Series 1962, No. 2

Issued May 1965

SOIL SURVEY

Washington County Florida

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with
UNIVERSITY OF FLORIDA AGRICULTURAL EXPERIMENT STATIONS

HOW TO USE THE SOIL SURVEY REPORT

THIS SOIL SURVEY of Washington County, Fla., 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 occur 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.

Finding Information

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

Farmers and those who work with farmers can learn about the soils in the section "Descriptions of the Soils" and then turn to the section "Use and Management of 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 these is described.

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

Engineers will want to refer to the subsection "Use of Soils for Engineering Works." Tables in that subsection show characteristics of the soils that affect engineering.

Scientists and others who are interested will find information about how the soils were formed and how they were classified in the section "Formation 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 Washington County will be especially interested in the section "General Soil Map," where broad patterns of soils are described. They may also be interested in the section "General Nature of the County" which gives additional information about the county.

* * * *

Fieldwork for this survey was completed in 1962. Unless otherwise indicated, all statements in the report refer to conditions in the county at the time the survey was in progress. This survey was made cooperatively by the United States Department of Agriculture and the University of Florida Agricultural Experiment Stations. It is a part of the technical assistance furnished by the Soil Conservation Service to the Orange Hill Soil Conservation District.

U.S. GOVERNMENT PRINTING OFFICE:1965

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20402

Contents

	Page
General soil map	1
1. Lakeland-Eustis association	1
2. Norfolk-Ruston-Goldsboro association	2
3. Tifton-Faceville-Marlboro association	2
4. Lakeland-Cuthbert-Shubuta association	3
5. Blanton-Klej-Plummer association	3
6. Goldsboro-Lynchburg-Rains association	4
7. Alluvial land-Swamp association	4
Uses of the general soil map	4
Agriculture	5
Homesites	5
Industry and transportation	5
Recreation	6
How soils are mapped and classified	6
Descriptions of the soils	7
Alluvial land	9
Angie series	9
Bayboro series	10
Bladen series	11
Blanton series	11
Borrow pits	12
Bowie series	12
Carnegie series	13
Cuthbert series	14
Dunbar series	16
Esto series	16
Eulonia series	17
Eustis series	18
Faceville series	19
Goldsboro series	20
Grady series	21
Gullied land	22
Klej series	22
Lakeland series	23
Leon series	26
Local alluvial land	26
Lynchburg series	27
Marlboro series	28
Norfolk series	28
Oktibbeha series	30
Plummer series	31
Pocomoke series	31
Rains series	32
Ruston series	32
Rutlege series	34
Scranton series	34
Shubuta series	35

	Page
Description of the soils—Continued	
Swamp	36
Tifton series	36
Use and management of soils	37
Use of soils for agriculture	37
General practices of soil management	37
Capability groups of soils	40
Management by capability units	43
Estimated yields	54
Use of soils as woodland	58
General woodland management	58
Soil properties affecting tree production	58
Woodland suitability groups	59
Use of soils for wildlife	65
Food and cover suitable for wildlife	65
Wildlife suitability of the soil associations	66
Use of soils for engineering works	67
Soil test data	72
Engineering classification systems	72
Soil properties significant to engineering	73
Suitability of soils for engineering uses	73
Formation and classification of soils	73
Factors of soil formation	73
Climate	73
Parent material	73
Relief	92
Living organisms	93
Time	93
Classification of soils	93
Red-Yellow Podzolic soils	95
Ground-Water Podzols	104
Humic Gley soils	104
Low-Humic Gley soils	105
Regosols	107
General nature of the county	109
Climate	109
Geology	111
History	115
Agriculture	115
Industries	116
Transportation and markets	117
Farm, home, and community facilities	117
Recreational facilities	117
Schools	117
Glossary	117
Guide to mapping units	Follows 119

Series 1962, No. 2

Issued May 1965

SOIL SURVEY OF WASHINGTON COUNTY, FLORIDA

BY H. F. HUCKLE, IN CHARGE, AND H. H. WEEKS, SOIL CONSERVATION SERVICE [1]

UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, IN COOPERATION WITH THE UNIVERSITY OF FLORIDA AGRICULTURAL EXPERIMENT STATIONS

WASHINGTON COUNTY is in the northwestern part of Florida and is bounded on the west by the Choctawhatchee River. Chipley, the county seat, is on U.S. Highway No. 90 near the geographical center of the State's panhandle. Distances by air from Chipley to the principal cities in the State are shown in figure 1. The county has a land area of 382,080 acres, or 597 square miles. A humid, temperate climate prevails, and the abundant rainfall is generally well distributed. The county is a general farming area. The principal crops are corn, cotton, peanuts, small grain, and watermelons. Watermelons are the main cash crop.

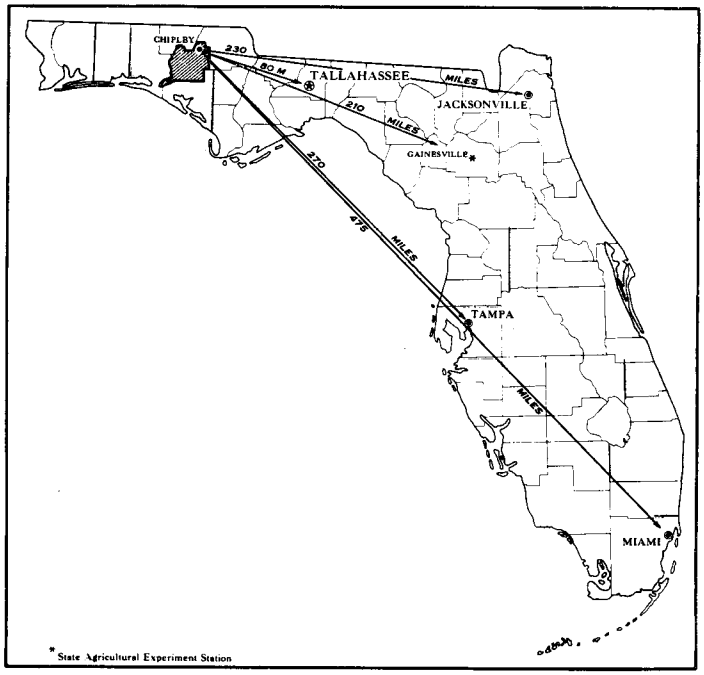

Figure 1.—Location of Washington County in Florida.

General Soil Map

In mapping a county or other large tract, it is fairly easy to see differences in the landscape from place to place. Some of the differences are in the shape, steepness, and length of slopes; in the course, depth, and speed of the streams; in the width of the bordering valleys; in kinds of wild plants; and in the kind of agriculture. With these more obvious differences are others less easily noticed in the patterns of soils. The soils differ along with the other parts of the environment.

By drawing lines around the different patterns of soils on a small map, one may obtain a general map of the soils. Each kind of pattern is called a soil association. The pattern, of course, is not strictly uniform in each association, but the same soils are present in somewhat the same proportion and arrangement. Such a map is useful to those who want a general idea of the soil, who want to compare different parts of the county, or who want to locate large areas suitable for some particular kind of farming or other broad use. It does not show accurately the kinds of soils on a single farm or a small tract.

The colored general soil map at the back of this report shows the soil associations in Washington County. The associations are named for the major soil series in them, but soils of other series may occur. Also, the major soil series of one area may occur in another soil association.

The Norfolk-Ruston-Goldsboro soil association in the northern part of the county and the Tifton-Faceville-Marlboro association in the northeastern part are the most important agricultural areas in the county. The soil differences in the other associations are important to the farms within them.

1. Lakeland-Eustis association: Well-drained to excessively drained, deep, undulating sands or coarse sands of the uplands

This soil association is made up mostly of long, gentle slopes and broad, nearly level ridgetops. In the southern part of the county, there are numerous sinks or potholes that range from saucerlike depressions to sinks that have steep sides and small, nearly circular lakes at the bottom. In the south-central part of the county, lakes and shallow intermittent ponds of various size are numerous. Drainage in this area is mostly underground, but a few poorly defined drainageways occur. The water level of the lakes and intermittent ponds fluctuates considerably according to the amount of rainfall and the seepage from the surrounding deep, sandy soils. Sloping to steep hillsides border most of the lakes and intermittent ponds. In other parts of the county, this association is dissected by a well-established pattern of creeks, branches, and draws that have narrow, wet bottoms along

[1] Others participating in the survey were E. M. DUFFEE, A. L. FURMAN, M. L. HARRELL, M. W. HAZEN, JR., K. J. LAFLAMME, B. W. MCEWEN, and B. P. THOMAS, Soil Conservation Service.

them. Most of the streams are bordered by moderately steep to steep hillsides.

This soil association occupies about 42 percent of the county and occurs predominantly in the southern half, but there are smaller areas in the northwestern, north-central, and east-central parts.

The Lakeland and Eustis soils are dominant. These soils have a dark-gray to grayish-brown coarse sand to sand surface layer that is 4 to 6 inches thick. It is underlain by brownish-yellow to yellowish-red very coarse sand to sand that extends to a depth of 30 inches or more.

In the southern half of the county are large, fairly uniform areas of deep, droughty coarse sands. About 86 percent of these areas consists of Lakeland and Eustis soils, and 10 percent of Blanton, Plummer, and Klej soils, Swamp, and wet bottom lands. The numerous lakes in this area occupy the remaining 4 percent. That part of the association in the northern part of the county generally consists of soils better suited to agricultural crops. Dominant are finer sands or shallow phases of Lakeland and Eustis soils. Scattered in a considerable acreage are Goldsboro, Ruston, Klej, Norfolk, and similar soils. In the northern part of the county, the Lakeland and Eustis soils occupy about 55 percent of the area; Goldsboro, Ruston, Klej, Norfolk, and similar soils, about 30 percent; and Swamp and wet bottom lands, about 15 percent.

