterways	
Reservoir area	Embankment					
Variable	Variable	Variable	Variable	(3)	(3)	Unsuitable; high water table.
Slow seepage in subsoil.	Moderate to high strength and stability; slow permeability in the subsoil.	Slowly permeable subsoil that is difficult to drain.	Moderate water-holding capacity; moderate rate of infiltration.	Highly erodible.	Highly erodible.	Fair to good; slow percolation.
Moderate seepage.	Low strength and stability; moderate permeability.	Seasonally high water table; moderate permeability.	Slow rate of infiltration; moderate water-holding capacity.	(3)	(3)	Unsuitable; subject to overflow; high water table.
Slow seepage in subsoil.	Moderate to high strength and stability; slow permeability in subsoil.	(6)	Low to moderate water-holding capacity; moderate rate of infiltration.	Highly erodible.	Highly erodible.	Good; fast percolation; low water table.
Moderate seepage in subsoil.	Moderate strength and stability; slow permeability in subsoil.	(6)	Low water-holding capacity; high rate of infiltration.	Highly erodible.	Highly erodible.	Good; fast percolation; low water table.
Slow seepage	Moderate to high strength and stability; slow permeability in subsoil.	Moderate to slow permeability.	Moderate water-holding capacity; moderate rate of infiltration.	(3)	(3)	Poor to unsuitable; high water table; slow permeability in subsoil.
Slow seepage	Moderate strength and stability; moderately slow permeability.	Moderately slow permeability.	Moderate water-holding capacity; moderate rate of infiltration.	(3)	(3)	Poor to unsuitable; subject to overflow; slow internal percolation.
Excessive seepage.	Low strength and stability; rapid permeability.	Seasonally high water table; slow to moderate permeability.	Moderate water-holding capacity; moderate rate of infiltration.	(3)	(3)	Poor to unsuitable; high water table; poor surface drainage.
Excessive seepage.	Low to moderate strength and stability, rapid permeability.	(6)	Low water-holding capacity; high rate of infiltration.	Highly erodible.	Highly erodible.	Good; fast percolation and low water table.
Excessive seepage.	Low to moderate strength and stability; rapid permeability.	(6)	Low water-holding capacity; high rate of infiltration.	Highly erodible.	Highly erodible.	Good; fast percolation and low water table.
Excessive seepage.	Low to moderate strength and stability; rapid permeability.	(6)	Low water-holding capacity; high rate of infiltration.	Highly erodible.	Highly erodible.	Good; fast percolation and low water table.
Slow seepage	Moderate strength and stability; slow permeability.	Slow permeability.	Moderately high water-holding capacity; moderate rate of infiltration.	(3)	(3)	Unsuitable; high water table; subject to overflow.
Slow to moderate seepage.	Moderate strength and stability; moderate permeability.	Seasonal high water table; moderate permeability.	Moderate water-holding capacity; moderate rate of infiltration.	(3)	(3)	Poor to unsuitable; high water table; slow permeability in the subsoil.

TABLE 8.—*Interpretations of engineering*

Soil series and map symbols	Suitability of soil material for—			Features affecting the location of highways	Suitability of soil material as source of—	
	Winter grading [1]	Road subgrade	Road fill		Topsoil [2]	Sand
Myatt (Mya)	Poor	Poor	Poor	High water table; floods; unstable slopes.	Fair	Unsuitable
Norfolk (NfA, NfB, NfC, NhA, NhB, NhB2, NhC2).	Good	Fair to good	Fair to good	Slopes easily eroded	Good	Good; poorly graded sands.[5]
Plummer (PeA, PeB)	Poor	Poor	Poor	High water table; unstable slopes.	Poor	Fair; poorly graded fine sands.[5]
Rains (ReB)	Poor	Fair	Fair	High water table; unstable slopes.	Fair to good.	Unsuitable
Sandy and clayey land (SkE).	Good	Fair to good	Fair to good	Seepage areas; boulders; unstable slopes.	Poor	Good; poorly graded gravelly sand.[5]
Sawyer,[7] Norfolk, and Cuthbert loamy sands (SlB, SlB2, SlC, SlC2).	Good; poor below a depth of 2 to 3 feet.	Fair to good; poor below a depth of 2 to 3 feet.	Fair to good; poor below a depth of 2 to 3 feet.	Seepage areas; slopes easily eroded; highly plastic soil material below a depth of 3 feet.	Fair	Fair; poorly graded fine sands.[5]
Sunsweet (ShD2)	Good	Fair to good	Fair to good	Seepage areas; plastic soil material; slopes easily eroded.	Poor	Unsuitable
Susquehanna (SiB, SiB2, SiC, SiC2).	Fair; poor below a depth of 1 foot.	Poor	Poor	Seepage areas; very plastic soil material; unstable slopes.	Poor	Unsuitable
Swamp (Swa)	Variable	Variable	Variable	High water table; floods; variable soil material.	Variable	Unsuitable
Tifton (TqA, TqB, TqB2, TqC2, TrB, TsB2, TsC2).	Good	Fair to good	Fair to good	Slopes easily eroded	Good	Good; poorly graded sands.[5]
Wahee (Waf)	Poor	Poor	Poor	High water table; floods; plastic soil material.	Poor	Unsuitable

[1] Also includes rating for suitability for grading in wet weather.
[2] Rating is for the surface layer, or the A horizon, that is used on embankments, cut slopes, and ditches to promote the growth of plants.
[3] Low wet land; terraces, diversions, and waterways not needed.
[4] Typical Gilead soil is rated in this table.

properties of the soils—Continued

Features affecting soil for conservation work with—						Suitability for septic tanks and drainage fields
Farm ponds		Agricultural drainage	Irrigation	Terraces and diversions	Waterways	
Reservoir area	Embankment					
Slow to moderate seepage in the subsoil.	Low to moderate strength and stability; slow permeability in the subsoil.	High water table; slow permeability.	Moderate to low water-holding capacity; moderate rate of infiltraton.	(3)	(3)	Unsuitable; high water table and subject to overflow.
Slow to moderate seepage in the subsoil.	Moderate to high strength and stability; moderate permeability.	(6)	Moderate water-holding capacity; high rate of infiltration.	Highly erodible in sloping phases.	Highly erodible in sloping phases.	Good; fast percolation and medium to low water table.
Slow to moderate seepage in the subsoil.	Low strength and stability; rapid permeability.	High water table; rapid permeability.	Low water-holding capacity; very high rate of infiltration.	(3)	(3)	Unsuitable; high water table; slow internal drainage.
Slow to moderate seepage.	Moderate strength and stability; slow to moderate permeability.	High water table; slow to moderate permeability.	Low water-holding capacity; moderate rate of infiltration.	(3)	(3)	Unsuitable; high water table; slow internal drainage.
Moderate seepage in the subsoil.	Moderate strength and stability; moderate permeability in the subsoil.	(6)	Low water-holding capacity; high rate of infiltration.	Highly erodible.	Highly erodible.	Fair to good; some areas have slow percolation.
Slow seepage in the subsoil.	Moderate to high strength and stability; slow permeability in the subsoil.	(6)	Low to moderate water-holding capacity; moderate rate of infiltration.	Highly erodible.	Highly erodible.	Fair to good; slow percolation.
Slow seepage in the subsoil.	Moderate strength and stability; slow permeability.	(6)	Moderate water-holding capacity; slow rate of infiltration.	Highly erodible.	Highly erodible.	Fair to good; medium percolation; low water table.
Slow seepage in the subsoil.	Moderate strength and stability; slow permeability.	Slowly permeable subsoil; drainage is difficult.	Moderate water-holding capacity; very slow rate of infiltration.	Highly erodible.	Highly erodible.	Poor; very slow percolation in the subsoil.
Variable	Variable	Variable	Variable	(3)	(3)	Unsuitable; high water table; subject to overflow.
Slow to moderate seepage in the subsoil.	Moderate to high strength and stability; moderate permeability.	(6)	Moderate water-holding capacity; moderate rate of infiltration.	Highly erodible.	Highly erodible.	Good; fast percolation and low water table.
Slow seepage	Low strength and stability; slow permeability.	Slow permeability.	Moderate water-holding capacity; very slow rate of infiltration.	(3)	(3)	Unsuitable; high water table; slow percolation.

[5] By a poorly graded soil is meant that the soil material consists of particles of nearly the same size. Because there is little difference in the size of the particles in poorly graded soil material, the density can be increased only slightly by compaction.
[6] Drainage not needed.
[7] Typical Sawyer soil is rated in this table.

The suitability of the soil material for road subgrade and for road fill depends largely on the texture of the material and on its natural water content. Highly plastic soil material is rated as *poor* for road subgrade and *poor* or *fair* for road fill, depending on the natural water content and on the degree of difficulty encountered in handling, drying, and compacting the soil material. Highly erodible soils, such as those composed primarily of fine sand or silt, require moderately gentle slopes and close control of moisture during compaction, to prevent erosion. The side slopes must also be protected by a cover of vegetation soon after they are established. These highly erodible soils are rated as *fair* for road subgrade and for road fill.

Features that affect the suitability of the soils for structures for conserving soil and water are also indicated in table 8. Suitable sites and suitable soil material are available in most well-defined drainageways for constructing good to excellent farm ponds.

Soils that need terraces and waterways are those that are highly erodible. By using proper grades in the terraces and establishing perennial grass in the waterways, erosion is controlled to a safe level for continued use within the capabilities of the soils.

Because the county is predominantly rural, the soils are rated to indicate their suitability for septic tanks and drainage fields. The suitability for septic tanks and drainage fields could determine the site for building the homestead.

Formation, Morphology, and Classification of Soils

In this section are discussed the factors that affect the formation of soils, the morphology and composition of the soils in the county, and the classification of the soils into higher categories. Following this discussion, each soil series in the county is described and a soil profile that is typical of that series is given.

Formation of Soils

Soils are formed by the processes of environment acting upon soil materials that are deposited or accumulated by geologic agencies. The characteristics of a soil at any given point are determined by (1) the physical and mineralogical composition of the parent material; (2) the climate under which the soil material accumulated and has existed since it accumulated; (3) the relief or lay of the land, which influences drainage; (4) the plants and animals that have lived in and on the soil; and (5) the length of time these processes have acted upon the soil material.

All of these five factors have influenced the formation and development of the soils of Treutlen County. Probably, however, the parent materials, climate, and vegetation have had more influence on the formation of different soils within the county than relief and time. The five factors of soil formation are discussed in the following pages.

Parent materials

The soil materials of Treutlen County were derived mostly from material of the Hawthorn geologic formation, but partly from recent, undifferentiated alluvium. The Hawthorn formation is of the Miocene epoch (*4*). It consists of irregular beds of sand, clay, sandy clay, and gravel deposited upon the floor of the ocean before the ocean receded from the Coastal Plain.

The Klej, Lakeland, and Plummer soils were formed in deposits of deep sand; the Gilead, Goldsboro, Lynchburg, Norfolk, Rains, and Tifton soils, in deposits of sandy clay; and the Boswell, Sawyer, Sunsweet, and Susquehanna soils, in clayey sediments. The Izagora, Myatt, and Wahee soils were formed on stream terraces in deposits of sandy clay and silty clay. The Leaf soils, on low stream terraces, were formed in recent stream alluvium consisting of clay and silty clay. The Cuthbert soils were formed in sandy material over clayey material of the Coastal Plain. They are in sloping areas and on ridges in the uplands. The material in which the Izagora, Leaf, Myatt, and Wahee soils formed was chiefly of Coastal Plain origin. It was washed mainly from clayey soils of the uplands, but part of it was washed from soils of other textures.

The Chewacla soils are on the flood plains of the Oconee River. Their parent material consists of recent alluvium deposited from fine sediments carried in suspension by the floodwaters of the river. This alluvium comes chiefly from soils of the Piedmont Plateau. Each time the river is flooded, the Chewacla and Leaf soils receive thin deposits of soil material, and, as a result, they show little profile development.

The Lakeland soils are composed chiefly of quartz sand. The sand is highly resistant to the soil-forming processes and, therefore, the Lakeland soils do not have a normal soil profile. The Tifton soils are composed of sandy clay loam and have a normal soil profile. They are considered to be in equilibrium with their environment.

The Susquehanna soils have a subsoil of clay that does not permit much movement of air and water through it. The physical properties of the soil material slow the action of the soil-forming processes. Natural geologic erosion nearly keeps pace with the processes of soil formation, resulting in a soil that has a poorly developed profile.

In this county bedrock outcrops in a few areas, such as on Bear Hill Bluff and on other escarpments that border streams. The rocks are of sedimentary origin and are chiefly of sandstone. In the areas where the escarpments occur, the parent material of the soils is of mixed origin. Part of the material in which the soils formed probably resulted from the weathering of sandstone.

Climate

Climate influences the processes of physical and chemical weathering. It also affects the biological forces at work in the soil material.

Treutlen County has a warm, humid climate. The average annual temperature is about 65 degrees, and the average annual rainfall is about 45 inches. The winters are mild, and no freezing and thawing of the soil material occur. Because the climate is warm and the soil is moist most of the time, chemical and biological actions are rapid. The large amount of rainfall causes the soils to be highly leached and low in organic matter. The removal of basic elements, such as calcium, magnesium, and sodium, and their replacement by hydrogen cause the soils to be acid. The translocation of soluble material, as bases, and less soluble material, as colloidal matter, has made the soils less fertile than they formerly were and has caused their surface layer to be more sandy than formerly.