On the deep sands the original vegetation was longleaf pine and wiregrass, and in the swampy areas it was cypress, bay, gum, and other wetland hardwoods. Water grasses and pond cedar are the main plants in the lakes and shallow intermittent ponds. The original pines and the commercially valuable hardwoods have been harvested, and most of the woodland now is second growth. Scrub oaks and scattered pines grow on most areas of the well-drained sands that are not farmed. About 5 percent of the acreage in well-drained soils is now in cultivated crops or forage crops. The wet areas have not been cleared or drained and remain in native trees or grasses.

In the southern part of the county large areas dominated by deep coarse sands are poorly suited for cultivation and have not been farmed. These remain mostly in scrub oak and scattered pines. On smaller areas in the northern part of the county, where about 35 percent of the association is suited to most farm crops, some of the more productive soils are farmed. Another 35 percent of these areas is suitable for limited cultivation or improved pasture but is mostly wooded. The remaining 30 percent is too steep or too wet for farming and is wooded.

2. Norfolk-Ruston-Goldsboro association: Well drained to moderately well drained soils of the uplands that have a loamy sand surface soil and a sandy clay loam subsoil

This soil association is made up of well drained, long, gently sloping ridgetops; moderately sloping hillsides; and lower, moderately well drained areas that are generally narrow but broaden into fairly large, nearly level flats in some places. The association is dissected by a well-established pattern of creeks, branches, and draws that have narrow, wet bottoms along them. Sloping to moderately steep hillsides rise from the edge of many streams. This association occupies about 16 percent of the county and occurs in scattered areas throughout the northern half.

Dominant in the association are the Norfolk and Ruston soils in the higher areas and the Goldsboro soils in the lower. The Norfolk, Ruston, and Goldsboro soils occupy about 55 percent of the association. They have a dark-gray to grayish-brown loamy sand surface layer that is underlain by lighter colored loamy sand layers to a depth of 30 inches or less. Their subsoil ranges from sandy loam to sandy clay loam and from red to yellow.

About 20 percent of this association is small, scattered areas of the Lakeland, Eustis, Faceville, Tifton, Carnegie, Bowie, and Marlboro soils. The remaining 25 percent consists of the somewhat poorly drained Lynchburg soils, the poorly drained Pocomoke and Rains soils, Swamp, and wet bottom lands.

The original vegetation on the well-drained soils was longleaf pine, scattered hardwoods, and native grasses, and on the poorly drained soils it was longleaf pine and various wetland grasses. Cypress, bay, gum, and other wetland hardwoods grew in the swampy areas and on the wet bottom lands. The original pines and the commercially valuable hardwoods have been harvested, and most of the woodland now is covered by second-growth longleaf pine and slash pine and various kinds of low shrubs.

About 38 percent of this association is made up of gently sloping ridges that are well suited to farming and are farmed fairly extensively. About 27 percent is on steeper slopes that are suited to cultivated crops and pasture, but to prevent erosion, these slopes require more intensive management than the gently sloping ridges.

Much of this steeper area is farmed. About 10 percent of the association is so steep or erodible that it cannot be cultivated, but it is well suited to trees. The remaining 25 percent consists of swampy areas and wet bottom lands that are still in woods.

Many general farms in the county are in this soil association. Many farms are well managed, and crops respond well to good management. Much of the association that is suitable for cultivation is woodland.

3. Tifton-Faceville-Marlboro association: Well-drained, undulating soils of the uplands that have a loamy sand surface soil and a fine sandy clay loam to fine sandy clay subsoil

This soil association is made up of ridgetops that are mostly gently sloping but that broaden in a few places into fairly large, nearly level areas. The area is dissected by a well-established pattern of creeks, branches, and draws that have narrow, wet bottoms along them. Sloping to moderately sloping hills rise from the edge of some of these streams. Adjacent to the streams in many places are gently sloping to nearly level, moderately well drained to poorly drained soils. This soil association occupies about 1 percent of the county and occurs in fairly small areas in the northeastern part.

The Tifton, Faceville, and Marlboro soils make up about 60 percent of the association. They have a very dark grayish-brown loamy sand surface soil that is underlain by lighter colored loamy sand layers to a depth of 18 inches or less. The subsoil ranges from fine sandy clay loam to fine sandy clay, and from brownish yellow to red. Widely distributed are small areas of Norfolk, Ruston, Carnegie, and other well-drained soils. These small, well-drained areas make up about 13 percent of the association. The moderately well drained Goldsboro and the somewhat poorly drained Lynchburg soils make

up 20 percent. The remaining 7 percent consists of poorly drained Pocomoke and Rains soils, Swamp, and wet bottom lands.

The original vegetation on the well-drained soils was longleaf pine, scattered hardwoods, and native grasses. On the more poorly drained soils the vegetation was longleaf pine and various wetland grasses. Cypress, bay, gum, and other wetland hardwoods grew in the swampy areas and on wet bottom lands. The original pines and the commercially valuable hardwoods have been harvested, and most of the woodland now is covered by second-growth longleaf pine and slash pine and various low shrubs and bushes.

About 65 percent of this association is made up of gently sloping and nearly level ridges that are well suited to farming and are farmed extensively. About 15 percent of the association is on steeper slopes that are suited to cultivation and are largely cultivated, but to prevent erosion more intensive management is needed on these steeper slopes than on the less steep areas. Approximately 13 percent of the association is too wet for cultivation most of the time but is well suited to pasture or trees. Poorly drained soils and wet bottom lands make up the remaining 7 percent, and these are wooded.

Many general farms are in this association. Most of these are managed well, and the crops respond well to good management. Most areas that are suitable for cultivation have been cleared and are cultivated.

4. Lakeland-Cuthbert-Shubuta association: Excessively drained to moderately well drained, sloping to very steep coarse sands, loamy sands, and sandy clay loams of the uplands that have a sandy clay to clay subsoil

The soils in this association occur in an intricate pattern on long hillsides that generally slope toward the north. The ridgetops are long and narrow in most places. They slope gently along their length but break abruptly on either side. The association is highly dissected by large streams, creeks, and branches. The bottom lands along the streams are narrow and poorly drained. This association occupies about 7 percent of the county. Part of it is on the north of the highly dissected, irregular, north-facing escarpment that crosses the central part of the county approximately in an east-west direction. Other small areas are widely scattered in the northern half of the county, and there are fairly large areas on Orange Hill, Oak Hill, and Falling Water Hill.

The Lakeland, Cuthbert, and Shubuta soils are dominant in this association. The Lakeland soils are most extensive in the eastern part of the county, and the Cuthbert soils in the western part. The Lakeland, Cuthbert, and Shubuta soils have a surface layer of dark-gray to grayish-brown very coarse sand to fine sandy loam. In the Lakeland soils, sand extends from the surface to a depth of more than 30 inches. The subsoil of the Lakeland, Cuthbert, and Shubuta soils ranges from very coarse sand to compact clay in texture and from yellow to red in color. Widely scattered in small areas on uplands are the Bowie, Klej, Blanton, Lynchburg, Norfolk, Goldsboro, Ruston, and other soils. These widely scattered soils and the Lakeland, Cuthbert, and Shubuta soils make up about 85 percent of the association. The remaining 15 percent consists of poorly drained Rutlege, Pocomoke, Rains, and Plummer soils; Swamp; and wet bottom lands.

The original vegetation on the better drained soils was longleaf pine, scattered hardwoods, and native grasses. It was cypress, bay, gum, and other wetland hardwoods in the swampy areas and on the wet bottom lands. The original pines and the commercially valuable hardwoods have been harvested. Most of the woodland now is covered by second-growth longleaf pine, slash pine, scrub oaks, and various other hardwoods, and there is a thick growth of low shrubs and bushes.

The soils of this association generally are highly susceptible to erosion, but a few slopes can be cultivated to shallow-rooted crops. Only about 15 percent of the association is suited to row crops. About 10 percent can be cultivated occasionally if erosion control is intensive, but the areas suitable for cultivation are generally too small for a practical field layout. About 60 percent is too steep or too erodible to be suited to farming. The remaining 15 percent is in swampy areas and wet bottom lands that are unsuitable for agriculture and are still in native vegetation. Most of this soil association has not been cleared.

Only a small part of this association is farmed. A few small areas are used for pasture or crops, but generally the association is best suited as woodland.

5. Blanton-Klej-Plummer association: Moderately well drained or poorly drained, nearly level or gently sloping, deep sandy soils of the uplands

Nearly level or gently sloping, broad areas make up most of this association, but short, narrow slopes occur at the base of the more sloping hillsides. In the south-central part of the county, this soil association contains several lakes and many shallow, intermittent ponds of various sizes. Drainage in this area is mostly underground, but a few poorly defined drainageways occur. The water level of the lakes and intermittent ponds fluctuates considerably according to the amount of rainfall and the seepage from the surrounding deep sandy soils. Other areas of this association are dissected by a well-established pattern of creeks, branches, and draws that are in many places bordered by moderately wide, wet bottoms. Nearly level to gently sloping wet soils are adjacent to these wet bottoms in many places. This soil association occupies about 8 percent of the county and occurs predominantly in the southern half.

The Blanton, Klej, and Plummer soils occupy about 51 percent of the association. They have a surface layer of gray to very dark gray fine sand to coarse sand that is 3 to 8 inches thick. The surface layer is underlain by mottled, white or light-gray and yellow fine sand to coarse sand that extends to a depth of 30 inches or more. The Lakeland, Rutlege, Scranton, Leon, and similar soils make up about 28 percent of the association. Swamp and wet bottom lands make up about 14 percent, and permanent lakes, the remaining 7 percent.

In the south-central part of the county, the original vegetation on this soil association was live oak, water oak, scattered longleaf pine, and native wetland grasses. In other parts of the association, the original vegetation was longleaf pine and several native grasses. Cypress, bay, gum, and other wetland hardwoods grow in swampy areas. The original pines and the commercially valuable

hardwoods have been harvested, and most of the woodland now is second growth.

In the south-central part of the county, the present native vegetation is principally wiregrass and other wetland grasses, but water grasses and pond cedar grow in the lakes and intermittent ponds. Cypress is dominant in swampy areas. In other parts of the county, the vegetation is mainly longleaf pine, slash pine, native grasses, and various shrubs.

Although all of this association is still in native vegetation, about 35 percent is moderately well suited to cultivation. Approximately 15 percent is suitable for occasional cultivation, but it would require intensive management to offset adverse soil characteristics. The remaining 50 percent consists of lakes and other water, Swamp, poorly drained soils, and wet bottom lands.

6. Goldsboro-Lynchburg-Rains association: Moderately well drained to poorly drained, nearly level or gently sloping soils of the uplands that have a loamy fine sand to loamy coarse sand surface soil and a sandy loam to sandy clay loam subsoil

This association is made up mainly of broad flats and undulating areas, but a few small areas are on steeper slopes. Narrow, wet bottom lands border branches and draws that generally are of slight gradient and in some places are poorly defined. There are many small or medium-sized swampy areas. This soil association occupies about 18 percent of the county and is mostly in the northeastern quarter and west-central part, but it also occurs throughout the northern half.

The Goldsboro, Lynchburg, and Rains soils are dominant and make up about 70 percent of the association. These soils have a surface layer of gray to very dark gray loamy sand to loamy coarse sand that is underlain by a lighter colored loamy sand to loamy coarse sand to a depth of 30 inches. Their subsoil is sandy loam to sandy clay loam. It ranges from yellowish brown, slightly mottled in the lower part, to dominantly gray, dark gray, or white. Also in this association are the Norfolk, Tifton, Faceville, Ruston, Carnegie, and other well-drained soils. These soils are scattered in higher positions than the major soils and occupy about 10 percent of the association. The remaining 20 percent consists of poorly drained Grady and Bayboro soils, Swamp, and wet bottom lands.

The original vegetation on the better drained soils was longleaf pine and grass, and on the poorly drained soils it was scattered longleaf pine, thick wiregrass, and other wetland grasses. Cypress, bay, gum, and other wetland hardwoods grew in the swampy areas and on the wet bottom lands. The original pines and the commercially valuable hardwoods have been harvested, and most of the woodland now is in second-growth longleaf pine and slash pine and in wiregrass and low shrubs.

About 50 percent of this soil association consists of moderately well drained soils and is well suited to general farming, but management that provides water control is needed. These moderately well drained soils are very well suited to improved pasture. About 15 percent of the soil association is somewhat poorly drained. The somewhat poorly drained soils are more restricted in use for cultivated crops than the better drained soils and require more intensive water control. This poorly drained part is well suited to improved pasture. The remaining 35 percent consists of very poorly drained soils in swampy areas and wet bottom lands. These soils are still wooded and are best suited to that use unless extensive practices of reclamation are followed.

7. Alluvial land-Swamp association: Wetland and land subject to flooding

This association is made up of Alluvial land, Swamp, and very poorly drained soils that are adjacent to the major rivers and streams. It is covered with a dense growth of hardwoods, scattered pines, and water-tolerant plants. The total area of this soil association amounts to about 8 percent of the county.

The soils in this association are very poorly drained and are frequently flooded. Alluvial land occupies about 78 percent of the association and occurs principally along the Choctawhatchee River and Holmes Creek. It consists primarily of alluvial material that varies within a short distance in texture, color, and thickness of layers. Swamp occupies about 15 percent of this area. It occurs principally in the southern half of the county, but small areas are scattered in other parts. About 2 percent of the association consists of the Blanton, Klej, Rutlege, Plummer, Leon, Rains, Pocomoke, Bayboro, and other nearly level or gently sloping soils. Open ponds and lakes occupy the remaining 5 percent.

This soil association has little or no agricultural value and has remained in forest. The native vegetation is cypress, bay, gum, a few pines, wax myrtle, and small native bushes and water-tolerant plants.

Uses of the General Soil Map [2]

Soil surveys provide useful information for farmers and also for area planners, engineers, contractors, homeowners, and others. Information for land planning and for preliminary work in locating roads, airports, and the like can be obtained from the small-scale general soil map. This map makes it possible to view the county's soil resources as a whole and to see contrasts among the different soil associations. The map and the descriptions of soil associations emphasize general soil patterns that affect several possible uses of the soils. Some of the kinds of uses are discussed briefly in this subsection. For more specific planning of structures or other works, the detailed soil map and descriptions of the soils should be consulted.

The soil associations in Washington County have been rated in a general way according to how favorable they are for agriculture, for homesites, for industry and transportation, and for recreation. The ratings used are *most favorable, very favorable, favorable, somewhat unfavorable,* and *unfavorable.* Somewhat unfavorable means that the soil association is severely limited for the use rated and that suitability for that use is questionable. Unfavorable means that the soil association is extremely limited for the use rated, that extreme measures are needed to overcome the limitations, and that the soil association generally is not suitable for the use rated.

[2] DAVID P. POWELL, soil specialist for interpretations, Soil Conservation Service, helped write this subsection.

Agriculture

Ratings for agriculture were based on the suitability of soils for production of general or special crops, of livestock, and of trees. Considered in this rating were drainage, susceptibility of soil to drought, suitability for crops, susceptibility to erosion, and potential productivity.

SOIL ASSOCIATION 1: *Somewhat unfavorable.* The deep sands that dominate in this association are droughty and respond poorly to fertilizer. Suitable crops are few, and yields are normally low. Under good management, these soils produce moderate to good grass pasture, but they are not suited to clover. The site index for pines is moderately low to low.

SOIL ASSOCIATIONS 2 AND 3: *Very favorable.* The dominant soils of these associations can produce moderate to high yields of many kinds of crops. Slopes are gentle, and erosion is a moderate hazard that can be controlled in cultivated fields. These soils produce high-quality pasture and have a high site index for pines.

SOIL ASSOCIATION 4: *Somewhat unfavorable.* This association has many steep soils that are poorly suited to cultivation, but some small areas can be cultivated. On the steep slopes erosion is a serious hazard, and a protective cover is difficult to maintain. Many areas are suited to improved pasture, and many have a moderate to high site index for pines.

SOIL ASSOCIATION 5: *Favorable.* The dominant soils in this association can produce moderate yields of a few crops. The erosion hazard is slight, but the sandy soils do not retain plant nutrients well. They are moderately well suited to improved pasture. The site index for pines is moderate.

SOIL ASSOCIATION 6: *Very favorable.* The soils in this association can produce moderate to high yields of many kinds of crops. Most slopes are nearly level, and the erosion hazard is slight. The excess water can be removed by using simple practices of water control. These soils are well suited to improved pasture. The site index for pines is high to moderately high.

SOIL ASSOCIATION 7: *Unfavorable.* This association has little land suitable for cultivation without major reclamation. It includes river swamps, bottom lands along small streams, and other wet areas. It is wet and subject to frequent flooding by streams. Many areas are well suited to improved pasture. The association generally is not well suited to pines, though local areas have a high site index for pines. Many swamp hardwoods grow well.

Homesites

Considered in rating the soil associations for homesites were suitability of the soils for private septic tanks; the drainage, the bearing strength, and the stability of the soils; the depth to bedrock; and the esthetic values, such as rolling topography and presence of trees.

SOIL ASSOCIATION 1: *Very favorable.* Most soils of this association have few limitations for homesites. The soils are well drained and have good bearing capacity for foundations. They are porous and have few limitations for septic-tank drainage fields. In many places desirability for homesites is lessened by lack of trees and by droughtiness that limits the growth of lawns and ornamental plants.

SOIL ASSOCIATIONS 2 AND 3: *Most favorable.* Most soils of this association have few limitations for homesites. They are well drained and have good bearing capacity for foundations. Most areas have moderate permeability and have few restrictions to use as septic-tank drainage fields. The soils can grow lawns, large trees, and a wide variety of ornamental plants. The gently sloping landscape of this association is also desirable.

SOIL ASSOCIATION 4: *Favorable.* By careful selection, many very desirable sites for rural homes can be found on this soil association, but many other sites have severe limitations. Although the soils in most areas provide good foundations, many soils are too slowly permeable for septic-tank drainage fields. Sloping to steep hillsides limit the general desirability for homesites. Most areas have attractive wooded landscapes and are suitable for growing lawns and ornamental plants.

SOIL ASSOCIATION 5: *Somewhat favorable.* Most areas are low and have a water table at a depth of only 3 or 4 feet. Only a few local sites on the highest points have adequate drainage for septic-tank drainage fields. Because the association is generally low and flat, many areas are excessively wet in rainy periods and provide poor house foundations. Lawns and ornamental plants grow well on most areas.

SOIL ASSOCIATION 6: *Favorable.* The dominant soils in this association present few problems if used for house foundations. Because the water table is high, most areas are too wet for septic-tank drainage fields. The soils are low and nearly level, and the view of the landscape is restricted. Trees, lawns, and ornamental plants grow well.