Relief

The other soil-forming processes are affected by relief because relief affects drainage, runoff, and geologic and accelerated erosion. It also reduces the percolation of water through the soils.

Differences in relief may greatly affect the amount of moisture and air within the soils. On soils that have a moderately steep slope, the tendency for water to run off is normally greater than the tendency for it to penetrate the soils. Therefore, moderately steep soils are well drained to excessively drained. Only during and immediately after rains are these soils wet or very moist.

The water from runoff drains from high areas and collects in low areas. The soils in the low areas then receive an excessive amount of water, and normal biotic activity is reduced. In many places where a large amount of runoff is received on gently sloping soils that are bare of vegetation, the soil material is removed faster than it is deposited. As a result, the soils are shallow or immature. The degree of profile development that takes place within a given time, in a given parent material, and under the same type of vegetation seems to depend largely on the amount of water that passes through the soil (*7*).

The relief in this county ranges from nearly level to strongly sloping. The influence of relief is reflected in the degree of development of some of the soils. The Susquehanna and Sunsweet soils, for example, have gentle to strong slopes, and they have slowly permeable material in their subsoil. The slowly permeable material restricts the movement of water and retards the growth of vegetation. Much of the water from rainfall runs off the areas instead of soaking in, and natural geologic erosion slightly overbalances the effect of the processes of soil formation.

Plant and animal life

Higher plants, micro-organisms, earthworms, insects, and other forms of life live on and in the soils and influence the direction of soil genesis. Plants and animals largely determine the kind of organic matter added to the soils and the way in which it is incorporated into the soils. They transfer nutrient elements from one horizon to another, and they may also shift soil material from one horizon to another. Gains and losses in organic nitrogen and plant nutrients, and the changes in porosity and structure, may be the result of the activities of plants and animals. Although these general effects are well known, the specific influence of various species or groups of related species in the formation of any one soil is not known. Animals play a secondary role in soil formation by furnishing one step in converting plant remains into organic matter.

Most of the soils in the county contain little organic matter and are sandy and light colored. The long summers and the type of trees on the uplands have kept organic matter from accumulating. In wooded areas, however, there is a thin surface layer of leaf mold and a small amount of organic matter in the uppermost 1 to 3 inches of the mineral soil. The dark-gray color in the uppermost few inches of soil material is caused chiefly by stains of organic matter on the sand grains rather than by any appreciable amount of organic matter.

In the poorly drained areas of the county are mineral soils that have a dark-gray or black surface layer. The content of organic matter in these soils ranges from 3 to 10 percent, by volume, and is in the uppermost 1 to 3 inches of soil material. On the poorly drained soils, the vegetation was a cypress-swamp-hardwood type of forest with scattered pines and an understory of gallberry bushes and other shrubs and grasses that tolerate water.

The soils in this county have formed under three broad types of vegetation. These are (1) longleaf pine and scattered hardwoods with an understory of wiregrass; (2) a cypress-swamp-hardwood type of forest with scattered pines and an understory of gallberry bushes and other shrubs and grasses that tolerate water; and (3) scrub oaks and scattered longleaf pines.

The original vegetation on the well-drained soils was mainly longleaf pines mixed with some hardwoods, and an understory of wiregrass. This type of vegetation retarded runoff. As a result, much of the water from rainfall penetrated the relatively permeable parent material, and little of it ran off. Because of the small amount of runoff, natural erosion was retarded; and consequently, much of the county has very gentle relief.

Man has become important to the future direction and rate of development of the soils. The clearing of the forests, the cultivation of the soils, construction work, and the introduction of new plants will be reflected in the direction and rates of soil genesis in the future. Except for a sharp reduction of organic matter in the uppermost few inches of the surface layer, and the thinning of the surface layer by erosion on the sloping uplands under cultivation, few results of these changes are evident in Treutlen County. It may be many centuries before any drastic changes are noticeable as a result of the activities of man.

Time

The length of time required for a well-developed profile to form in a soil depends upon the factors of parent material, climate, relief, and plant and animal life and on the degree to which these factors influence the soil material. In a warm, humid climate, less time is required for a profile to develop than in a cold, dry climate. This is because moisture and a warm temperature accelerate the chemical and biological activity in the soil material. Also, less time is required for a soil to develop a distinct profile in moderately permeable soil material than in slowly permeable material.

In Treutlen County the soils that formed in alluvium along the first bottoms of streams lack well-defined and genetically related horizons. This is because the soil material has not been in place long enough for a well-defined profile to develop. In contrast, the soil material in which soils such as the Sunsweet and Susquehanna developed, has been in place long enough for a normal profile to develop. Because of the slowly permeable parent material of the Susquehanna and Sunsweet soils, however, water has not affected the soil material greatly, and these soils have a profile that is somewhat poorly developed. The Norfolk and Tifton soils, on the other hand, have a well-developed profile. Because these soils have parent material that is moderately permeable, water could reach the parent material, and, as a result, a well-developed profile was formed. The Norfolk and Tifton soils are of approximately the same age. Geologically, all the soils of the county are young.

Morphology and Classification of Soils

The natural soil classification used in the United States (*6*) consists of six categories. Beginning with the most inclusive, the six categories are the order, suborder, great soil group, family, series, and type.

The highest category consists of three orders, but thousands of soil types are recognized in the lowest category. The suborder and family categories have never been fully developed and are little used. Attention has been concentrated on great soil groups, series, and types. The groups in the highest category of the classification scheme are the zonal, intrazonal, and azonal orders. Table 9 lists the soil series by great soil groups and gives some of the distinguishing characteristics and genetic relationships of the soils in each soil series.

Zonal soils

The zonal order consists of soils that have a well-developed profile as a result of the active factors of soil genesis, climate, and living organisms, chiefly vegetation. Gently undulating, but not perfectly level, well-drained soils of uplands have the best developed profiles.

TABLE 9.—*Characteristics and genetic relationships of soil series*

Great soil group and soil series	Brief profile description [1]	Position	Soil drainage	Slope range	Parent material	Degree of profile development [2]
Red-Yellow Podzolic soils (central concept):				*Percent*		
Boswell	Grayish-brown sandy loam over yellowish-red clay; mottled dark-red, light-gray, and yellowish-brown, heavy, dense, plastic clay at a depth of 14 to 24 inches.	Slopes in the uplands.	Moderately good.	2 to 8	Clayey material of the Coastal Plain.	Medium to strong.
Gilead	Grayish-brown sand over compact, yellowish-brown sandy clay loam; mottled yellowish-brown, red, and light-gray, firm, compact sandy clay at a depth of 18 to 26 inches.	Slopes and ridges in the uplands.	Good	2 to 12	Slightly compact sandy clay loam or sandy clay of the Coastal Plain.	Medium to strong.
Norfolk	Grayish-brown, very friable loamy sand over brownish-yellow, friable sandy clay loam; mottled yellowish-brown, red, and light-gray sandy loam at a depth of 32 to 48 inches.	Ridges and gentle side slopes in the uplands.	Good	0 to 8	Sandy loam and sandy clay loam of the Coastal Plain.	Strong.
Tifton	Grayish-brown, pebbly loamy sand over yellowish-brown, friable, pebbly sandy clay loam; mottled yellowish-brown, strong-brown, and yellowish-red, friable sandy clay at a depth of 26 to 36 inches.	Ridges and gentle side slopes in the uplands.	Good	0 to 8	Sandy loam to sandy clay of the Coastal Plain.	Strong.
Intergrading toward Low-Humic Gley soils:						
Goldsboro	Grayish-brown, very friable loamy sand over brownish-yellow, friable sandy clay loam mottled with red and gray; depth to distinct mottles of gray, red, and brownish yellow is 26 to 42 inches.	Chiefly toe slopes.	Moderately good.	2 to 5	Sandy loam and sandy clay loam of the Coastal Plain.	Medium.

See footnotes at end of table.

TABLE 9.—*Characteristics and genetic relationships of soil series*—Continued

Great soil group and soil series	Brief profile description [1]	Position	Soil drainage	Slope range	Parent material	Degree of profile development [2]
Intergrading toward Low-Humic Gley soils—Con.						
Izagora	Grayish-brown, very friable sandy loam over yellowish-brown, friable sandy clay loam; depth to mottled yellowish-brown, red, and gray, friable sandy clay is 12 to 30 inches.	Low stream terraces.	Moderately good.	0 to 2	Thin beds of sandy alluvium over clayey alluvium of the Coastal Plain.	Medium.
Lynchburg	Dark-gray, friable loamy sand over light yellowish-brown sandy clay loam that has a few mottles of yellowish brown and gray; depth to distinct mottles of light gray, yellowish red, and strong brown is about 24 inches.	Flats and toe slopes.	Somewhat poor.	0 to 5	Loamy sand over sandy clay loam of the Coastal Plain.	Medium.
Sawyer	Dark grayish-brown, very friable loamy sand over yellowish-brown, friable sandy clay loam; mottled strong-brown, light-gray, and yellowish-red, firm clay is at a depth of 16 to 24 inches.	Ridges and side slopes in the uplands.	Moderately good.	2 to 8	Clayey material of the Coastal Plain.	Medium to strong.
Intergrading toward Planosols:						
Wahee	Light-gray, very friable fine sandy loam over very firm, yellowish-brown silty clay mottled with light gray and pale yellow; mottled gray and yellowish-brown, very dense clay is at a depth of 14 to 24 inches.	Low stream terraces.	Moderately good to somewhat poor.	0 to 2	Fine sandy loam over clayey alluvium.	Strong.
Intergrading toward Regosols:						
Cuthbert	Dark-gray to reddish-yellow sand over firm, compact sandy clay, mottled with strong brown and reddish yellow, at a depth of about 15 inches; beneath this is light-gray, compact clay.	Slopes and ridges in the uplands.	Moderately good.	2 to 12	Sandy material over clayey material of the Coastal Plain.	Weak.
Susquehanna	Dark-gray, friable sandy loam over mottled dusky-red, gray, and brown, heavy, dense clay at a depth of 6 to 16 inches.	Ridges and side slopes in the uplands.	Somewhat poor.	2 to 8	Plastic, clayey material of the Coastal Plain.	Weak.
Low-Humic Gley soils (central concept):						
Leaf	Dark-gray fine sandy loam over mottled gray, strong-brown, and red, massive, plastic clay at a depth of 5 to 20 inches.	Low stream terraces.	Poor	0 to 2	Clayey alluvium	Strong.

See footnotes at end of table.

TABLE 9.—*Characteristics and genetic relationships of soil series*—Continued

Great soil group and soil series	Brief profile description [1]	Position	Soil drainage	Slope range	Parent material	Degree of profile development [2]
Low-Humic Gley soils (central concept)—Con.						
Myatt	Dark-gray, friable sandy loam over mottled gray and brownish-yellow, friable sandy clay loam; underlain by mottled gray, brown, and yellowish-brown sandy loam; depth to mottles ranges from 10 to 24 inches.	Low stream terraces.	Poor	0 to 2	Sandy loam over alluvium of friable sandy clay loam.	Weak.
Plummer	Thin layer of dark-gray sand over light-gray fine sand; light-gray sandy loam faintly mottled with yellowish brown at a depth of 36 to 48 inches.	Low, flat areas and toe slopes.	Poor	0 to 5	Sandy material of the Coastal Plain.	Weak.
Rains	Very dark gray to gray sandy loam over mottled gray, brownish-yellow, and strong-brown sandy clay loam at a depth of 24 to 30 inches.	Low areas and branch heads.	Poor	2 to 5	Sandy loam over sandy clay loam of the Coastal Plain.	Weak.
Regosols (central concept):						
Lakeland	Gray or grayish-brown to yellow, loose sand to a depth of more than 30 inches.	Ridges and slopes in the uplands.	Somewhat excessive.	0 to 12	Sandy material of the Coastal Plain.	Weak.
Sunsweet	Brown, very friable, pebbly sandy loam over yellowish-red, pebbly sandy clay; depth to mottled red, strong-brown, and pale-yellow, firm sandy clay is 4 to 12 inches.	Slopes in the uplands.	Good	5 to 12	Sandy clay of the Coastal Plain.	Weak.
Intergrading toward Low-Humic Gley soils:						
Klej	Dark-gray to gray loamy fine sand over pale-yellow loamy fine sand; mottled light-gray and brownish-yellow, friable sandy loam is at a depth of 30 to 40 inches.	Flats and toe slopes in the uplands.	Moderately good to somewhat poor.	0 to 2	Sandy material of the Coastal Plain.	Weak.
Alluvial soils: Intergrading toward Low-Humic Gley soils:						
Chewacla	Dark-brown, friable silt loam over yellowish-brown, firm silty clay loam; mottled yellowish-brown, red, and gray, firm silty clay is at a depth of 10 to 24 inches.	Flood plains	Moderately good to somewhat poor.	0 to 2	Medium-textured, recent alluvium over clayey material.	Weak.

[1] These descriptions are of soil profiles not materially affected by accelerated erosion.

[2] As measured by the number of important genetic horizons and the degree of contrast between them.

The soils of the zonal order have a profile that is essentially in equilibrium with the environment. The most important characteristics of soils of the zonal order have resulted from the action of climate and biological factors on well-drained, but not excessively drained, parent material of mixed mineralogical composition over a long period of time. These soils are sometimes called normal soils, or soils that have well-defined A, B, C horizons. The zonal order of this county is represented by soils of the Red-Yellow Podzolic great soil group.