SOIL ASSOCIATION 7: *Unfavorable.* In this association the low, wet bottom lands along rivers and streams are subject to flooding and most of the time are so wet that septic tanks cannot function. The suitability for foundations is seriously limited by the variable physical properties of the soils and by the pockets of organic soils.

Industry and transportation

The ratings of the soil associations for industrial and transportation use were based on the requirements for light industrial and manufacturing plants, airports, highways, railroads, and similar facilities. Considered in the rating were topography, drainage, depth to the bedrock and the water table, and suitability of the soils and substrata for foundations and as sources of sand and gravel.

SOIL ASSOCIATION 1: *Most favorable.* The soils in this association are well drained and stable; they provide a good foundation for light buildings, highways, and other structures. Slopes are gentle and moderately sloping, and only a moderate amount of cut and fill is needed. The sandy soils are easily moved by ordinary earth-moving equipment, and ditches and the shoulders of roads are easily stabilized.

SOIL ASSOCIATIONS 2 AND 3: *Most favorable.* The soils of these associations are well drained and stable; they provide a good foundation for light buildings, highways, and other structures. Slopes generally are gentle and moderate, and only a moderate amount of cut and fill is needed. The deep sandy loam to clay loam is easily moved, but ditches and the shoulders of roads require moderately intensive management if serious erosion is to be prevented.

SOIL ASSOCIATION 4: *Favorable.* Most soils of this association provide a stable foundation for light buildings, highways, and other structures. Slopes are generally sloping to steep, and a considerable amount of cut and fill is needed. The soils can be moved by ordinary earth-moving machinery. Ditches and the shoulders of roads require intensive management if severe erosion is to be prevented.

SOIL ASSOCIATION 5: *Favorable.* The dominant soils of this association are moderately well drained to somewhat poorly drained. Many areas require some drainage, but the sandy areas make stable foundations for light buildings, highways, and other structures. Little cut and fill is required on the nearly level terrain, and the soils are easily moved by ordinary earth-moving equipment. Erosion of ditches and the shoulders of roads is not a serious problem.

SOIL ASSOCIATION 6: *Favorable.* The dominant soils of this association have a sandy clay loam subsoil that is often saturated to within 2 feet of the surface. If adequately drained, these soils have a good bearing capacity. Because the dominant soils are very gently sloping, little cut and fill is needed. Ordinary earth-moving equipment moves these soils easily.

SOIL ASSOCIATION 7: *Unfavorable.* This association consists of very poorly drained, mixed alluvial soils, many of which have high organic-matter content and poor bearing capacity. Many areas are subject to frequent flooding.

Recreation

The soil associations were rated according to the capability of the soils to provide hunting grounds and wildlife sanctuaries. Considered in the rating were topography, natural drainage, and the capability of the soils to produce wildlife food and cover.

Ratings were also based on restrictions of the soils if used for camp and picnic sites, playgrounds, golf courses, and constructed ponds and lakes. Considered in rating the soils were topography, drainage, wetness, erosion hazard, trafficability, and restrictions to service facilities.

SOIL ASSOCIATION 1: *Very favorable.* Deep sandy soils are extensive in this soil association. Because these soils are somewhat unfavorable for agriculture, many large areas are still woodland. In these areas the numerous lakes and streams are well spaced, and the areas are well suited to hunting and fishing. They have many desirable camp and picnic sites.

SOIL ASSOCIATIONS 2 AND 3: *Most favorable.* In these associations are many farms and urban fringe areas. Quail, dove, and other birds that live around farms and provide good hunting are common and can be increased by good management. Numerous small streams and draws provide sites for farm ponds and good fishing.

Because the soils are rolling and can grow good sod and trees, these soil associations have few limitations to constructing golf courses, playgrounds, wildlife sanctuaries, and other recreational facilities commonly associated with urban fringe areas.

SOIL ASSOCIATION 4: *Very favorable.* The soils of this association are somewhat unfavorable for agriculture. Most of the association is wooded and provides fair to good hunting. A few small streams provide sites for small ponds. A few areas are especially suitable for camp or picnic sites, and many sites are suitable for golf courses and playgrounds. Many nongame birds and animals live in this association and are available to people studying nature.

SOIL ASSOCIATION 5: *Very favorable.* Most soils of this association are closely associated with the soils in soil association 1 and have been used little for agriculture. They occupy low, nearly level areas around lakes and in flatwoods. These areas are well suited to hunting and fishing, but most areas are too low and too wet for camp or picnic sites.

SOIL ASSOCIATION 6: *Very favorable.* The soils in this association are well suited to plants that make good food and cover for many species of wildlife. They provide good hunting grounds that can be improved by good game management. Only a few sites are suitable for building ponds or lakes for fishing, and most areas are too low and too wet for good camp and picnic sites. The association is only moderately well suited for golf courses or playgrounds.

SOIL ASSOCIATION 7: *Favorable.* In this association the wooded flood plains of rivers provide good wildlife sanctuaries or good hunting. The Choctawhatchee River, Holmes Creek, and Pine Log Creek provide good fishing. A few sites are favorable camp and picnic grounds, but most areas are subject to flooding. This soil association is not suitable for golf courses, playgrounds, and similar recreational facilities.

How Soils Are Mapped and Classified

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

They went into the county knowing they likely 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 flow of streams; kinds of native plants or crops; kinds of rock; and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material that has not been changed much by leaching or by 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 nationwide, 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 Lakeland, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in those characteristics that go with their behavior in the natural, untouched landscape. Soils of one series can differ somewhat in texture of the surface soil and in slope, stoniness, or some other characteristic that affects use of the soils by man.

Many soil series contain soils that differ in texture of their surface layer. According to such differences in texture, 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. Norfolk loamy sand and Norfolk sand are two soil types in the Norfolk series. The difference in texture of their surface layer is apparent from their names.

Some soil types vary so much in slope, degree of erosion, number and size of stones, 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 phases. The name of a soil phase indicates a feature that affects management. For example, Norfolk loamy sand, 2 to 5 percent slopes, is one of several phases of Norfolk loamy sand, a soil type that ranges from nearly level to sloping.

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

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning management of farms and fields, 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, it may be better to show two or more related soils as one mapping unit. Such groups are called undifferentiated soil groups. For example, in some soil surveys the difference between the steep phases of different series may not be significant, because slope is so important in its effect on management that it outweighs the other soil characteristics. In this county Lakeland, Cuthbert, and Shubuta soils, 12 to 45 percent slopes, is an undifferentiated soil group. Also, on most soil maps, areas are shown that are so rocky, so shallow, or so frequently worked by wind and water that they scarcely can be called soils. These areas are shown on a soil map like other mapping units, but they are given descriptive names, such as Alluvial land or Gullied land, and are called land types rather than soils.

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

But only part of a soil survey is done when the soils have been named, described, and delineated on the map, and the laboratory data and yield data have been assembled. The mass of detailed information then needs to be organized in a way that it is readily useful to different groups of readers, among them farmers, managers of woodland, and engineers. Grouping soils that are similar in suitability for each specified use is the method of organization commonly used in the soil survey reports. Based on the yield and practice tables and other data, the soil scientists set up trial groups, and test them by further study and by consultation with farmers, agronomists, engineers, and others. Then, the scientists adjust the groups according to the results of their studies and consultation. Thus, the groups that are finally evolved reflect up-to-date knowledge of the soils and their behavior under present methods of use and management.

Descriptions of the Soils

This section describes, in nontechnical language, the soil series (groups of soils) and single soils (mapping units) of Washington County. The approximate acreage and proportionate extent of each mapping unit are given in table 1.

The procedure in this section is first to describe the soil series, and then the mapping units in that series. Thus, to get full information on any one mapping unit, it is necessary to read the description of that unit and also the description of the soil series to which it belongs. As mentioned in the section "How Soils Are Mapped and Classified," not all mapping units are members of a soil series. Borrow pits and Swamp are miscellaneous land types and do not belong to a soil series but, nevertheless, are listed in alphabetic order along with the soil series.

Following the name of each mapping unit, there is a symbol in parentheses. This symbol identifies the mapping unit on the detailed soil map. Listed at the end of each description of a mapping unit are the capability unit and the woodland suitability group in which the mapping unit has been placed. The page on which each capability unit is described can be found readily by referring to the "Guide to Mapping Units" at the back of the report.

Soil scientists, engineers, students, and others who want more technical descriptions of soil series should turn to the section "Formation and Classification of Soils." In that section a profile representative of each series is described in detail. Many terms used in the soil descriptions and other sections of the report are defined in the Glossary.

726-719—65——2

TABLE 1.—*Approximate acreage and proportionate extent of soils mapped* [1]

Map symbol	Soil	Area	Extent	Map symbol	Soil	Area	Extent
		Acres	*Percent*			*Acres*	*Percent*
Al	Alluvial land	39, 427	10. 3	FaB	Faceville loamy sand, 2 to 5 percent slopes	242	0. 1
AnA	Angie loamy sand, 0 to 2 percent slopes	55	(2)	FaB2	Faceville loamy sand, 2 to 5 percent slopes, eroded	748	. 2
AnB	Angie loamy sand, 2 to 5 percent slopes	531	. 1	FaC2	Faceville loamy sand, 5 to 8 percent slopes, eroded	205	. 1
AnC	Angie loamy sand, 5 to 8 percent slopes	120	(2)	GcA	Goldsboro coarse sand, thick surface, 0 to 2 percent slopes	1, 053	. 3
Ba	Bayboro soils	1, 189	. 3	GcB	Goldsboro coarse sand, thick surface, 2 to 5 percent slopes	5, 981	1. 6
Bd	Bladen soils	1, 360	. 4	GcC	Goldsboro coarse sand, thick surface, 5 to 8 percent slopes	305	. 1
BfB	Blanton fine sand, 0 to 5 percent slopes	1, 584	. 4	GdA	Goldsboro loamy coarse sand, 0 to 2 percent slopes	5, 770	1. 5
BnB	Blanton sand, 0 to 5 percent slopes	6, 850	1. 8	GdB	Goldsboro loamy coarse sand, 2 to 5 percent slopes	21, 993	5. 8
BnC	Blanton sand, 5 to 8 percent slopes	1, 501	. 4	GdC	Goldsboro loamy coarse sand, 5 to 8 percent slopes	447	. 1
Bp	Borrow pits	262	. 1	Gr	Grady loam	175	(2)
BoA	Bowie loamy sand, 0 to 2 percent slopes	196	(2)	Gu	Gullied land	34	(2)
BoB	Bowie loamy sand, 2 to 5 percent slopes	3, 141	. 8	KaB	Klej fine sand, 0 to 5 percent slopes	1, 839	. 5
BoB2	Bowie loamy sand, 2 to 5 percent slopes, eroded	365	. 1	KgB	Klej sand, 0 to 5 percent slopes	15, 711	4. 1
BoC	Bowie loamy sand, 5 to 8 percent slopes	614	. 2	KgC	Klej sand, 5 to 8 percent slopes	1, 566	. 4
BoC2	Bowie loamy sand, 5 to 8 percent slopes, eroded	322	. 1	KsB	Klej sand, shallow, 0 to 5 percent slopes	2, 022	. 5
BwB	Bowie loamy sand, thick surface, 2 to 5 percent slopes	670	. 2	KsC	Klej sand, shallow, 5 to 8 percent slopes	174	(2)
BwC	Bowie loamy sand, thick surface, 5 to 8 percent slopes	146	(2)	LaB	Lakeland coarse sand, 0 to 5 percent slopes	73, 549	19. 2
CaB	Carnegie loamy sand, 2 to 5 percent slopes	120	(2)	LaC	Lakeland coarse sand, 5 to 8 percent slopes	19, 293	5. 0
CaB2	Carnegie loamy sand, 2 to 5 percent slopes, eroded	270	. 1	LaD	Lakeland coarse sand, 8 to 12 percent slopes	7, 367	1. 9
CaC2	Carnegie loamy sand, 5 to 8 percent slopes, eroded	82	(2)	LaF	Lakeland coarse sand, 12 to 45 percent slopes	4, 111	1. 1
CtB3	Cuthbert sandy clay loam, 2 to 5 percent slopes, severely eroded	250	. 1	LdB	Lakeland sand, 0 to 5 percent slopes	6, 499	1. 7
CtC3	Cuthbert sandy clay loam, 5 to 8 percent slopes, severely eroded	232	. 1	LdC	Lakeland sand, 5 to 8 percent slopes	1, 570	. 4
CuB	Cuthbert soils, 2 to 5 percent slopes	232	. 1	LkB	Lakeland sand, shallow, 0 to 5 percent slopes	4, 062	1. 1
CuB2	Cuthbert soils, 2 to 5 percent slopes, eroded	2, 060	. 5	LkC	Lakeland sand, shallow, 5 to 8 percent slopes	1, 185	. 3
CuC	Cuthbert soils, 5 to 8 percent slopes	476	. 1	LnD	Lakeland, Cuthbert, and Shubuta soils, 5 to 12 percent slopes	11, 303	3. 0
CuC2	Cuthbert soils, 5 to 8 percent slopes, eroded	1, 456	. 4	LnF	Lakeland, Cuthbert, and Shubuta soils, 12 to 45 percent slopes	3, 838	1. 0
CwD3	Cuthbert, Shubuta, and Lakeland soils, 5 to 12 percent slopes, severely eroded	609	. 2	Lo	Leon coarse sand	703	. 2
				Lu	Local alluvial land	516	. 1
DuB	Dunbar loamy sand, 2 to 5 percent slopes	1, 363	. 4	LyA	Lynchburg loamy fine sand, 0 to 2 percent slopes	11, 672	3. 1
EaB	Esto loamy sand, 0 to 5 percent slopes	83	(2)	LyB	Lynchburg loamy fine sand, 2 to 5 percent slopes	1, 311	. 3
EfA	Eulonia loamy fine sand, 0 to 2 percent slopes	880	. 2	LzA	Lynchburg loamy fine sand, thick surface, 0 to 2 percent slopes	1, 472	. 4
EfB	Eulonia loamy fine sand, 2 to 5 percent slopes	832	. 2	LzB	Lynchburg loamy fine sand, thick surface, 2 to 5 percent slopes	370	. 1
EnA	Eulonia loamy fine sand, thick surface, 0 to 2 percent slopes	174	(2)	MaB	Marlboro loamy sand, 2 to 5 percent slopes	640	. 2
EnB	Eulonia loamy fine sand, thick surface, 2 to 5 percent slopes	133	(2)	MaB2	Marlboro loamy sand, 2 to 5 percent slopes, eroded	399	. 1
EsB	Eustis coarse sand, 0 to 5 percent slopes	15, 252	4. 0	NoA	Norfolk loamy sand, 0 to 2 percent slopes	395	. 1
EsC	Eustis coarse sand, 5 to 8 percent slopes	2, 908	. 8	NoB	Norfolk loamy sand, 2 to 5 percent slopes	10, 670	2. 8
EsD	Eustis coarse sand, 8 to 12 percent slopes	1, 358	. 4	NoB2	Norfolk loamy sand, 2 to 5 percent slopes, eroded	1, 574	. 4
EsE	Eustis coarse sand, 12 to 35 percent slopes	383	. 1	NoC	Norfolk loamy sand, 5 to 8 percent slopes	801	. 2
EtB	Eustis sand, 0 to 5 percent slopes	849	. 2	NoC2	Norfolk loamy sand, 5 to 8 percent slopes, eroded	634	. 2
EtC	Eustis sand, 5 to 8 percent slopes	703	. 2	NrA	Norfolk sand, thick surface, 0 to 2 percent slopes	198	(2)
EuB	Eustis sand, shallow, 0 to 5 percent slopes	299	. 1	NrB	Norfolk sand, thick surface, 2 to 5 percent slopes	6, 670	1. 7
EuC	Eustis sand, shallow, 5 to 8 percent slopes	216	. 1				

See footnotes at end of table.

TABLE 1.—*Approximate acreage and proportionate extent of soils mapped* [1]—Continued

Map symbol	Soil	Area	Extent	Map symbol	Soil	Area	Extent
		Acres	*Percent*			*Acres*	*Percent*
NrC	Norfolk sand, thick surface, 5 to 8 percent slopes	1, 270	0. 3	RsC2	Ruston loamy sand, 5 to 8 percent slopes, eroded	369	0. 1
OkB	Oktibbeha soils, 2 to 5 percent slopes	220	. 1	Ru	Rutlege loamy fine sand	4, 147	1. 1
OkC	Oktibbeha soils, 5 to 8 percent slopes	196	(2)	Sc	Scranton fine sand	157	(2)
Pm	Plummer soils	5, 992	1. 6	Sf	Scranton fine sand, shallow	966	. 3
Pr	Pocomoke and Rains soils	1, 460	. 4	ShB	Shubuta loamy sand, 2 to 5 percent slopes	2, 032	. 5
Pt	Pocomoke and Rains soils, thick surface	705	. 2	ShB2	Shubuta loamy sand, 2 to 5 percent slopes, eroded	1, 601	. 4
Ra	Rains loamy sand	5, 541	1. 4	ShC	Shubuta loamy sand, 5 to 8 percent slopes	669	. 2
RcB	Ruston coarse sand, 2 to 5 percent slopes	531	. 1	ShC2	Shubuta loamy sand, 5 to 8 percent slopes, eroded	650	. 2
RdB	Ruston coarse sand, thick surface, 2 to 5 percent slopes	964	. 3	Sw	Swamp	709	. 2
RdC	Ruston coarse sand, thick surface, 5 to 8 percent slopes	490	. 1	TfB	Tifton loamy sand, 2 to 5 percent slopes	1, 510	. 4
RsB	Ruston loamy sand, 2 to 5 percent slopes	1, 853	. 5	TfB2	Tifton loamy sand, 2 to 5 percent slopes, eroded	234	. 1
RsB2	Ruston loamy sand, 2 to 5 percent slopes, eroded	711	. 2	TfC2	Tifton loamy sand, 5 to 8 percent slopes, eroded		
RsC	Ruston loamy sand, 5 to 8 percent slopes	522	. 1		Total	382, 080	100. 0

[1] Includes areas of water less than 40 acres in size.

[2] Less than 0.1 percent.

Alluvial Land

Alluvial material on first bottoms along streams makes up this land type, which is frequently flooded and has variable drainage.

Alluvial land (Al).—This land type consists of alluvial soil material on first bottoms along streams. It is frequently flooded and varies greatly in drainage. The sediments of the alluvial material were washed from many different soils and vary widely in texture and color. Variable amounts and kinds of sediments are deposited in each overflow. The wide bottom lands, except in the narrow strips along their drainage channels, generally receive much finer textured sediments than the narrow bottom lands. Along these narrow strips the material consists dominantly of sand and loamy sand. The finer textured sediments are deposited in areas farther from the stream channels than are the coarser textured materials. Water backs up in these areas, and surface drainage is slow. The texture of the soil material is extremely variable because the location of stream channels has changed from time to time and sediments with varied texture have built up.