RED-YELLOW PODZOLIC SOILS

The Red-Yellow Podzolic great soil group consists of a group of well-developed and well-drained, acid soils that have a thin, organic (A0) layer in areas that are wooded and an organic-mineral (A1) horizon over a light-colored, leached (A2) horizon. The A2 horizon overlies a yellow, yellowish-red, or red, more clayey B2 horizon. The parent material is all more or less siliceous. Coarse, reticulate streaks or mottles of red, yellow, brown, and light gray are characteristic of the deep horizons of Red-Yellow Podzolic soils where the parent material is thick (*5*). These soils have developed under a mixed forest of deciduous and coniferous trees in a warm, temperate climate where there is relatively high rainfall. Under these conditions, the decomposition of organic matter and the leaching of plant nutrients are rapid. The soils are low in calcium, magnesium, and other bases. They are strongly acid.

Differences in morphology among the Red-Yellow Podzolic soils in the county are largely, but not entirely, associated with the characteristics of the parent material, especially with its texture. In wooded areas the soils have a thin A0 horizon and a well-defined, dark-colored A1 horizon. In areas that have been cultivated, however, the A0 and the A1 horizons are mixed, to some extent, with the material in the A2 horizon, and they can no longer be separately distinguished. The A1 horizon, in areas that have been cultivated, is fainter and deeper than that in areas that have not been cultivated, and it is recognized as the Ap horizon, or plow layer. Much of the A1 horizon in eroded areas, or in some places all of it, has been removed.

The Gilead, Norfolk, Tifton, and Boswell soils are representative, or central concept, Red-Yellow Podzolic soils. Except for the Boswell soils, all of these soils have a similar color. The Gilead, Norfolk, and Tifton soils have a yellowish B2 horizon, and the Boswell soils have a red B2 horizon. The Norfolk and Tifton soils are good examples of Red-Yellow Podzolic soils that have a thick, yellowish-brown subsoil, or B2 horizon, which has a moderately developed, subangular blocky structure. The subsoil of the Boswell soils is red, and it is much thinner and more clayey than the subsoil of the other soils.

The Gilead soils have a thinner, more compact subsoil than the Norfolk and Tifton soils, and their profile contains more coarse grains and fragments of quartz. The Tifton soils have a more brownish surface layer and a slightly finer textured subsoil than the Norfolk soils, and they have small, rounded iron concretions throughout the profile. Iron concretions are also scattered on the surface of the Tifton and Norfolk soils where those soils occur in the same general areas.

The Gilead soils are much coarser textured throughout the profile than the Boswell soils, in addition to having a more yellowish subsoil. The C horizon of the Gilead soils is more compact and less clayey than that of the Boswell soils. Few to many small iron concretions and small fragments of quartz are on the surface of the Gilead soils.

In the following pages a description of a representative profile is given for each soil series in the county that is within the central concept of the Red-Yellow Podzolic great soil group.

Boswell series.—The soils of the Boswell series are moderately well drained. They are in the uplands. The soils have a subsoil of plastic clay. The following describes a representative profile of Boswell sandy loam, 2 to 5 percent slopes, near the Treutlen-Emanuel county line, 2 miles west of Georgia Highway No. 78:

A1—0 to 2 inches, grayish-brown (10YR 5/2), very friable sandy loam; weak, medium, granular structure; strongly acid; abrupt, wavy boundary.

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

B2—8 to 16 inches, yellowish-red (5YR 5/8), plastic clay; strong, medium, angular blocky structure; strongly acid; gradual, wavy boundary.

C—16 to 32 inches, mottled dark-red (10YR 3/6), light-gray (10YR 7/2), and yellowish-brown (10YR 5/4), heavy, dense clay; strong, coarse, angular blocky structure; very sticky when wet and hard when dry; strongly acid.

Gilead series.—The soils of the Gilead series are well drained. They are in the uplands. The soils have a moderately thin subsoil of compact sandy clay loam. The following describes a representative profile of Gilead sand, 2 to 5 percent slopes, in an undifferentiated unit of Gilead, Lakeland, and Cuthbert sands, in a stand of planted pines, 400 yards south of the Harmony Baptist Church:

A1—0 to 7 inches, grayish-brown (2.5Y 5/2), very friable sand; weak, fine, granular structure; has a few, small, white quartz pebbles; strongly acid; gradual, wavy boundary.

A2–7 to 15 inches, light yellowish-brown (2.5Y 6/4), very friable loamy sand; weak, fine, granular structure; strongly acid; clear, smooth boundary.

B2—15 to 19 inches, yellowish-brown (10YR 5/6), compact, friable sandy clay loam; weak, fine, subangular blocky structure; strongly acid; gradual, wavy boundary.

B3—19 to 25 inches, yellowish-brown (10YR 5/6), firm sandy clay loam that has a few, medium, prominent mottles of light gray (2.5Y 7/2), strong brown (7.5YR 5/8), and red (2.5YR 4/8); moderate, medium, subangular blocky structure; strongly acid; gradual, wavy boundary.

C1—25 to 32 inches, yellowish-brown (10YR 5/6), firm sandy clay that has many, medium, prominent mottles of red (2.5YR 4/8) and light gray (2.5Y 7/2); moderate, medium, angular blocky structure; strongly acid.

C2—32 to 40 inches, red (2.5YR 4/8), firm sandy clay that has many, coarse, prominent mottles of light gray (2.5Y 7/2), light olive brown (2.5Y 5/6), and yellowish brown (10YR 5/6); strong, coarse, angular blocky structure; strongly acid.

Norfolk series.—The Norfolk series consists of deep, well-drained soils of the uplands. The soils have a thick subsoil of yellow, friable sandy clay loam. The following describes a representative profile of Norfolk loamy sand, 2 to 5 percent slopes, in a cultivated field three-fourths of a mile northeast of Barnhill Store on Georgia Highway No. 46:

Ap—0 to 6 inches, grayish-brown (2.5Y 5/2), very friable loamy sand; weak, fine, granular structure; abundant, fine roots; strongly acid; clear, wavy boundary.

A2—6 to 12 inches, light olive-brown (2.5Y 5/6), very friable sandy loam; weak, granular structure; strongly acid.

B1—12 to 22 inches, light brownish-yellow (10YR 6/6), friable sandy clay loam; weak, fine, subangular blocky structure; strongly acid; gradual, wavy boundary.

B2—22 to 38 inches, brownish-yellow (10YR 6/6), friable sandy clay loam; medium, subangular blocky structure; strongly acid; gradual, wavy boundary.

B3—38 to 48 inches, yellowish-brown (10YR 5/8), very friable sandy loam; fine, granular structure; strongly acid; gradual, wavy boundary.

C—48 to 54 inches +, yellowish-brown (10YR 5/4), friable sandy clay loam that has common, medium, distinct mottles of red (2.5YR 4/6) and light gray (10YR 7/2); moderate, medium, subangular blocky structure; strongly acid.

Tifton series.—The soils of the Tifton series are well drained and pebbly. They are in the uplands. The following describes a representative profile of Tifton loamy sand, 2 to 5 percent slopes, in a cultivated field, 3 miles north of Soperton along Swainsboro Highway, west 0.5 mile on the Sand Hill Lake Road:

Ap—0 to 6 inches, dark grayish-brown (10YR 4/2), very friable loamy sand; weak, fine, granular structure; contains many iron concretions or pebbles; abundant, fine roots; strongly acid; clear, smooth boundary.

A2—6 to 9 inches, yellowish-brown (10YR 5/6), very friable loamy sand; weak, fine, granular structure; many iron concretions or pebbles present; strongly acid; clear, smooth boundary.

B1—9 to 12 inches, light yellowish-brown (2.5Y 6/4), friable light sandy clay loam; weak, fine, subangular blocky structure; contains numerous iron concretions or pebbles; strongly acid; clear, smooth boundary.

B2—12 to 25 inches, yellowish-brown (10YR 5/6), friable sandy clay loam; moderate, medium, subangular blocky structure; few iron concretions; strongly acid; gradual, irregular boundary.

B3—25 to 32 inches, yellowish-brown (10YR 5/8) sandy clay loam that has a few, fine, distinct mottles of strong brown (7.5YR 5/8); slightly firm but friable; moderate, medium, subangular blocky structure; few, slightly soft iron concretions; strongly acid; gradual, wavy boundary.

C—32 to 48 inches +, yellowish-brown (10YR 5/4), firm sandy clay that has many, medium, prominent mottles of strong brown (7.5YR 5/6), yellowish red (5YR 4/8), and red (2.5YR 4/8); moderate, medium, subangular blocky structure; strongly acid.

RED-YELLOW PODZOLIC SOILS INTERGRADING TOWARD LOW-HUMIC GLEY SOILS

The Goldsboro, Izagora, Lynchburg, and Sawyer soils have dominant characteristics of soils of the Red-Yellow Podzolic great soil group, but they also have some characteristics of soils in the Low-Humic Gley great soil group. Thus, these soils are classified as Red-Yellow Podzolic soils that intergrade toward Low-Humic Gley soils. They have a profile that is moderately well developed, but they were formed under slightly wetter conditions than soils within the central concept of the Red-Yellow Podzolic great soil group.

The Goldsboro, Izagora, and Lynchburg soils have a darker colored A1 horizon than is typical for the soils of the Red-Yellow Podzolic great soil group, and their subsoil, or B2 horizon, is more grayish. The Goldsboro and Lynchburg soils have a similar texture, but the Goldsboro soils are better drained than the Lynchburg soils. In most parts of the county, the Lynchburg soils are in narrow bands at the foot of slopes. Unlike the soils on broad flats on the lower part of the Coastal Plain in Georgia, they receive seepage water from the uplands. Their somewhat poor drainage is caused by seepage water from higher areas rather than because these soils have a high water table.

The Goldsboro, Izagora, Lynchburg, and Sawyer soils all have yellow, red, and gray mottles in the lower part of the subsoil, indicating that they developed in areas where moisture is slightly excessive. The Izagora soils developed in alluvial deposits on stream terraces, and in general, they are finer textured than the Goldsboro and Lynchburg soils. The Goldsboro soils are the best drained of the soils in this group. They have profile characteristics that are similar to those of the Norfolk soils.

In the following pages a representative profile is described for the soils of each of the Goldsboro, Izagora, Lynchburg, and Sawyer series.

Goldsboro series.—The soils of the Goldsboro series are moderately well drained. They have a thick surface layer of loamy sand and a subsoil of sandy loam to sandy clay loam. The following describes a representative profile of Goldsboro loamy sand, thick surface, 2 to 5 percent slopes, along a road in a wooded area, 200 yards northeast of Anderson Pond:

A1—0 to 6 inches, grayish-brown (10YR 5/2), very friable loamy sand; weak, fine, granular structure; many, fine roots; strongly acid; abrupt, smooth boundary.

A2—6 to 14 inches, light brownish-gray (2.5Y 6/2), very friable loamy sand; weak, fine, granular structure; strongly acid; gradual, smooth boundary.

A3—14 to 22 inches, light yellowish-brown (2.5Y 6/4) loamy sand; weak, fine to medium, granular structure; strongly acid; gradual, wavy boundary.

B1—22 to 26 inches, yellowish-brown (10YR 5/8), friable light sandy clay loam; weak, fine, subangular blocky structure; strongly acid; gradual, wavy boundary.

B2—26 to 30 inches, brownish-yellow (10YR 6/8), friable sandy clay loam that has common, medium, olive-yellow (2.5Y 6/6) and red (2.5YR 5/8) mottles; moderate, medium, subangular blocky structure; strongly acid; gradual, wavy boundary.

B3—30 to 42 inches, brownish-yellow (10YR 6/8), friable sandy clay loam that has common, medium, olive-yellow (2.5Y 6/6) and red (2.5YR 5/8) mottles; moderate, medium, subangular blocky structure; strongly acid; gradual, wavy boundary.

C—42 to 50 inches +, olive-yellow (2.5Y 6/6), friable sandy clay loam that has many, distinct, red (2.5YR 5/8) and brownish-yellow (10YR 6/8) mottles; medium to coarse, blocky structure; strongly acid.

Izagora series.—The soils of the Izagora series are moderately well drained and are on the flood plains of streams. The following describes a representative profile of an Izagora sandy loam 6.5 miles from Soperton along Eastman Highway, 0.8 mile south on a farm road and east 200 yards in a pasture:

A1—0 to 6 inches, dark grayish-brown (2.5Y 4/2), very friable sandy loam; weak, fine, granular structure; many fine roots; strongly acid; clear, smooth boundary.

A2—6 to 10 inches, gray (10YR 6/1), very friable sandy loam; weak, fine, granular structure; strongly acid; clear, smooth boundary.

B1—10 to 18 inches, pale-brown (10YR 6/3), friable light sandy clay loam; weak, medium, subangular blocky structure; strongly acid; gradual, wavy boundary.

B2—18 to 28 inches, yellowish-brown (10YR 5/6), friable sandy clay loam; medium, blocky structure; strongly acid; gradual, wavy boundary.

C—28 to 42 inches +, mottled yellowish-brown (10YR 5/4), red (2.5YR 4/8), and gray (10YR 6/1), friable sandy clay; blocky structure; slightly sticky when wet; strongly acid; wavy boundary.

Lynchburg series.—The Lynchburg series is made up of somewhat poorly drained soils that have a thick surface layer of loamy sand and a subsoil of sandy clay loam. The following describes a representative profile of Lynchburg loamy sand, thick surface, 0 to 2 percent slopes, in a wooded area 0.9 mile north of Gillis Springs along U.S. Highway No. 221, 0.2 mile on a county road:

A0—2 to 0 inches of humus.

A1—0 to 4 inches, dark-gray (10 YR 4/1), friable loamy sand; weak, fine, granular structure; strongly acid; clear, smooth boundary.

A2—4 to 17 inches, grayish-brown (10YR 5/2), friable loamy sand; weak, fine, granular structure; strongly acid; clear, smooth boundary.

B1—17 to 24 inches, light olive-brown (2.5Y 5/4) sandy loam that has a few, fine featherings of pale yellow (2.5Y 7/4); weak, medium, granular structure; strongly acid; gradual, wavy boundary.

B2—24 to 30 inches, light yellowish-brown (2.5Y 6/4) sandy clay loam that has a few, medium, distinct mottles of yellowish brown (10YR 5/4) and light gray (10YR 7/1); medium, subangular blocky structure; strongly acid; gradual, wavy boundary.

B3—30 to 40 inches, light-gray (10YR 7/2) sandy clay loam that has many, medium, distinct mottles of strong brown (7.5YR 5/8) and light yellowish brown (10YR 6/4); medium, subangular blocky structure; strongly acid; gradual, wavy boundary.

C—40 to 48 inches, light-gray (2.5Y 7/2), firm sandy clay that has many, coarse, prominent mottles of yellowish red (5YR 5/6) and strong brown (7.5YR 5/8); medium, subangular blocky structure; strongly acid.

Sawyer series.—The soils of the Sawyer series are moderately well drained. They are in the uplands. The soils have a subsoil of plastic clay. The following describes a profile of Sawyer loamy sand, 2 to 5 percent slopes, in a wooded area, 0.6 mile north of the intersection of Georgia Highway No. 86 and Sand Hill Lake Road:

A1—0 to 4 inches, dark grayish-brown (2.5Y 4/2), very friable loamy sand; weak, fine, granular structure; strongly acid; gradual, smooth boundary.

A2—4 to 12 inches, light yellowish-brown (2.5Y 6/4), very friable loamy sand; weak, fine, granular structure; strongly acid; clear, smooth boundary.

B1—12 to 14 inches, yellowish-brown (10YR 5/8), friable sandy clay loam; moderate, medium, subangular blocky structure; strongly acid; clear, smooth boundary.

B2—14 to 20 inches, yellowish-brown (10YR 5/6) sandy clay that has few prominent mottles of yellowish red (5YR 4/8); moderate, medium, subangular blocky structure; strongly acid; gradual, smooth boundary.

C—20 to 48 inches, strong-brown (7.5YR 5/8), firm clay that has many, coarse, prominent mottles of light gray (10YR 7/2) and yellowish red (5YR 4/8); moderate, medium, angular blocky structure; strongly acid.

RED-YELLOW PODZOLIC SOILS INTERGRADING TOWARD PLANOSOLS

The Wahee soils have some characteristics of Red-Yellow Podzolic soils, but they also resemble Planosols. They are better drained than Planosols, but, like the Planosols, there is a sharp contrast between the texture and consistence in their A2 horizon and that in their B2 horizon. An abrupt boundary separates the A2 horizon of fine sandy loam from the B2 horizon of dense, plastic soil material.

The Wahee soils developed in alluvial deposits. They are on low, nearly level stream terraces that contain slight, oval depressions where surface water concentrates. Their drainage is somewhat restricted because of the heavy, plastic material in their subsoil.

Wahee series.—The Wahee series consists of moderately well drained to somewhat poorly drained soils on stream terraces. The soils have a subsoil of mottled silty clay. The following describes a representative profile of a Wahee fine sandy loam that has slopes of 0 to 2 percent, at Silver Bluff Landing on the Oconee River, 50 feet from a flowing well:

A1—0 to 7 inches, light-gray (10YR 7/2), very friable fine sandy loam; weak, fine, granular structure; strongly acid; abrupt, smooth boundary.

A2—7 to 15 inches, grayish-brown (10YR 5/2), very friable fine sandy loam; weak, fine, granular structure; strongly acid; clear, smooth boundary.

B2—15 to 24 inches, yellowish-brown (10YR 5/6), firm silty clay that has many, prominent mottles of light gray (5Y 7/2) and pale yellow (2.5Y 7/4); moderate, medium, blocky structure; strongly acid.

C—24 to 36 inches, gray clay (10YR 5/1); many, coarse mottles of yellowish brown (10YR 5/4); coarse, blocky structure; strongly acid.

RED-YELLOW PODZOLIC SOILS INTERGRADING TOWARD REGOSOLS

The Cuthbert and Susquehanna soils have dominant characteristics of soils in the Red-Yellow Podzolic great soil group, but they also have some characteristics of Regosols. Thus, these soils are classified as Red-Yellow Podzolic soils intergrading toward Regosols. Regosols consist of unconsolidated deposits of clay or sand in which no clearly expressed soil characteristics have developed.

In the Cuthbert and Susquehanna soils, the A1 horizon and the leached A2 horizon rest directly on the parent material of heavy, dense, mottled clay, which is at a depth of about 16 inches. The dense clay restricts the movement of water through these soils. A zone of illuviation has not developed in the soils, because of the moderately rapid geologic erosion. The Cuthbert and Susquehanna soils are less well drained than the soils of the Red-Yellow Podzolic great soil group, and they lack the normal profile development common to those soils. In the following pages a representative profile is described for both the Cuthbert and Susquehanna series.

Cuthbert series.—The Cuthbert series is made up of moderately well drained soils of the Coastal Plain. These soils have a sandy surface layer and a subsoil of sandy clay to clay. The following describes a representative profile of a Cuthbert sand, in an undifferentiated mapping unit of Gilead, Lakeland, and Cuthbert sands, 0.25 mile north of U.S. Highway No. 221 and Georgia Highway No. 86 in a wooded area:

A1—0 to 3 inches, dark-gray (10YR 4/1) sand; weak, fine, granular structure; very friable; abundant fine roots; strongly acid; abrupt, smooth boundary.

A2—3 to 15 inches, reddish-yellow (7.5YR 7/6) sand; weak, fine, granular structure; very friable; strongly acid; gradual, smooth boundary.

B—15 to 25 inches, strong-brown (7.5YR 5/8), compact sandy clay that has many, fine, distinct mottles of red (2.5YR 4/6) and yellowish red (5YR 4/6); weak, subangular blocky structure; roots present; strongly acid; gradual, wavy boundary.

C—25 to 40 inches, reddish-yellow (7.5YR 6/8), firm, compact sandy clay that has many, prominent mottles of red (2.5YR 4/8) and dusky red (7.5R 3/2); medium, subangular blocky structure; gradual, wavy boundary.
D—40 to 50 inches, light-gray (2.5Y 7/2), compact clay that has mottles of dark yellowish brown (10YR 4/4); subangular blocky structure; strongly acid.

Susquehanna series.—Somewhat poorly drained soils of the uplands make up the Susquehanna series. The soils have a subsoil of mottled, plastic clay. The following describes a representative profile of Susquehanna sandy loam, 2 to 5 percent slopes, along the side of the road in a wooded area, 1 mile north of Gillis Springs on U.S. Highway No. 221, 0.5 mile west on a county road, south 0.1 mile:

A0—1 inch to 0 of partly decomposed forest litter.
A1—0 to 2 inches, dark-gray (10YR 4/1), friable sandy loam; weak, granular structure; abundant, fine roots; strongly acid; abrupt, smooth boundary.
A3—2 to 8 inches, grayish-brown (10YR 5/2), friable, slightly heavy sandy loam faintly mottled with light olive brown (2.5Y 5/4); weak, granular structure; strongly acid; abrupt, wavy boundary.
B—8 to 30 inches, many, coarse, prominent mottles of very dusky red (7.5R 2/4), gray (10YR 6/1), and pale-brown (10YR 6/3), dense clay; blocky structure; very plastic when wet; strongly acid.
C—30 to 46 inches +, gray (10YR 6/1), dense, heavy clay that has a few yellowish-brown (10YR 5/6) mottles and a few specks of dusky red (7.5R 3/4); blocky structure; very plastic when wet; strongly acid.

Intrazonal soils

The intrazonal order is made up of soils that reflect the dominating influence of a local factor of relief or parent material over the effects of climate and vegetation. In Treutlen County only the Low-Humic Gley soils are in the intrazonal order. The soils of this group are characterized by impeded drainage.

LOW-HUMIC GLEY SOILS

Low-Humic Gley soils are somewhat poorly drained or poorly drained. They have a thin surface layer, are moderately high in organic matter, and overlie mottled gray and brown, gleylike mineral horizons that differ little in texture (*5*). The process of soil development involved in their formation is called gleization. The Leaf, Myatt, Plummer, and Rains soils are the representative, or central concept, Low-Humic Gley soils in this county.

The soils of this group formed in acid marine sediments under a cover of pine, sweetgum, blackgum, maple, water oak, cypress, tupelo, myrtle, gallberry bushes, pitcher-plants, and other trees, shrubs, and grasses that tolerate water. They have well-developed characteristics that more strongly reflect the influences of nearly level relief, a high water table, and impeded drainage than the effects of climate and vegetation. Their surface layer ranges from light gray to very dark gray in color. Their subsoil is dominantly gray to mottled gray, red, and brown.

The Leaf and Myatt soils are poorly drained and were formed on stream terraces. The Plummer and Rains soils have a surface layer that is similar, but the Plummer soils are sandy throughout the profile. The surface layer of the Plummer soils is light colored, and their subsurface layer is gray, but the two layers contain about the same amount of clay. The Rains soils contain fine-textured material in their subsurface layer. They are similar to the Myatt soils in texture, structure, and consistence, but their underlying material is less sandy than the material that underlies the Myatt soils.

In the following pages a representative profile that is similar to the central concept of the soils in the Low-Humic Gley great soil group is described for each of the series in this group.

Leaf series.—The Leaf series is made up of poorly drained soils of stream terraces. These soils have a subsoil of plastic clay. The following describes a representative profile of Leaf fine sandy loam that has slopes of 0 to 2 percent, in a wooded area at Silver Bluff Landing on the Oconee River:

A1—0 to 3 inches, dark-gray (5Y 4/1), very friable fine sandy loam; fine, granular structure; strongly acid; abrupt or clear boundary.
A2—3 to 5 inches, light-gray (5Y 7/1), friable fine sandy loam; fine, granular structure; strongly acid; abrupt or clear boundary.
B—5 to 42 inches, olive-gray (5Y 5/2), firm clay that has few, distinct mottles of red (2.5YR 4/8) and common, distinct mottles of strong brown (7.5YR 5/6); strong, subangular blocky structure; strongly acid; gradual, wavy boundary.
C—42 to 48 inches, mottled light-gray (10YR 7/2), grayish-brown (10YR 5/2), and strong-brown (7.5YR 5/6), heavy, dense, compact clay; strong, subangular blocky structure; sticky when wet and very hard when dry; strongly acid.

Myatt series.—The soils of the Myatt series are poorly drained and are in depressions on low stream terraces. The soils have a subsoil of sandy clay loam. The following describes a representative profile of a Myatt sandy loam that has slopes of 0 to 2 percent in a low pasture area north of the bridge across the Oconee River, 1.6 miles east of the highway, and 0.8 mile on a farm road:

A1—0 to 2 inches, dark-gray (10YR 4/1), friable sandy loam; weak, fine, granular structure; many fine roots; very strongly acid; abrupt, smooth boundary.
A2—2 to 14 inches, gray (10YR 5/1), friable sandy loam; weak, fine, granular structure; strongly acid; clear, smooth boundary.
B1—14 to 26 inches, grayish-brown (2.5Y 5/2) sandy clay loam faintly mottled with light brown (7.5YR 6/4); weak, subangular blocky structure; slightly sticky; strongly acid; gradual, wavy boundary.
B2—26 to 36 inches, mottled gray (7.5YR 6/0) and brownish-yellow (10YR 6/6), friable sandy clay loam; medium, subangular blocky structure; slightly sticky; strongly acid; clear, wavy boundary.
C—36 to 42 inches +, mottled gray (10YR 6/1), brown (10YR 5/3), and yellowish-brown (10YR 5/8) sandy loam; structureless; strongly acid.

Plummer series.—Poorly drained soils of the lowlands make up the Plummer series. The soils have a surface layer of dark-gray sand. They have slow permeability. The following describes a representative profile of Plummer sand, 0 to 2 percent slopes, 0.5 mile north of the west bridge of Sand Hill Lake, 20 yards east of a paved county road, along a dirt road:

A1—0 to 4 inches, very dark gray (10YR 3/1) sand; structureless; strongly acid; clear, wavy boundary.
C—4 to 38 inches, light-gray to white (10YR 7/1 to 8/1) fine sand; structureless; strongly acid; gradual, wavy boundary.

D—38 to 60 inches +, light-gray (10YR 6/1), friable sandy loam that has few, distinct mottles of yellowish brown (10YR 5/8); weak, medium, subangular blocky structure; slightly sticky; strongly acid.