The drainage of this land varies extremely in the narrow bottom lands. The better drained areas occur along the stream channels where the streams have enough gradient to form a deep channel. They are also in the higher areas along old meandering drainage channels where the surface is hammocky or uneven. Some of the narrow bottom lands are well drained, and the soil material is brown or yellowish brown. In many of these narrow strips, however, drainage is slow and the soil material is gray. Here the stream gradient is slight, and water seeps from adjacent uplands. The soil materials on the large bottom lands range from brown, yellowish brown, and pale brown to gray and light gray. The brownish and yellowish soil materials are in the better drained areas, and the grayish soil materials are in the more poorly drained areas.

The native vegetation consists chiefly of oak, bay, gum, hickory, and pine. Only a small part of this land type has been cleared. The cultivated areas consist of only a few small patches that are especially suited to garden crops and a few areas that adjoin cultivated areas of other soils. Because it is frequently flooded and has variable drainage, and because it is rough and dissected, this land is not suited to cultivation in most places. Cleared, well-managed areas, however, produce favorable yields of improved grasses, except in the most poorly drained areas or in the areas that are flooded for long periods. (Capability unit VIIws–1; woodland suitability group 12)

Angie Series

In the Angie series are deep, somewhat poorly drained, strongly acid soils that developed from thinly bedded clay and sandy clay on nearly level to sloping uplands. These soils have a very dark gray to grayish-brown loamy sand surface layer that is underlain by light yellowish-brown, yellowish-brown, or grayish-brown loamy sand. The entire surface layer is less than 18 inches thick. Between the surface layer and the subsoil, the boundary is abrupt. The subsoil is yellow to strong-brown, very firm sandy clay to clay that is mottled with yellow, red, and gray in the lower part. At a depth of 16 to 44 inches, the subsoil grades into distinctly mottled, stratified sandy loam to clay parent material.

The Angie soils occur mostly on small knolls and hillsides and are next to the Bowie, Shubuta, Cuthbert, and Goldsboro soils. The Angie soils are similar to the Bowie and Goldsboro soils in color and texture of the surface layer, but they have a thinner and finer textured subsoil than those soils and are less well drained. Angie soils

are also less well drained than the Shubuta soils and have a yellow instead of a red subsoil. The subsoil of the Angie soils is thicker, more friable, and less compact than the red subsoil of the Cuthbert soils.

The Angie soils occur in small, widely scattered areas in the northern half of the county. They are most common in the north-central and west-central parts. The native vegetation consists principally of longleaf pine, slash pine, various hardwoods, low shrubs, and native grasses. Although these soils are not extensive and are only moderately well suited to crops, many areas are cultivated along with more extensive soils.

Angie loamy sand, 2 to 5 percent slopes (AnB).—This somewhat poorly drained soil is on uplands and has a very firm, yellow or yellowish-brown sandy clay or clay subsoil.

Representative profile in a wooded area:

0 to 5 inches, very friable, very dark gray loamy sand.
5 to 15 inches, very friable, grayish-brown loamy sand.
15 to 24 inches, very firm, yellow sandy clay.
24 to 60 inches +, very firm, mottled red, yellow, brown, and light-gray sandy clay.

The plow layer normally ranges from very dark gray to grayish brown and is generally loamy sand but is loamy fine sand in a few small areas. The subsoil is 10 to 30 inches thick, is yellow to strong brown, and has sandy clay to clay texture. The lower 6 to 20 inches of the subsoil is mottled with various hues of yellow, brown, red, and gray. The underlying material is highly mottled, stratified sandy loam to clay.

This soil is strongly acid, is low in natural fertility, and contains little organic matter. The highly permeable surface soil has low available moisture capacity. The root zone is restricted by the dense, sticky, poorly aerated, slowly permeable subsoil. Periodic wetness also restricts normal growth of roots, but forage crops and other shallow-rooted crops do well on this soil.

Under good management, this soil is moderately well suited to cultivation. It is moderately well suited to improved pasture and is well suited to pines. (Capability unit IVes–2; woodland suitability group 5)

Angie loamy sand, 0 to 2 percent slopes (AnA).—This soil is less sloping than Angie loamy sand, 2 to 5 percent slopes. Surface runoff is slower, and consequently, this soil remains wet longer after rains. Surface drainage may be necessary in some areas for best growth of crops.

This soil is moderately well suited to cultivated crops but is suited only to those crops that tolerate slight wetness. It is best suited to corn. If management is good, this soil is moderately well suited to improved pasture consisting of bermudagrass and bahiagrass. It is well suited as woodland and for wildlife habitats. (Capability unit IVes–2; woodland suitability group 5)

Angie loamy sand, 5 to 8 percent slopes (AnC).—This soil occurs in only a few small areas. It is steeper than Angie loamy sand, 2 to 5 percent slopes, and is shallower and generally more variable.

This soil is highly susceptible to erosion. Because slopes are strong and the subsoil is slowly permeable, runoff is rapid and erosion is severe on unprotected areas. The dense, poorly aerated subsoil is not favorable for the growth of roots.

Included with this soil are a few small spots that have been damaged by moderate sheet erosion.

Because of unfavorable characteristics, this soil has limited suitability for crops. It should be cultivated only occasionally. Low fertility and low available moisture capacity limit yields of crops and make the control of erosion difficult. This soil is best suited to pasture grasses, to trees, and for wildlife habitats. (Capability unit VIes–1; woodland suitability group 5)

Bayboro Series

In the Bayboro series are deep, very poorly drained, strongly acid soils that developed from thick beds of acid sandy clay and clay. These soils occur in nearly level, depressional or ponded areas in low positions on the uplands and have accumulated a large amount of organic matter. They have a black to very dark gray loamy sand to clay loam surface layer that is high in organic-matter content and is 8 to 18 inches thick. The subsoil is dark-gray to light-gray, firm fine sandy clay loam in the upper part and is extremely firm, plastic sandy clay to clay in the lower part. It is mottled in the lower part with yellow, brownish yellow, and red, and it grades to parent material of mottled light-gray and gray sandy clay loam to clay.

Bayboro soils generally occur in depressions as do Bladen, Pocomoke, Rains, and Dunbar soils. Bayboro soils have a thicker, more highly organic surface layer than Bladen soils. They have a thicker, darker surface layer than Rains soils, and a finer textured, more plastic and sticky subsoil. The surface layer of Bayboro soils is similar to that of Pocomoke soils in color, thickness, and organic-matter content, but the subsoil is finer textured and more plastic and sticky. Bayboro soils are more poorly drained than Dunbar soils and have a thick, highly organic surface layer and a gray or light-gray subsoil instead of a brownish one.

Bayboro soils occur in small to moderately large, very poorly drained areas, dominantly in the east-central and west-central parts of the county. The native vegetation consists mainly of cypress, blackgum, bay, and pond grasses. These soils are not suitable for cultivation under natural conditions. They are not extensive, and they remain in native vegetation.

Bayboro soils (Ba).—In this mapping unit are very poorly drained soils on uplands. These soils have a thick surface layer, which contains a large amount of organic matter, and an extremely firm and plastic sandy clay or clay subsoil.

Representative profile in a nearly level wooded area:

0 to 15 inches, friable, black very fine sandy loam.
15 to 18 inches, firm, dark-gray fine sandy clay loam.
18 to 44 inches, extremely firm and plastic, gray clay that has common, dark-gray and few, yellowish-brown mottles.
44 to 54 inches +, extremely firm and very plastic, mottled light-gray and gray heavy sandy clay.

The surface layer ranges from loamy sand to clay, is 8 to 18 inches thick, and is black to very dark gray. In many places it is underlain by a gray to grayish-brown layer that is 2 to 6 inches thick in some places. Sandy clay to clay occurs within 18 inches of the surface and is slightly mottled light gray to dark gray. It is underlain by light-gray and gray sandy clay loam to clay parent material at a depth greater than 36 inches.

These soils are strongly acid, are moderate in natural fertility, and have a moderate to high content of organic matter. Permeability is rapid to moderately rapid in the surface layer, and available moisture capacity is moderately high. These soils have a moderately deep root zone. Roots develop poorly because the subsoil is very dense, very poorly aerated, and subject to waterlogging during wet periods.

If these soils are adequately drained, they are suited to improved pasture, but good soil management is needed for high yields. They are well suited as woodland and as wildlife habitats. (Capability unit Vws–1; woodland suitability group 9)

Bladen Series

In the Bladen series are deep, poorly drained, strongly acid soils that developed from thick beds of acid clay and sandy clay in low, nearly level or depressional areas in uplands. These soils have a dark to very dark gray loamy sand to clay loam surface layer. Within 14 inches of the surface is a dark-gray to grayish-brown subsoil that is mottled with various shades of yellow, brown, gray, and red. The upper 1 to 3 inches of the subsoil is light sandy clay loam to sandy clay loam, and the lower part is very firm, plastic sandy clay to clay. The parent material is highly mottled sandy clay to clay.

Bladen soils generally occur with the Rains, Bowie, Eulonia, Goldsboro, Dunbar, and Lynchburg soils. They are finer textured than all those soils except the Dunbar. The Bladen soils are similar to the Rains soils in color and drainage. They are more poorly drained than Bowie, Eulonia, and Goldsboro soils and are dominantly gray rather than yellow. Bladen soils are more poorly drained and are grayer than Dunbar and Lynchburg soils.