Rains series.—Poorly drained soils of the lowlands make up the Rains series. The Rains soils in this county have a thick surface layer of sandy loam and a subsoil that typically is sandy clay loam. The following describes a representative profile of Rains sandy loam, thick surface, 2 to 5 percent slopes, in a low, wet, wooded area 0.9 mile north of Gillis Spring along U.S. Highway No. 221, 0.5 mile west on a county road and 0.2 mile south on a second county road:

A0—1 to 0 inch of humus.
A1—0 to 4 inches, very dark gray (10YR 3/1), very friable sandy loam; weak, fine, crumb structure; strongly acid abrupt, smooth boundary.
A2—4 to 26 inches, gray (10YR 5/1) sandy loam that has few, faint featherings of yellowish brown (10YR 5/6); medium, granular structure; strongly acid; abrupt, smooth boundary.
B1—26 to 32 inches, gray (10YR 5/1) sandy clay loam that has few, medium, distinct mottles of yellowish brown (10YR 5/6) and strong brown (7.5YR 5/6); sticky when wet and hard when dry; weak, medium, subangular blocky structure; strongly acid; gradual, wavy boundary.
B2—32 to 37 inches, gray (10YR 5/1) sandy clay loam that has many, distinct mottles of brownish yellow (10YR 6/6) and strong brown (7.5YR 5/6); weak, medium, subangular blocky structure; strongly acid; gradual, wavy boundary.
C—37 to 46 inches, gray (10YR 5/1) sandy clay loam that has few, distinct mottles of brown (10YR 5/3) and red (2.5YR 4/6); weak, medium, subangular blocky structure; strongly acid.

Azonal soils

The azonal order consists of soils that lack well-developed profile characteristics. The characteristics of the soils of this order are determined, not by climate or by any particular soil-forming process, but rather by the characteristics of the parent material. In this county two great soil groups—the Regosols and Alluvial soils—are recognized.

REGOSOLS

Regosols are soils in which few or no clearly expressed soil characteristics have developed. In Treutlen County they have formed in deep, soft, unconsolidated, loose mineral deposits of quartz sand, dry sand, and somewhat poorly drained sand. The profile characteristics are poorly developed because of the resistance of the quartz sand to the soil-forming processes. In the soils of this great soil group that overlie very slowly permeable clay, the profile characteristics have not developed, because of the resistance of the soil material to movement of the water within the parent material. Also, the rapid geologic erosion prevents the soils from being essentially in equilibrium with the natural soil-forming process.

The Lakeland and Sunsweet soils in this county represent the central concept of the Regosols great soil group. The resistance of the parent material of the Lakeland soils and the rapid geologic erosion of the Sunsweet soils prevent these soils from having a well-developed profile.

In wooded areas the Lakeland soils normally have a thin A1 layer that ranges from gray to dark gray in color. This color results from organic staining of the sand grains rather than from an appreciable amount of organic matter. The structural and textural characteristics of the B horizon are lacking. The yellow sand in the underlying C horizon is highly resistant to the soil-forming factors and is relatively unchanged.

The Sunsweet soils normally have a thin A1 layer, but the underlying, impervious soil material in the C horizon resists the intake of water. In many areas the A1 layer has been lost as the result of previous erosion. The B layer in many areas has not developed. In other places erosion has exposed the underlying parent material.

Lakeland series.—The Lakeland series is made up of somewhat excessively drained soils of the uplands. These soils have a sandy texture and very rapid permeability. The following describes a representative profile of Lakeland sand, 0 to 5 percent slopes, in a wooded area about 200 yards from the east side of Sand Hill Lake Dam:

A1—0 to 4 inches, gray (10YR 5/1), loose sand; single grain; strongly acid; clear, wavy boundary.
C1—4 to 46 inches, yellow (2.5Y 8/6), loose sand; structureless; strongly acid; gradual, wavy boundary.
C2—46 to 50 inches, brownish-yellow (10YR 6/8), loose sand; structureless; strongly acid; gradual, wavy boundary.
D—50 to 60 inches +, strong-brown (7.5YR 5/6), friable fine sandy clay loam that has many, medium, distinct mottles of brownish yellow (10YR 6/8) and red (2.5YR 4/8); medium, subangular blocky structure; strongly acid.

Sunsweet series.—Well-drained soils of the uplands are in the Sunsweet series. The soils have a subsoil of compact clay. The following describes a representative profile of Sunsweet sandy loam, 5 to 12 percent slopes, eroded, in a road cut near the city limits of Soperton on the Sand Hill Lake Road:

A—0 to 3 inches, brown (10YR 4/3), very friable sandy loam; weak, medium, granular structure; numerous concretions; strongly acid; clear, smooth boundary.
B—3 to 8 inches, yellowish-red (5YR 4/6), firm sandy clay; moderate, medium, subangular blocky structure; many concretions; strongly acid; gradual, irregular boundary.
C—8 to 72 inches, red (2.5YR 4/8), firm sandy clay reticulately mottled with strong brown (7.5YR 5/8) and pale yellow (5Y 7/4); moderate, medium, angular blocky structure; peds break easily into smaller aggregates; strongly acid.

REGOSOLS INTERGRADING TOWARD LOW-HUMIC GLEY SOILS

The Klej soils have characteristics that are dominantly like those of Regosols, but they also have some characteristics of soils of the Low-Humic Gley great soil group. They are somewhat poorly drained and have faint mottles in the lower part of the profile.

The Klej soils developed in deep loamy sand and fine sand at the foot of slopes and adjacent to streams. They receive seepage water from the surrounding uplands and have been influenced by a relatively high water table that fluctuates in periods of high and low rainfall. The vegetation under which these soils developed was rather heavy and consisted of pine and some water oak, myrtle, gallberry bushes, and native grasses.

These soils are sandy and strongly acid. The wide fluctuation in the amount of soil moisture has prevented organic matter from accumulating. In areas still under vegetation, the A1 horizon is dark gray, but it contains little organic matter. In cultivated areas the plow layer is gray. The resistance of the sandy parent material to the soil-forming processes and the somewhat poor drainage prevent the Klej soils from forming a normal profile.

Klej series.—The soils of the Klej series are sandy and are moderately well drained to somewhat poorly drained. They have a surface layer of loamy fine sand. The following describes a representative profile of Klej loamy fine sand, 0 to 2 percent slopes, 6 miles south of Soperton on Eastman Highway, 0.8 mile on a farm road, 200 yards in a pasture:

A1—0 to 8 inches, dark-gray (2.5Y 4/0), very friable loamy fine sand; weak, medium, granular structure; very strongly acid; gradual, wavy boundary.

AC—8 to 28 inches, pale-yellow (2.5Y 8/4), very friable loamy fine sand; weak, medium, granular structure; very strongly acid; gradual, wavy boundary.

C1—28 to 40 inches, pale-yellow (2.5Y 7/4), friable loamy sand that has common, coarse, faint mottles of white (2.5Y 8/2); weak, medium, granular structure; very strongly acid; gradual, wavy boundary.

D—40 to 52 inches, light-gray (5Y 7/1), friable sandy loam that has common, medium, distinct mottles of brownish yellow (10YR 6/6); medium, subangular blocky structure; strongly acid.

ALLUVIAL SOILS INTERGRADING TOWARD LOW-HUMIC GLEY SOILS

This great soil group consists of young soils that have been little changed by their environment. The soils are developing in recent deposits of alluvial material on the flood plains of streams. The original material has been modified little, or not at all, by the soil-forming processes.

Alluvial soils generally show stratification, but this represents deposition, not soil development. In some places a weakly defined profile has developed, particularly in the upper horizons. In most places mottling is at a depth of about 15 inches. The Chewacla soils, on the flood plains of the Oconee River, are the only members of this great soil group in the county. The alluvium in which they are forming is chiefly from the uplands of the Piedmont Plateau. These soils are in the azonal order, but they have some characteristics of the Low-Humic Gley great soil group, particularly somewhat poor to poor drainage.

Chewacla series.—The Chewacla series consists of moderately well drained to somewhat poorly drained soils on stream terraces. The soils have a subsoil of mottled silty clay. The following describes a representative profile of Chewacla silt loam (0 to 2 percent slopes), under the Oconee River Bridge on the Eastman Highway, 100 yards from the river:

A—0 to 6 inches, dark-brown (10YR 4/3), friable silt loam; weak, fine, granular structure; strongly acid; clear, smooth boundary.

C1—6 to 12 inches, yellowish-brown (10YR 5/4), firm silty clay loam; medium, moderate, subangular blocky structure; strongly acid; clear, wavy boundary.

C2—12 to 19 inches, yellowish-brown (10YR 5/4), firm silty clay loam mottled with reddish yellow (7.5YR 6/6); medium, subangular blocky structure; strongly acid; clear, wavy boundary.

C3—19 to 42 inches, yellowish-brown (10YR 5/4), firm silty clay that has many, medium, distinct mottles of red (2.5YR 4/6) and gray (10YR 6/1); massive; the gray color increases with increasing depth; strongly acid.

General Nature of the County

This section gives information about the organization, settlement, and population of the county and about the physiography, relief, drainage, climate, and water supplies. It also describes the agriculture, transportation and markets, and the industries and community facilities.

Organization, Settlement, and Population

Treutlen County was created by a legislative act of the General Assembly of Georgia on August 21, 1917. It was formed from parts of Emanuel and Montgomery Counties and was named for Gov. John Adam Treutlen.

The early settlers called the area wiregrass country because it looked like an unbroken forest of pines with a carpet of wiregrass. After they had gone farther into the area, however, they found tracts of deep, sandy soils where scrub oaks were dominant and there were only scattered pines. They also found an intricate pattern of bays and intermittent streams that had a dense stand of trees along their banks.

The population of the area was sparse in the early days. This was mainly because the areas were outside the path of cotton planters and because the soils were thought to be hopelessly sterile. By 1890, however, the lumber and turpentine industries had attracted many settlers and a large amount of capital to the area, and for a time these two industries were predominant. Then, when most of the pines in the original stand had been cut, many of the tracts, formerly in trees, were sold and were used for farming.

The large tracts of land that could be bought at low cost attracted many people from the northern part of Georgia and from the Carolinas. The farmers learned that they could grow cotton if they used a large amount of fertilizer. As a result, the growing of cotton became much more extensive. Too, water from artesian wells became available, and health conditions improved in the area.

Many former lumbermen and producers of turpentine became farmers after they had cut all the trees on their holdings. They retained many of their former laborers as tenants to help with the farmwork. Later, when farm machinery was improved so that less labor was required, many of these former lumbermen operated their own farms, and tenant farming became less extensive. More recently, a large acreage that was formerly used for crops has been replanted to pines or has been planted to improved pasture. The pulp and turpentine industries are again becoming important in the county, and the raising of cattle has increased rapidly.

Physiography, Relief, and Drainage

Treutlen County is within the Middle Atlantic Coastal Plain. All of the county is underlain by rocks of the Hawthorn formation. The elevation in most places is about 300 feet, but it is slightly higher along the northern boundary of the county and slightly lower along the southern boundary. A narrow band of terraces borders the Oconee River, which forms a part of the western boundary of the county. The soils on these terraces formed in comparatively recent alluvium. They are nearly level and are poorly drained to well drained. A second narrow band of terraces borders the Ohoopee River, which forms a part of the northeastern boundary of the county. The soils on those terraces formed in deposits of Coastal Plain origin. They are poorly drained to moderately well drained.

In general, the relief is gently rolling throughout the county. The area is a plain in which there are moderately wide interstream divides but no marked parallelism of the ridges. The tops of the divides are nearly level to very gently sloping, but the side slopes of the drainageways have a gradient of about 4 to 10 percent. There are narrow, steep escarpments in places, generally at the head of small branches. In some places the escarpments run parallel to a stream for a short distance. Along the major streams, there are broad valley flats that are bordered by one or more low terraces.

The most conspicuous topographic feature in the county is Bear Hill Bluff, which is near the Oconee River. This bluff is short and steep and is about 100 feet high. It consists of rock outcrop, which is chiefly sandstone. Sand ridges, locally called oak ridges, border the eastern side of Pendleton Creek. These sand ridges are described under the Lakeland series in the section "Descriptions of Soils."

The county is drained by the Oconee River, Pendleton Creek, Red Bluff Creek, Mercer Creek, Tiger Creek, and the Ohoopee River. In most of the areas between these streams, there is a moderately well developed drainage pattern. When the areas are flooded, the waters of the Oconee River are laden with brownish-red clay and silt from soils of the Piedmont Plateau.

The drainage provided by the small branches and creeks is sluggish. In the upper reaches of these small streams, there is no definite channel, but farther downstream the drainage channel is better defined. The bottom lands along all the larger creeks are subject to overflow during periods of heavy rainfall. The channels of the larger streams, as a rule, are not distinct. These streams have a tendency to meander over areas of lowland.

The bottom lands along the branches and creeks are usually too wet for cultivation and have been left in forest. Most areas of bottom land along the Oconee River are about 1½ miles wide. They could be used for crops if some drainage were provided. The areas are subject to floods of fairly long duration, however, and they have been left in forest. The forests consist chiefly of hardwoods, but there are some scattered pines.

Climate [5]

The climate of Treutlen County is typical of that in other areas of the central part of Georgia. The summers are characterized by warm or hot days and, as a rule, there is little variation from day to day. The nights are usually not uncomfortably warm. Early in the morning, the temperature generally drops to the low seventies or below. The temperature in the afternoon reaches or exceeds 90° F. on about 95 days during the average year. Three-fourths of these days occur in June, July, and August. On an average of 7 days in summer, the maximum temperature is equal to or exceeds 100 degrees. The highest temperature on record for this area, 108 degrees, was reached on both June 1954 and September 1925. The average minimum temperature for the 3 months in summer is just below 70 degrees.

Winters are not severe in this county. Normal out-of-doors activities can be carried on throughout the winter with only minor interruptions because of cold weather. Cold spells in winter, when the temperature drops to freezing or below early in the morning are of short duration and alternate with longer periods of warmer weather. Freezing occurs on an average of slightly more than 30 days a year, but a temperature as low as 20 degrees can be expected on only 2 days during an average winter.

Even during the coldest weather, the temperature during the day usually rises to well above the freezing mark. The lowest temperature ever recorded in the area was slightly above zero. The chances of high temperatures in summer and of low temperatures in winter are indicated in table 10. Figures in this table are based on records kept at Dublin, in Laurens County, but they are considered to be representative of conditions in Treutlen County.

On an average of 2 years in 10, as shown in table 10, there will be a maximum temperature of 100° or higher on at least 4 days in July. On an average of 2 years in 10, there will be a minimum temperature of 25° or lower for at least 4 days in January.

TABLE 10.—*Temperature and precipitation*

[Based on records kept at Dublin, Laurens County, Ga.]

Month	Temperature: Average daily maximum	Temperature: Average daily minimum	Two years in 10 will have at least 4 days with—: Maximum temperature equal to or higher than—	Two years in 10 will have at least 4 days with—: Minimum temperature equal to or lower than—	Precipitation: Average monthly total	One year in 10 will have—: Less than—	One year in 10 will have—: More than—
	°F.	*°F.*	*°F.*	*°F.*	*Inches*	*Inches*	*Inches*
January	61. 8	39. 1	77	25	3. 58	1. 2	6. 1
February	64. 0	40. 3	78	27	4. 14	1. 4	7. 0
March	70. 1	45. 2	84	31	4. 64	1. 8	8. 7
April	78. 5	52. 6	88	38	3. 75	1. 7	7. 5
May	86. 3	60. 7	94	50	3. 59	1. 3	6. 5
June	92. 1	68. 0	100	61	3. 82	1. 1	6. 2
July	92. 7	70. 5	100	66	5. 18	2. 5	8. 0
August	92. 6	69. 5	99	63	4. 47	2. 1	7. 9
September	88. 3	64. 7	96	54	3. 58	1. 1	7. 3
October	79. 8	53. 6	89	40	2. 67	. 3	4. 9
November	69. 5	42. 9	82	29	2. 09	. 6	5. 1
December	61. 6	38. 1	75	24	3. 80	1. 1	8. 0
Year	78. 1	53. 8	101	20	45. 35	37. 5	60. 0

[5] This section was prepared with the assistance of HORACE S. CARTER, State climatologist, Athens, Ga.

TABLE 11.—*Probabilities of the last freezing temperatures in spring and the first in fall*

[Based on data for Dublin, Laurens County, Ga.]

Probability	Dates for given probability and temperature		
	24° F. or lower	28° F. or lower	32° F. or lower
Spring:			
1 year in 10, later than.	March 4	March 15	April 6.
2 years in 10, later than.	February 28	March 11	March 29.
5 years in 10, later than.	February 6	February 26	March 16.
Fall:			
1 year in 10, earlier than.	November 24	November 9	October 28.
2 years in 10, earlier than.	November 27	November 12	November 1.
5 years in 10, earlier than.	December 9	November 24	November 10.

This county has a growing season of about 240 days. The average date of the last freeze in spring is about March 16, but the last freeze in spring has occurred as early as February 10 and as late as April 15. The average date of the first freeze in fall is about November 10, but the date of the first freeze in fall has occurred as early as October 18 and as late as December 20. The probabilities of a freeze after a specified date are given in table 11.

The average annual precipitation is about 45 inches in Treutlen County. (See table 10.) The precipitation is distributed fairly uniformly throughout the year. In no month is there an average of less than 2 inches, and only in July is there an average of more than 5 inches. Usually, there is enough rainfall during the growing season for crops to grow well. The least amount of precipitation comes in fall when dry weather is needed for harvesting the crops. Although the rainfall is generally adequate, damaging dry spells sometimes occur. They are most likely to occur late in summer and in fall, but in most years there is enough moisture early in fall so that good stands of winter grain and grazing crops can be established. Table 12 gives the total number of days in 10 years, by months, in which a specified amount of rainfall may be expected; table 13 gives the total number of days in 10 years, by months, in which the amount of rainfall is equal to or greater than the specified amounts; and table 14 gives the probable total number, in 10 years, of periods of 2-, 4-, and 6-weeks' duration when there will be no more than 0.25 inch of precipitation on any 1 day.

Thunderstorms that come in the afternoon account for much of the rainfall during the warm season. These can be expected on about one-third of the days during the summer months. They are occasionally accompanied by wind and hail, which cause damage locally. According to the records, no tornadoes have occurred in this county.

Records for relative humidity are not available for Treutlen County; the data given are based on records kept at Macon and Savannah. The humidity early in the morning can be expected to range from the low eighties in spring and early in summer to the high eighties late in summer and in fall. The average humidity early in the

TABLE 12.—*Average number of days per year, by months and the year, that have an amount of rainfall equal to or greater than the stated amounts*

[Based on records at Dublin, Laurens County, Ga., for a 10-year period 1951 through 1960]

Rainfall equal to or greater than—	Average number of days in—												
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Inches													
0.10	6	7	7	6	6	6	8	6	6	4	4	7	73
.25	4	5	4	4	4	4	6	4	4	2	3	5	49
.50	2	3	3	3	2	2	4	2	3	1	2	2	29

TABLE 13.—*Total number of days in 10 years, by months and the 10-year period, that have an amount of rainfall equal to or greater than the stated amounts*

[Based on records at Dublin, Laurens County, Ga.]

Rainfall equal to or greater than—	Total number of days in—												
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	10 years
Inches													
1.00	6	14	15	10	11	10	10	11	12	8	6	9	122
2.00	0	1	3	2	2	4	1	3	6	1	0	1	24
3.00	0	0	1	0	0	0	1	0	2	0	0	0	4
4.00	0	0	0	0	0	0	0	0	1	0	0	0	1

TABLE 14.—*Total number of 2-, 4-, and 6-week periods in 10 years with no day having 0.25 inch or more precipitation*

[Based on records at Dublin, Laurens County, Ga.]

Periods free of precipitation equal to or greater than—	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	10 years
2 weeks	3	4	5	7	7	10	2	7	8	9	7	6	75
4 weeks	0	2	1	1	2	0	1	2	2	3	3	2	19
6 weeks	0	0	1	0	0	0	0	0	0	0	1	0	2

afternoon is 50 percent or less in spring than it is during the same part of the day in summer and fall. It is in the fifties during the summer and winter months.

Wind speeds range from about 7 miles per hour in August to about 10 miles per hour in February and March. The prevailing winds are from the south during the summer, and they are predominantly from the north from September through March.

ESTIMATING PROBABILITY OF DROUGHT DAMAGE TO A CROP

Lists A and B can be used with table 15 to judge the likelihood that drought will damage a particular crop on a specified soil (*8*). In list A find the name of the crop and the average depth of its root zone. Then turn to list B, where the total capacity of the soils to hold moisture is given for 12-inch, 24-inch, and 36-inch depths. When you have learned the available moisture capacity of the soil down to the depth where roots of the selected crop will penetrate, turn to table 15, where you are given the chances of drought days, by months, for 1-inch, 2-inch, 3-inch, 4-inch, and 5-inch capacities.

Suppose you want to know how likely it is that there will be dry days in May that will retard the growth of garden vegetables on a Norfolk loamy sand. In list A you note that vegetables have most of their roots in the topmost 12 inches of soil; therefore, in list B, in the column under "12-inch depth" you find that Norfolk loamy sand holds approximately 1 inch of available moisture to a depth of 12 inches. Then in table 15 find the column for 1 inch of moisture and read under the "Probability" column the chances of days when drought will damage vegetables. The chances are 1 in 10 that in May there will be at least 26 drought days, 2 in 10 that there will be at least 23 drought days, 3 in 10 that there will be at least 21 drought days, and 5 in 10 that there will be at least 18 drought days.

LIST A: Normal Root Zone for Common Crops on Permeable Soils

Eighty percent of roots at depths not exceeding—

12 inches	*24 inches*	*36 inches*
Grasses (annual).	Cantaloups.	Bahiagrass.
Lespedeza (annual).	Clover (crimson).	Lespedeza sericea (perennial).
Most garden vegetables.	Clover (white).	
Small grains.	Corn.	
	Cotton.	
	Cowpeas.	
	Grain sorghum.	
	Lima beans.	
	Soybeans.	
	Tobacco.	
	Tomatoes.	
	Watermelons.	

LIST B: Total Available Moisture

Soils:	Approximate available moisture capacity, in inches of water in soil from surface to— 12-inch depth	24-inch depth	36-inch depth
Alluvial land	[1]	[1]	[1]
Boswell sandy loam	1.1	2	[2]
Chewacla silt loam	1.5	3	4
Cuthbert sand	.7	1	[2]
Cuthbert coarse sand	.5	1	[2]
Gilead sand	.7	2	[2]
Gilead coarse sand	.5	1	[2]
Goldsboro loamy sand, thick surface	1.3	3	4
Izagora soils	1.0	2	3
Klej loamy fine sand	1.0	2	3
Lakeland loamy sand, shallow	.7	1	2
Lakeland sand	.5	1	1
Lakeland coarse sand, deep	[1]	[1]	[1]
Leaf fine sandy loam	[1]	[1]	[1]
Lynchburg loamy sand, thick surface	1.0	2	3
Myatt sandy loam	[1]	[1]	[1]
Norfolk loamy sand	1.0	2	3
Norfolk loamy sand, thick surface	.8	2	3
Plummer sand	[1]	[1]	[1]
Rains sandy loam, thick surface	[1]	[1]	[1]
Sandy and clayey land	[1]	[1]	[1]
Sawyer loamy sand	1.1	2	[2]
Sunsweet sandy loam	[1]	[1]	[1]
Susquehanna sandy loam	[1]	[1]	[1]
Swamp	[1]	[1]	[1]
Tifton loamy sand	1.4	2	3
Tifton loamy sand, thick surface	.8	2	3
Tifton sandy loam, thin solum	1.1	2	[2]
Wahee fine sandy loam	1.1	2	[2]

[1] Not cultivated.
[2] Roots do not penetrate below a depth of 24 inches.

Or, again, suppose you want to know the likelihood of dry days in June that will retard the growth of corn if corn is planted on a Tifton loamy sand. Corn has most of its roots in the topmost 24 inches (list A), and to that depth (list B) the Tifton loamy sands hold approximately 2 inches of moisture, or an average capacity of 2 inches. By referring to table 15, under the the 2-inch column, we can see that there will be at least 11 drought days for corn on this soil half the time, or 5 years out of 10. This, of course, is not 11 days without rain but 11 days after all available moisture has been used from the soil profile. Thus, you weigh the cost of growing corn against the chance of damage from drought and then decide on which soils the probability of a poor yield would be too great for favorable economic returns.

TABLE 15.—*Probabilities of drought days on soils of different moisture-storage capacity*

Month [1]	Probability	Minimum drought days if soil has available moisture capacity [2] of—				
		1 inch	2 inches	3 inches	4 inches	5 inches
April	1 in 10	19	12	0	0	0
	2 in 10	16	9	0	0	0
	3 in 10	15	6	0	0	0
	5 in 10	12	0	0	0	0
May	1 in 10	26	25	22	17	10
	2 in 10	23	22	18	12	6
	3 in 10	21	19	15	9	0
	5 in 10	18	15	10	0	0
June	1 in 10	23	23	22	21	18
	2 in 10	20	19	18	17	14
	3 in 10	18	16	15	13	10
	5 in 10	15	11	9	7	5
July	1 in 10	20	18	17	16	16
	2 in 10	17	14	13	12	11
	3 in 10	15	11	11	9	8
	5 in 10	11	7	6	0	0
August	1 in 10	19	15	12	11	10
	2 in 10	16	12	8	7	6
	3 in 10	14	10	5	0	0
	5 in 10	11	6	0	0	0
September	1 in 10	23	18	17	15	13
	2 in 10	29	15	13	10	8
	3 in 10	17	13	10	6	0
	5 in 10	13	8	0	0	0
October	1 in 10	31	29	20	16	16
	2 in 10	22	18	15	10	10
	3 in 10	20	14	10	5	5
	5 in 10	15	7	0	0	0

[1] The months of January, February, March, November, and December are not shown, because crops are rarely damaged by drought in those months.

[2] Inches of water soil can hold and make available to the roots of the plant to be grown; takes into account moisture capacity of the soil to a depth of 36 inches if the crop to be grown has roots that go down that far; moisture capacity to a depth of 24 inches for a crop that has roots reaching to that depth; and moisture capacity to a depth of only 12 inches for shallow-rooted crops, such as most garden vegetables. (See lists A and B.)

Water Supplies

Available water for municipal, industrial, and agricultural needs in Treutlen County is supplied by streams and by artesian wells. There are many streams in the county, but most of the smaller ones contain flowing water only in wet weather. The larger streams flow through wide areas of bottom lands and overflow their banks during heavy rains. A number of farm ponds, which supply water for livestock, fishing, and irrigation, have been built on the smaller streams, and there are suitable sites for many additional ponds. Many seepy areas at the base of slopes could also be improved so that they would provide watering places for livestock.

Throughout the county, there is water suitable for drinking. The first wells were dug to a depth of only 15 to 35 feet. These shallow wells generally did not supply water for livestock and for home use. Later, many deeper wells, 200 to 400 feet deep, were drilled in the underlying limestone to obtain artesian water. These yield an abundant supply of good-quality water for municipal use, as well as for irrigation and other uses.