The Bladen soils occur in scattered areas in the northeast-central and west-central parts of the county. The native vegetation consists principally of scattered slash and longleaf pines, various water-tolerant hardwoods, and native grasses. The total acreage in this county is small. A moderate part has been cleared and is used for improved pasture.

Bladen soils (Bd).—These poorly drained soils of the uplands have an extremely firm, plastic sandy clay or clay subsoil.

Representative profile in a nearly level improved pasture:

0 to 7 inches, friable, very dark gray loamy fine sand.
7 to 15 inches, very firm or plastic, grayish-brown clay that has a few, light olive-brown mottles.
15 to 52 inches +, very firm or plastic, mottled gray clay.

The plow layer ranges from gray or very dark gray loamy sand to clay loam but is loamy fine sand in most places. The subsoil is gray to grayish-brown, plastic sandy clay to clay that is mottled with various shades of gray, brown, yellow, and red. It is underlain by highly mottled sandy clay or clay at a depth of 36 to more than 48 inches. Included with these soils are a few small areas with slopes of 2 to 8 percent.

These soils are strongly acid, have a medium content of organic matter, are moderate in natural fertility, and have a moderately high available moisture capacity. Permeability is rapid to moderately rapid in the surface layer and is very slow in the subsoil. Because these soils are wet and are slowly drained internally, they have a very poorly aerated subsoil. Consequently, the root zone and the suitability for cultivated crops are limited.

If these soils are adequately drained and well managed, they are suited to shallow-rooted crops. If they are intensively managed, they are well suited to improved pasture. (Capability unit IIIws–2; woodland suitability group 9)

Blanton Series

In the Blanton series are deep, moderately well drained, strongly acid soils that developed from thick beds of acid sand on nearly level to sloping uplands. The surface layer of these soils is gray to very dark gray sand or fine sand 2 to 4 inches thick. It is underlain by layers that range from fine sand to coarse sand and extend to a depth greater than 42 inches. These layers are mottled or splotched with various hues of yellow, brown, gray, or white.

The Blanton soils occur mainly with the Lakeland, Klej, Leon, and Plummer soils. All of these soils have developed from similar material. Blanton soils are paler than Lakeland soils and have a higher water table, which is commonly within 60 inches of the surface. They are similar to the Klej soils but are dominantly gray instead of yellow. Blanton soils are better drained than Plummer and Leon soils and lack the organic pan that is characteristic of Leon soils.

Blanton soils occur throughout the county but are more common in the southern half. The native vegetation generally consists of thin stands of longleaf and slash pines, turkey oak, post oak, low shrubs, and native grasses. However, in the south-central part of the county where these soils are adjacent to the many lakes, the native vegetation is very sparse and consists chiefly of low shrubs. Some areas of these soils have been cleared and are used for cultivated crops.

Blanton sand, 0 to 5 percent slopes (BnB).—This moderately well drained soil of the uplands consists of rapidly permeable, deep sand throughout the profile.

Representative profile in a native pasture:

0 to 4 inches, loose, very dark gray sand.
4 to 38 inches, loose, light-gray sand mottled with brownish yellow.
38 to 76 inches +, loose, white sand mottled with very pale brown and yellowish brown.

The plow layer ranges from very dark gray to gray sand that is underlain by very pale brown to white sand with a variable amount of mottling. Included with this soil are a few areas of fine sand and a few small areas that are higher and more droughty than is normal for this soil.

This soil is strongly acid, is low in natural fertility, and contains little organic matter. Permeability and leaching of plant nutrients are rapid. These soils have low available moisture capacity and are droughty during periods of low rainfall.

Under good management that includes large additions of fertilizer, corn, small grain, and pasture plants generally produce moderate yields. This soil is well suited as woodland, and it makes good habitats for wildlife. (Capability unit IIIse–2; woodland suitability group 7)

Blanton sand, 5 to 8 percent slopes (BnC).—This soil has stronger slopes and better surface drainage than Blanton sand, 0 to 5 percent slopes, and normally has a lower water table. Included in mapped areas are a few small areas with slopes of 8 to 12 percent and a few small areas of fine sand.

This soil is more susceptible to erosion than Blanton sand, 0 to 5 percent slopes, and requires more intensive management if cultivated. It is best suited to improved pasture and trees. (Capability unit IVse–1; woodland suitability group 7)

Blanton fine sand, 0 to 5 percent slopes (BfB).—This soil is finer textured than Blanton sand, 0 to 5 percent slopes, and consequently, has a slightly higher available moisture capacity and is more productive of cultivated crops. Under good management, the soil is moderately well suited to corn, small grain, and improved pasture. It is well suited as woodland, and it makes good habitats for wildlife. (Capability unit IIIse–2; woodland suitability group 7)

Borrow Pits

The open excavations and uneven piles of waste material that make up this land type have little or no agricultural value.

Borrow pits (Bp).—The excavations in this land type were made when the soil material was removed to be used in road construction and repair. Some waste material that cannot be used on roads remains at the sides of the pits. The pits vary in size but are generally less than 3 acres. Areas that are too small to be delineated are shown on the map by the symbol for gravel pits. Areas of Borrow pits occur throughout the county but have a small total acreage. They have little or no agricultural value in their present condition. Some areas may be valuable for wildlife if they are reforested by natural seeding or planting. (Capability unit VIIse–2; woodland suitability group 12)

Bowie Series

In the Bowie series are deep, well-drained, strongly acid soils that developed from thick beds of acid sandy clay material on nearly level to sloping uplands. These soils have a dark-gray to yellowish-brown loamy sand to sandy loam surface layer that is underlain by yellow to yellowish-brown sandy loam to fine sandy clay loam. Generally, at a depth of about 28 inches, the subsoil is heavy fine sandy clay loam to sandy clay mottled with strong brown to red. The depth to mottling, however, ranges from 20 inches to as much as 34 inches. The subsoil is underlain by distinctly mottled sandy clay loam or sandy clay parent material.

Bowie soils generally occur with the Norfolk, Goldsboro, Angie, Shubuta, and Cuthbert soils. They are slightly finer textured and slightly more compact than the Norfolk soils, which do not have strong-brown to red mottles in the lower part of the subsoil. The Bowie soils resemble the Goldsboro soils in color but are better drained and have prominent, strong-brown to red mottles in the subsoil instead of pale-brown and gray ones. In the lower part of the subsoil, the Bowie soils are finer textured than the Goldsboro soils. They are not so fine textured in the subsoil as the Angie soils but are better drained and more friable. Bowie soils are better drained than the Shubuta and Cuthbert soils and have a coarser textured and yellower subsoil.

Bowie soils occupy a moderately large total acreage that is scattered through all the county except in most of the southern half. The largest areas occur in the northeastern part of the county. The native vegetation consists chiefly of longleaf pine, slash pine, hickory, oak, various shrubs, native grasses, and in places a scattering of gallberry. These soils are well suited to many kinds of cultivated crops and to improved pasture. They have been extensively cleared and cultivated.

Bowie loamy sand, 2 to 5 percent slopes (BoB).—This well-drained soil on the uplands has a loamy surface layer and a clayey subsoil.

Representative profile in an idle field:

0 to 6 inches, very friable, brown loamy sand.
6 to 14 inches, very friable, yellowish-brown loamy sand.
14 to 27 inches, friable, yellowish-brown fine sandy clay loam.
27 to 36 inches, firm, yellowish-brown fine sandy clay with prominent, red mottles.
36 to 52 inches +, firm, mottled sandy clay; few thin lenses of fine sandy clay loam below 41 inches.

The plow layer ranges from brown to dark-gray loamy sand and is underlain by a very pale brown to yellowish-brown layer. Sandy loam to sandy clay loam extends from a depth of about 18 inches to a depth of 25 to 30 inches. Below this depth, the subsoil is heavy sandy clay loam to sandy clay. Below the very pale brown to yellowish-brown layer, the subsoil ranges from yellow to yellowish brown and is normally mottled at a depth of about 28 inches. Depth to mottling, however, ranges from 20 inches to as much as 34 inches. The underlying material is sandy clay loam to clay and occurs at a depth of 36 to 42 inches.

This soil is strongly acid and has moderately low natural fertility and organic-matter content. It is sufficiently loamy to have good tilth and moderately high available moisture capacity. Permeability is rapid to moderately rapid in the surface layer and is moderately rapid in the subsoil. Surface drainage is good, and internal drainage is medium. This soil retains plant nutrients well, has moderate cation-exchange capacity, and responds well to fertilizer. It has a deep, moderately well aerated root zone, but deep-rooted crops may be damaged during wet periods because drainage is restricted in the lower part of the subsoil. The available moisture capacity is low in the surface layer and high in the subsoil.

This soil is well suited to many kinds of locally grown crops. It is also well suited to improved pasture or to trees and as a habitat for wildlife. (Capability unit IIe–2; woodland suitability group 4)

Bowie loamy sand, 0 to 2 percent slopes (BoA).—This nearly level soil has slower surface runoff than Bowie loamy sand, 2 to 5 percent slopes. In a few areas the surface layer is slightly thicker than 18 inches. This soil is well suited to most locally grown crops, to improved pasture, and to trees. It makes good habitats for wildlife. (Capability unit I-1; woodland suitability group 4)

Bowie loamy sand, 2 to 5 percent slopes, eroded (BoB2).—This moderately eroded soil has a thinner surface layer than Bowie loamy sand, 2 to 5 percent slopes. The surface layer is about 8 inches thick in most

places but ranges from 4 to 13 inches in thickness. Most erosion is sheet erosion, and there are only a few shallow gullies. Included with this soil, however, are a few small spots that are severely eroded. To produce high yields, more intensive use of cover crops and green-manure crops is required on this soil than on Bowie loamy sand, 2 to 5 percent slopes.