Figure 15 shows how to determine the approximate depth to the top of the principal aquifers for artesian water (*3*). On the figure there is a broken line marked zero, which indicates sea level, a contour line marked −50, one marked +50, and one marked +100. The contour line marked −50 indicates that the approximate depth to the top of the principal aquifer in that area is 50 feet below sea level. Along the line marked zero (sea level), the approximate depth to the artesian aquifer is the same as the elevation. Along the line marked +50, which extends through the county a short distance southeast of Soperton, the approximate depth to the artesian aquifer is 50 feet above sea level. Along this line the elevation is 305 feet. By subtracting 50 feet from 305 feet, it will be found that the water-bearing aquifer is at a depth of about 255 feet. Likewise, the depth to the water-bearing aquifer can be determined along the contour line marked +100 by subtracting 100 from the number of feet elevation.

To obtain a good supply of artesian water, it is usually necessary to drill an additional 100 or more feet into the limestone strata. This does not mean that in every area one could have a continuously flowing well at the surface of the ground, but there are several scattered flowing wells in the county. These are mostly in low places along the rivers and the larger creeks. It is generally necessary, however, to use a pump to pull the water to the surface. At Silver Bluff Landing on the Oconee River, there is a flowing well 4 inches in diameter and 136 feet deep that yields 30 gallons of water per minute. Another flowing well in the northern part of the county, to the left of U.S. Highway No. 221 near the Ohoopee River, is 4 inches in diameter and 214 feet deep. It yields 60 gallons of water per minute.

Soperton obtains its water supply from two artesian wells. These wells are 8 inches in diameter, are approximately 400 feet deep, and have a maximum capacity of about 300 gallons per minute each. The water from these wells is of good quality, and it is pumped directly into the city water mains.

Agriculture

During the early development of agriculture, before Treutlen County was formed, small clearings were made in the pine woods and the settlers grew corn, rice, sweetpotatoes, sugarcane, and vegetables for home use. Cattle, sheep, and hogs were grazed on the open range. Little commercial fertilizer was used, and a practice called cowpenning was the common method of improving the fertility of the land. This consisted of bringing cattle from the open range and penning them at night on a few acres of land for several weeks before planting the crop.

Prior to 1900, not much farming was done and the capital and labor were used mainly to develop the lumber and turpentine industries. When the original resources were nearly exhausted, the inhabitants of the county turned to agriculture. Farming was slow to develop, however, because the soils were low in plant nutrients. The soils

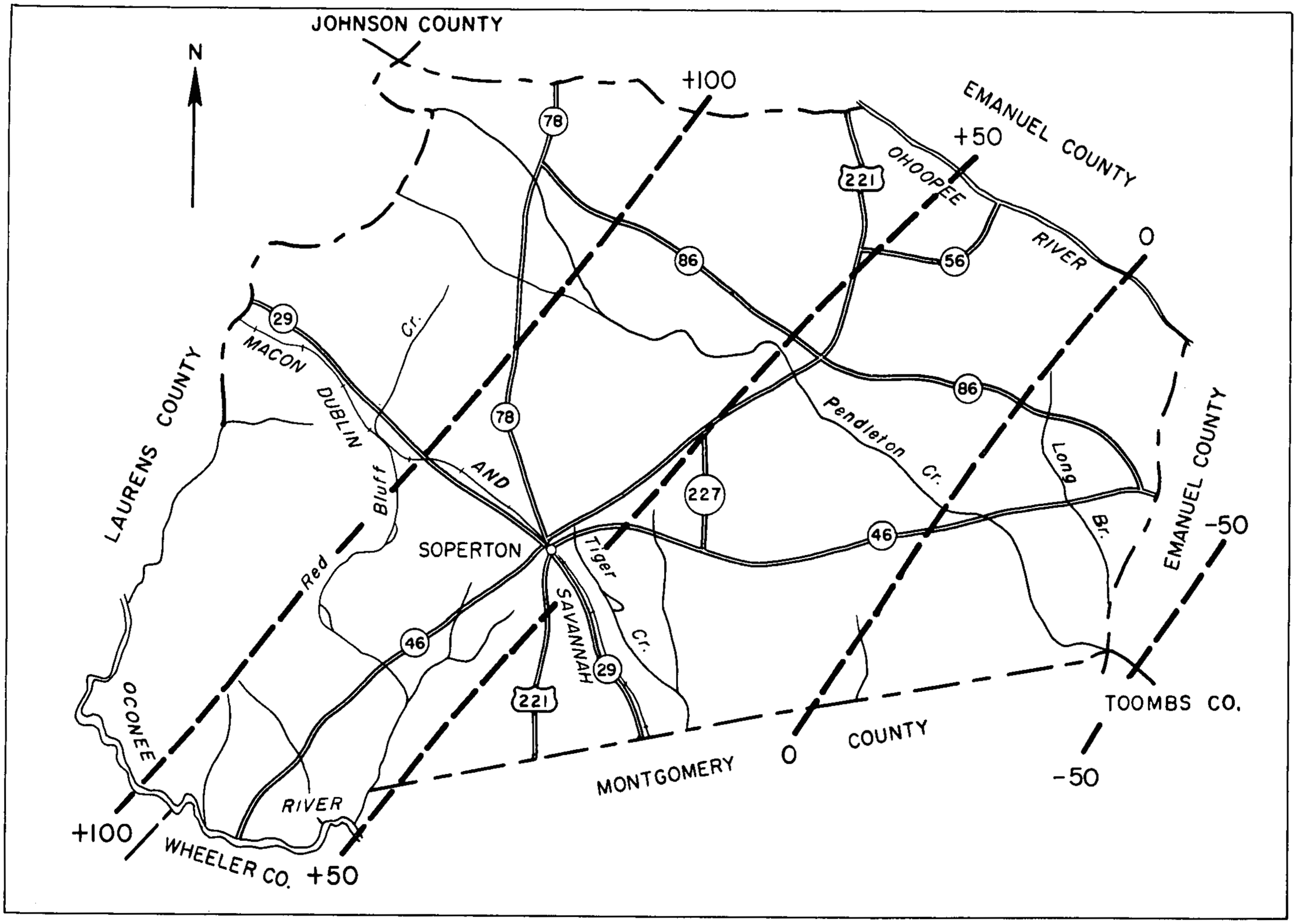

Figure 15.—**Map of Treutlen County showing the approximate depth to artesian limestone.**

did not respond well, because the farmers lacked skill in managing them. In addition, the area lacked markets for livestock and for crops other than cotton. About 1902, when a railroad was constructed through the area, farming increased fairly rapidly. Cotton was the principal cash crop until about 1919, when a total of 24,229 acres was harvested. Then, the cotton boll weevil appeared, and farmers began to practice a more modern and diversified type of farming. Only 2,764 acres of cotton was harvested in 1959.

In 1920, there were 1,205 farms in the county, but since 1930 there has been a sharp decline in the number of farms. There were 1,064 farms in the county in 1930, and at that time the average-sized farm consisted of 85 acres. By 1950, there were only 763 farms, and the average-sized farm consisted of 145 acres. In 1959, the number of farms had decreased to 451, and the average-sized farm consisted of 205 acres.

Crops

Table 16 shows the acreage of the principal crops and the number of peach trees and pecan trees of all ages in the years 1939, 1949, and 1959. Since 1925, there has been an increase in the acreage of woodland on farms and a decrease in the amount of cropland. Corn is an important crop, but the acreage has dropped considerably since 1939, when 25,427 acres was grown. After the decline had occurred in the acreage used for cotton, tobacco became a second cash crop, although it was still not grown extensively in the county. The average yield

TABLE 16.—*Acreage of principal crops and number of peach and pecan trees of all ages*

Crop	1939	1949	1959
	Acres	*Acres*	*Acres*
Corn grown for all purposes	25, 427	17, 097	14, 080
Cotton harvested	10, 498	6, 621	2, 764
Tobacco harvested	911	1, 088	856
Oats harvested	29	235	376
Soybeans grown for all purposes	531	219	1, 623
	Number [1]	*Number* [1]	*Number*
Pecan trees	[2] 6, 038	[2] 5, 740	[2] 2, 074
Peach trees	2, 677	4, 056	452

[1] One year later than year at head of column.
[2] Includes wild, seedling, and improved pecan trees.

of tobacco in Treutlen County is about 1,000 pounds per acre.

Farming methods have improved in the county during the past few years. Better crop rotations, including grass-base rotations, are used, better varieties of crops are selected for planting, and an attempt has been made to control insects and diseases and to control moisture. In addition, crop residues are used more effectively, a high-analysis fertilizer is used liberally, and some of the less productive soils, formerly used for row crops, have been seeded to good varieties of pasture plants or have been planted to pines. As a result of all these practices, yields of row crops have increased during the past few years.

Livestock and livestock products

Table 17 gives the number of livestock in the county in stated years. Hogs and cattle, chiefly beef-type cattle, are the principal kinds of livestock raised in the county, but chickens are also important. Cattle are grazed from early in spring to late in fall on improved pastures of Coastal bermudagrass and bahiagrass. Many farmers plant velvetbeans with the corn and allow cattle to graze the crop residues. Small grains, ryegrass, vetch, and crimson clover are planted for winter grazing. Hay, crushed corn, or silage is hauled to the field to supplement the forage from the winter pastures. Hogs are grazed on oats and crop residues, and they are also fed corn and mineral supplements during the winter months. A large acreage of corn or of corn planted with peanuts or beans is grazed by hogs.

Almost all the farmers in the county own a few chickens. The growth of the broiler industry has been responsible for a large increase in the number of chickens sold. In 1959, a total of 205,371 chickens was sold, as compared to 2,575 in 1949. Broilers made up about 98 percent of this total. There was also a slight increase in the number of layers kept for egg production. In 1959, a total of 33,930 dozen eggs was sold, as compared to 10,536 dozen in 1949.

TABLE 17.—*Livestock on farms*

Livestock	1940	1950	1959
	Number	*Number*	*Number*
Horses and mules	[1] 1, 397	1, 212	316
Cattle and calves	[1] 4, 131	4, 954	4, 302
Hogs and pigs	[2] 7, 435	10, 804	10, 968
Chickens	[1] 21, 198	[2] 17, 968	[2] 13, 633

[1] More than 3 months old. [2] More than 4 months old.

Transportation and Markets

Treutlen County has ample highways and railroad service. Facilities for farm-to-market transportation are good. A branch line of the Seaboard Railroad passes through Soperton and crosses the county in a northwest direction. U.S. Highway No. 221 and State Highway Nos. 15, 29, 46, and 56 pass through the county. There are many State and county paved roads and improved roads that reach all parts of the county.

Soperton is the chief market for livestock, cotton, pulpwood, and turpentine. Tobacco, most small grains, and truck and vegetable crops are sold in Dublin, Swainsboro, and Vidalia in the surrounding counties.

Industries

Many of the industries are dependent on the forests, which cover about two-thirds of the county. The forests consist mainly of pines. Raw gum (turpentine) and pulpwood from the forests are collected at receiving stations and are shipped to other cities for conversion to finished products.

One lumber plant and several portable sawmills operate within the county. Some pine poles are treated at these places and are used for fenceposts. In addition, one garment factory, one fertilizer-blending plant, one feedmill, and two cotton gins are located at Soperton. Many people in Treutlen County commute to jobs in cities in nearby counties.

Community Facilities

Two county school systems are located in Soperton. Buses are operated throughout the county to provide transportation to and from school.

Soperton has one hospital, one health center, and a library. There are churches in many communities.

Electricity and telephone service are available to nearly all the farms in the county. Most of the homes have a radio and a television set. Recreational facilities are provided by the Oconee and Ohoopee Rivers and by the many farm ponds. All of these furnish water for fishing.

Literature Cited

(1) ABERCROMBIE, W. F.
1954. A SYSTEM OF SOIL CLASSIFICATION. Proceedings of the Thirty-third annual meeting of Natl. Res. Council, Natl. Acad. Sci., pp. 509–514, illus. Washington, D.C.

(2) AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICALS.
1955. STANDARD SPECIFICATIONS FOR HIGHWAY MATERIALS AND METHODS OF SAMPLING AND TESTING. Ed. 7, 2 v., illus., p. 219.

(3) GEORGIA DEPARTMENT OF MINES, MINING AND GEOLOGY, DIVISION OF CONSERVATION.
1956. AVAILABILITY AND USE OF WATER IN GEORGIA. Prepared in coop. with the U.S. Dept. Int., Geol. Survey. Bul. No. 65, pp. 285–286, illus.

(4) GEORGIA DIVISION OF MINES, MINING AND GEOLOGY.
1939. GEOLOGIC MAP OF GEORGIA. Prepared by Ga. Div. of Mines, Mining and Geol. in coop. with the U.S. Dept. Int., Geol. Survey, 1 p.

(5) THORP, JAMES, AND SMITH, GUY D.
1949. HIGHER CATEGORIES OF CLASSIFICATIONS: ORDER, SUBORDER, AND GREAT SOIL GROUPS. Soil Sci. 67: 117–126.

(6) U.S. DEPARTMENT OF AGRICULTURE.
1929. VOLUME, YIELD, AND STAND TABLES FOR SECOND-GROWTH SOUTHERN PINES. Misc. Pub. No. 50, 202 pp. Washington, D.C. [Now out of print.]

(7) ———
1938. SOILS AND MEN. U.S. Dept. Agr. Ybk., pp. 979–1001, illus.

(8) VAN BAVEL, C. H. M., AND CARREKER, JOHN R.
1957. AGRICULTURAL DROUGHT IN GEORGIA. Ga. Agr. Expt. Sta. Tech. Bul. N. S. 15, 41 pp., illus.

(9) WATERWAYS EXPERIMENT STATION, CORPS OF ENGINEERS.
1953. UNIFIED SOIL CLASSIFICATION SYSTEM. Tech. Memo. No. 3–357, v. 1.

Glossary

Acidity, soil. The degree of acidity or alkalinity of a soil mass expressed in pH values, or in words, as follows:

	pH		*pH*
Extremely acid	Below 4.5	Neutral	6.6–7.3
Very strongly acid	4.5–5.0	Mildly alkaline	7.4–7.8
Strongly acid	5.1–5.5	Moderately alkaline	7.9–8.4
Medium acid	5.6–6.0	Strongly alkaline	8.5–9.0
Slightly acid	6.1–6.5	Very strongly alkaline	9.1 and higher

Alluvium. Fine material, such as sand, silt, or clay, that has been deposited on land by streams.

Aquifer. A porous soil or geological formation that yields ground water to wells and springs.

Available moisture capacity. The difference between the amount of water in a soil at field capacity and the amount in the same soil at the permanent wilting point. Commonly expressed as inches of water per inch depth of soil.

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.

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

Coastal Plain. A geologic area or soil province extending along the coast. It was once covered by the ocean.

Concretions. Hard grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrations of compounds that cement the soil grains together. The composition of some concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are examples of materials commonly found in concretions.

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

Loose. Noncoherent; will not hold together in a mass.

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

Firm. When moist, crushes under moderate pressure between the thumb and forefinger, but resistance is distinctly noticeable.

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

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

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

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

Drainage, soil. The rapidity and extent of the removal of water from the soil, in relation to additions, especially by surface runoff, by flow through the soil to underground spaces, or by a combination of both processes.

Surface runoff. Refers to the relative rate that water is removed by flow over the surface of the soil. Degree of runoff is expressed in the following six classes: *Very rapid, rapid, medium, slow, very slow,* and *ponded.*

Internal soil drainage. The downward movement of water through the soil profile. The rate of movement is determined by the texture, structure, and other characteristics of the soil profile and underlying layers, and by the height of the water table, either permanent or perched. Relative terms for expressing internal drainage are *none, very slow, slow, medium, rapid,* and *very rapid.*

Natural drainage. Refers to those conditions 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 result from other causes, such as sudden deepening of channels or sudden blocking of drainage outlets. The following are relative terms used to express natural-drainage classes: *Excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained,* and *very poorly drained.*

Effective root depth. The depth to which roots can penetrate a soil in search of plant food and water.

Eluviation. The movement of soil material from one place to another within the soil, either in a true solution or in colloidal suspension, when there is an excess of rainfall over evaporation. Soil horizons that have lost material through eluviation are referred to as eluvial, and those that have received material, as illuvial.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the oven-dry weight, after the gravitational, or free, water has been allowed to drain away; the field moisture content 2 or 3 days after a soaking rain.

First bottom. The soils along the normal flood plain of a stream, subject to frequent or occasional flooding.

Gleyed soil. A soil in which waterlogging and lack of oxygen have caused the material in one or more horizons to be neutral gray in color. The term "gleyed" is applied to soil horizons that have yellow and gray mottling caused by intermittent waterlogging.

Hawthorn formation. Formed during the middle Miocene geological age about 20 million years ago; known as the Tifton upland, or wiregrass region.

Horizon boundary. Horizon boundaries can be described as *smooth,* if nearly a plane; *wavy,* if pockets are wider than their depth; *irregular,* if irregular pockets are deeper than their width; and *broken,* if parts of the horizon are unconnected with other parts. The characteristic width of boundaries between soil horizons is described as *abrupt,* if less than 1 inch wide; *clear,* if about 1 to 2½ inches wide; *gradual,* if 2½ to 5 inches wide; and *diffuse,* if more than 5 inches wide.

Illuvial, horizon. A soil horizon that has received material in suspension or solution from some other part of the soil.

Intake rate (engineering). The rate, generally expressed in inches per hour, at which water enters the soil. The rate is controlled either by surface conditions (infiltration rate) or subsurface conditions (permeability). It also varies with the method of applying water. The same soil has different intake rates under sprinkler, border, or furrow irrigation.

Leaching. The removal of soluble material from a soil or other material by percolating water.

Loam. Soil material that contains 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand.

Mechanical analysis (engineering). The separation of various soil particles into size groups. Usually shown as a percentage of the sample used.

Moisture capacity. See Available moisture capacity; Field moisture capacity.

Mottling, soil. Irregularly marked with spots of different colors that vary in number and size. Generally associated with poor drainage. Descriptive terms for mottles follow: Contrast—*faint, distinct,* and *prominent;* abundance—*few, common,* and *many;* and size—*fine, medium,* and *coarse.* The size measurements are as follows: *Fine,* commonly less than 5 millimeters (about 0.2 inch) in diameter along the greatest dimension; *medium,* commonly ranging between 5 and 15 millimeters (about 0.2 to 0.6 inch) along the greatest dimension; and *coarse,* commonly more than 15 millimeters (about 0.6 inch) along the greatest dimension.

Parent material. The horizon of weathered rock or partly weathered soil material from which a soil has formed; horizon C in the soil profile.

Permeability, soil. The quality of a soil horizon that enables water or air to move through it. The following terms are used to describe permeability: *Very slow, slow, moderately slow, moderate, moderately rapid, rapid,* and *very rapid.* Moderately permeable soils transmit air and water readily, and, in those soils, conditions are favorable for the growth of roots. Slowly permeable soils allow water and air to move so slowly that the growth of roots may be restricted. Rapidly permeable soils transmit water and air rapidly, and as a result, roots make good growth.

Relief. The elevation or inequalities of a land surface, considered collectively.

Sand. A size group of mineral particles ranging in diameter from 0.05 millimeter 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.

Shrink-swell potential (engineering). The amount that a soil will expand when wet or contract when dry. Indicates kinds of clay in a soil.

Silt. A size group of mineral particles having a diameter of 0.05 millimeter to 0.002 millimeter. As a textural class, silt includes soil material that contains 80 percent or more silt and less than 12 percent clay.

Structure, soil. The arrangement of primary soil particles into compound particles or clusters that are separated from adjoining unaggregated primary soil particles. The principal forms of soil structure are *platy* (laminated), *prismatic* (vertical axis of aggregate longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are (1) *single grain* (each grain by itself, as in dune sand), or (2) *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 profile below plow depth.

Terrace (geological). An old alluvial plain, ordinarily flat or undulating, bordering a river, lake, or the sea. Stream terraces are commonly called *second bottoms*, as contrasted to *flood plains*, and they are seldom subject to overflow. The material in marine terraces was deposited by the sea, and these terraces are generally wide.

Texture, soil. The relative proportions of the various size groups of individual soil grains in a mass of soil; specifically, the proportions of sand, silt, and clay. The following are the soil textural classes, in increasing order of the content of the finer separates: *Sand, loamy sand, sandy loam, loam, silt loam*, and *clay*. These classes may be modified according to the relative size of the coarser particles; for example, *fine sand, loamy fine sand, fine sandy loam, very fine sandy loam, coarse sandy loam, gravelly sandy loam, gravelly loam, cobbly loam, sandy clay, stony clay*, and *stony loam*.

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.

Understory. That part of a forest that is below the upper crown canopy.

GUIDE TO MAPPING UNITS

[See table 1, p. 5, for the acreage and proportionate extent of the soils, and table 2, p. 32, for the estimated yields. To find facts about the suitability of the soils used as woodland, see the section beginning on p. 34. To find the engineering properties of the soils, see the section beginning on p. 44]

Map symbol	Mapping unit	Page	Capability unit		Woodland suitability group	
			Symbol	Page	Symbol	Page
Acn	Alluvial land	6	IVw-2	29	4	37
BqB	Boswell sandy loam, 2 to 5 percent slopes	6	IIIe-3	26	3	37
BqB2	Boswell sandy loam, 2 to 5 percent slopes, eroded	6	IIIe-3	26	3	37
BqC2	Boswell sandy loam, 5 to 8 percent slopes, eroded	6	IVe-3	29	3	37
Csl	Chewacla silt loam	7	IIIw-2	28	4	37
GAB	Gilead, Lakeland, and Cuthbert sands, 2 to 5 percent slopes	7	IIe-4	24	3	37
GAB2	Gilead, Lakeland, and Cuthbert sands, 2 to 5 percent slopes, eroded	8	IIIe-4	27	3	37
GAC	Gilead, Lakeland, and Cuthbert sands, 5 to 8 percent slopes	8	IIIe-4	27	3	37
GAC2	Gilead, Lakeland, and Cuthbert sands, 5 to 8 percent slopes, eroded	8	IVe-4	29	3	37
GAD2	Gilead, Lakeland, and Cuthbert sands, 8 to 12 percent slopes, eroded	8	VIe-2	30	3	37
GBB	Gilead, Lakeland, and Cuthbert coarse sands, 2 to 5 percent slopes	8	IIIs-1	28	3	37
GBC	Gilead, Lakeland, and Cuthbert coarse sands, 5 to 8 percent slopes	8	IVs-1	30	3	37
GnB	Goldsboro loamy sand, thick surface, 2 to 5 percent slopes	9	IIe-3	23	2	37
Izs	Izagora soils	9	IIw-2	24	2	37
KgA	Klej loamy fine sand, 0 to 2 percent slopes	10	IIIw-1	27	7	38
Lea	Leaf fine sandy loam	11	IVw-2	29	4	37
LoB	Lakeland loamy sand, shallow, 2 to 5 percent slopes	10	IIIs-1	28	5	37
LpB	Lakeland sand, 0 to 5 percent slopes	10	IVs-1	30	5	37
LpC	Lakeland sand, 5 to 8 percent slopes	10	IVs-1	30	5	37
LpD	Lakeland sand, 8 to 12 percent slopes	10	VIs-2	31	5	37
LwB	Lakeland coarse sand, deep, 2 to 5 percent slopes	10	VIs-2	31	5	37
LwD	Lakeland coarse sand, deep, 5 to 12 percent slopes	11	VIIs-1	31	5	37
LzA	Lynchburg loamy sand, thick surface, 0 to 2 percent slopes	12	IIw-2	24	2	37
LzB	Lynchburg loamy sand, thick surface, 2 to 5 percent slopes	12	IIe-3	23	2	37
Mya	Myatt sandy loam	12	IVw-2	29	4	37
NfA	Norfolk loamy sand, thick surface, 0 to 2 percent slopes	14	IIs-1	25	1	36
NfB	Norfolk loamy sand, thick surface, 2 to 5 percent slopes	14	IIs-1	25	1	36
NfC	Norfolk loamy sand, thick surface, 5 to 8 percent slopes	14	IIIe-5	27	1	36
NhA	Norfolk loamy sand, 0 to 2 percent slopes	13	I-1	22	1	36
NhB	Norfolk loamy sand, 2 to 5 percent slopes	13	IIe-1	22	1	36
NhB2	Norfolk loamy sand, 2 to 5 percent slopes, eroded	13	IIe-1	22	1	36
NhC2	Norfolk loamy sand, 5 to 8 percent slopes, eroded	14	IIIe-1	25	1	36
PeA	Plummer sand, 0 to 2 percent slopes	14	Vw-2	30	4	37
PeB	Plummer sand, 2 to 5 percent slopes	15	Vw-2	30	4	37
ReB	Rains sandy loam, thick surface, 2 to 5 percent slopes	15	IVw-2	29	4	37
ShD2	Sunsweet sandy loam, 5 to 12 percent slopes, eroded	17	VIe-2	30	6	37
SiB	Susquehanna sandy loam, 2 to 5 percent slopes	17	IVe-3	29	6	37
SiB2	Susquehanna sandy loam, 2 to 5 percent slopes, eroded	17	IVe-3	29	6	37
SiC	Susquehanna sandy loam, 5 to 8 percent slopes	17	VIe-2	30	6	37
SiC2	Susquehanna sandy loam, 5 to 8 percent slopes, eroded	18	VIe-2	30	6	37
SkE	Sandy and clayey land	15	VIe-2	30	3	37
SlB	Sawyer, Norfolk, and Cuthbert loamy sands, 2 to 5 percent slopes	16	IIe-3	23	3	37
SlB2	Sawyer, Norfolk, and Cuthbert loamy sands, 2 to 5 percent slopes, eroded	16	IIe-3	23	3	37
SlC	Sawyer, Norfolk, and Cuthbert loamy sands, 5 to 8 percent slopes	16	IIIe-3	26	3	37
SlC2	Sawyer, Norfolk, and Cuthbert loamy sands, 5 to 8 percent slopes, eroded	16	IIIe-3	26	3	37
Swa	Swamp	18	VIIw-1	31	(1)	
TqA	Tifton loamy sand, 0 to 2 percent slopes	18	I-2	22	1	36
TqB	Tifton loamy sand, 2 to 5 percent slopes	18	IIe-2	23	1	36
TqB2	Tifton loamy sand, 2 to 5 percent slopes, eroded	19	IIe-2	23	1	36
TqC2	Tifton loamy sand, 5 to 8 percent slopes, eroded	19	IIIe-2	26	1	36
TrB	Tifton loamy sand, thick surface, 2 to 5 percent slopes	19	IIs-1	25	1	36
TsB2	Tifton sandy loam, thin solum, 2 to 5 percent slopes, eroded	19	IIIe-4	27	3	37
TsC2	Tifton sandy loam, thin solum, 5 to 8 percent slopes, eroded	19	IVe-4	29	3	37
Waf	Wahee fine sandy loam	20	IIIw-2	28	2	37

[1] Swamp not assigned to a woodland group.

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