Under good management that includes practices to control erosion, this soil is well suited to many kinds of cultivated crops. It is also well suited to improved pasture and trees, and it makes good habitats for wildlife. (Capability unit IIe–2; woodland suitability group 4)

Bowie loamy sand, 5 to 8 percent slopes (BoC).—This sloping soil has more rapid runoff than Bowie loamy sand, 2 to 5 percent slopes, and is more susceptible to erosion. It generally has a slightly thinner surface layer. The surface layer is 13 to 16 inches thick in most places but in some areas is as much as 18 inches thick. The mottling is generally nearer the surface, or at a depth of 20 to 28 inches. Included with this soil are a few, small, moderately eroded areas and a few areas on slopes of 8 to 12 percent.

This soil is well suited to most cultivated crops grown in the county, but because of the erosion hazard, it is suited to only moderately intensive use. However, under good management that provides intensive practices to control erosion, good yields may be produced. The soil is well suited to improved pasture and trees, and it makes good wildlife habitats. (Capability unit IIIe–2; woodland suitability group 4)

Bowie loamy sand, 5 to 8 percent slopes, eroded (BoC2).—This sloping, eroded soil generally has a thinner surface layer than Bowie loamy sand, 2 to 5 percent slopes. The surface layer ranges from 4 to 13 inches in thickness but is generally about 6 inches thick. The parent material is generally nearer the surface in this soil. Because this soil is steeper than Bowie loamy sand, 2 to 5 percent slopes, it is more susceptible to erosion. Most erosion is sheet erosion, and there are only a few shallow or deep gullies. Included with this soil are a few small spots on slopes of 8 to 12 percent that are severely eroded. Intensive management is needed to get high yields on these severely eroded areas.

This soil is well suited to cultivated crops if erosion control practices are used. It is well suited to improved pasture and trees and as a habitat for wildlife. (Capability unit IIIe–2; woodland suitability group 4)

Bowie loamy sand, thick surface, 2 to 5 percent slopes (BwB).—This well-drained soil of the uplands has a sandy surface layer that is 18 to 30 inches thick. The upper part of the subsoil is yellowish-brown sandy loam to sandy clay loam. The lower part is mottled and finer textured.

Representative profile in a wooded area:

0 to 5 inches, very friable, dark-gray loamy sand.
5 to 21 inches, very friable, yellowish-brown loamy sand.
21 to 28 inches, friable, yellowish-brown sandy clay loam.
28 to 43 inches, friable, yellowish-brown heavy sandy clay loam mottled with strong brown and red.
43 to 70 inches +, friable, mottled yellowish-brown, strong-brown, red, light-gray, and very pale brown sandy clay loam.

Included with this soil are a few areas that have a loamy fine sand surface layer. In a few areas the sandy layer is slightly less than 18 inches thick or is slightly more than 30 inches.

This soil is strongly acid and is low in natural fertility and in organic-matter content. Permeability is rapid in the surface layer and moderate in the subsoil. Surface drainage is good, and internal drainage is medium. The soil retains plant nutrients well, has a moderate cation-exchange capacity, and responds well to fertilizer. Because of restricted drainage in the lower subsoil, deep-rooted crops are sometimes damaged during periods of very high rainfall. The available moisture capacity is low in the surface layer and high in the subsoil.

This soil is well suited to most locally grown crops. It is also well suited to improved pasture and trees and as a habitat for wildlife. (Capability unit IIse–1; woodland suitability group 4)

Bowie loamy sand, thick surface, 5 to 8 percent slopes (BwC).—This sloping soil has more rapid runoff than Bowie loamy sand, thick surface, 2 to 5 percent slopes, and is more susceptible to erosion. In some areas mottling in the subsoil is slightly nearer the surface.

For high yields, this soil requires more control of erosion and other management than Bowie loamy sand, thick surface, 2 to 5 percent slopes. It is suited to moderately intensive cultivation. Under good management that includes intensive practices of erosion control, good yields may be produced. The soil is well suited to improved pasture of bermudagrass and bahiagrass, to trees, and for wildlife habitats. (Capability unit IIIes–2; woodland suitability group 4)

Carnegie Series

In the Carnegie series are deep, well-drained, and strongly acid soils that developed from stratified, acid sandy clay loam and sandy clay on nearly level to strongly sloping uplands. These soils have a very dark gray to dark-brown loamy sand to fine sandy loam surface layer that is underlain by strong-brown to red sandy clay loam to fine sandy clay at a depth of about 14 inches. The subsoil is moderately friable and porous and is underlain by distinctly mottled fine sandy clay loam to fine sandy clay parent material. These soils contain many iron pebbles throughout.

Carnegie soils generally occur with the Tifton, Ruston, and Faceville soils. Their subsoil is redder than that of the Tifton soils but is about the same color as the subsoil of the Ruston and Faceville soils. Carnegie soils have a finer textured and less friable subsoil than the Ruston soils. The concentration of iron pebbles is much greater throughout the Carnegie soils than throughout the Ruston and Faceville soils.

Carnegie soils occur throughout the northern half of the county but are most common in the northeastern part. Their total acreage is small. The native vegetation consists chiefly of longleaf pine, slash pine, hickory, various oaks, low shrubs, and native grasses. A considerable acreage has been cleared and is used for most cultivated crops and improved pasture grasses grown in the county.

Carnegie loamy sand, 2 to 5 percent slopes (CaB).—This well-drained, deep soil of the uplands has a well-

developed, clayey subsoil. Iron pebbles are abundant throughout the soil.

Representative profile in a bahiagrass pasture:

0 to 8 inches, very friable, dark-brown loamy sand.
8 to 18 inches, friable, yellowish-red light fine sandy clay loam.
18 to 50 inches, friable, yellowish-red heavy fine sandy clay loam.
50 to 80 inches +, firm, mottled strong-brown fine sandy clay loam.

The loamy sand plow layer ranges from very dark gray to dark brown. The subsoil is mainly yellowish red to red, but in some areas it is strong brown. It is dominantly heavy fine sandy clay loam but is coarser in some places. The subsoil is generally mottled below 42 inches, but in some areas brown and red mottles occur only 36 inches from the surface. The underlying parent material generally occurs at a depth of 52 to 74 inches, but it is as shallow as 45 to 50 inches in some areas.

Included with this soil are a few small areas with a sandy loam surface soil. Also included are a few small areas that have slopes of 0 to 2 percent and some small areas that are moderately sheet eroded.

This soil is strongly acid and has moderate natural fertility and organic-matter content. It is sufficiently loamy to have good tilth and good available water capacity. The available moisture capacity is moderate in the surface layer and is high in the subsoil. Permeability is moderately rapid in the surface layer and is moderately slow in the subsoil. The soil retains plant nutrients well and responds well to fertilizer. It has good surface and internal drainage and a moderately high cation-exchange capacity. The root zone is deep and well aerated and extends to the underlying mottled material.

This soil is well suited to all locally grown crops, pasture grasses, and clovers. It is well suited as woodland, and it makes good habitats for wildlife. (Capability unit IIe–1; woodland suitability group 4)

Carnegie loamy sand, 2 to 5 percent slopes, eroded (CaB2).—This moderately eroded soil generally has a thinner surface layer than Carnegie loamy sand, 2 to 5 percent slopes. Most of this soil is sheet eroded, but there are a few deep or shallow gullies in some areas. The surface layer ranges from 4 to 10 inches in thickness but is generally about 7 inches thick. The subsoil normally is mottled at a depth of 30 to 42 inches, but in a few areas mottling begins at 28 inches. The parent material generally occurs at a depth of 42 to 54 inches, but in a few areas it is at 38 to 42 inches. Included are a few, small, severely eroded areas that have a fine sandy loam surface layer.

This soil is well suited to all cultivated crops and improved pasture plants that are generally grown in the county. For high yields of cultivated crops, it requires more intensive use of soil-improving crops than Carnegie loamy sand, 2 to 5 percent slopes, and more intensive practices for control of erosion. It is well suited as woodland and makes good habitats for wildlife. (Capability unit IIe–1; woodland suitability group 4)

Carnegie loamy sand, 5 to 8 percent slopes, eroded (CaC2).—This sloping, eroded soil generally has a thinner surface layer than Carnegie loamy sand, 2 to 5 percent slopes. As a result of erosion and less soil development, the parent material is generally nearer the surface, or at a depth of 38 to 48 inches. Most areas have been uniformly sheet eroded, and some areas have a few deep or shallow gullies. The surface layer ranges from 4 to 10 inches in thickness but is generally about 6 inches thick. Mottling normally occurs 28 to 42 inches below the surface.

A few included areas are slightly eroded, and a few are severely sheet eroded. In the slightly eroded areas the surface layer is 10 to 14 inches thick. Also included with this soil are a few small areas that have slopes of 8 to 12 percent.

For high yields of cultivated crops, this soil requires more intensive management than Carnegie loamy sand, 2 to 5 percent slopes. Under good management that includes control of erosion, this soil is well suited to most locally grown crops. It is well suited as woodland, and it makes good habitats for wildlife. (Capability unit IIIe–1; woodland suitability group 4)

Cuthbert Series

In the Cuthbert series are deep, moderately well drained, strongly acid soils on gently sloping to steep areas of the uplands. These soils developed in thick beds of acid sandy clay and clay in which thin lenses of a coarse-textured material are intermixed. The surface layer of these soils is dark grayish-brown to dark-gray coarse sand to sandy clay loam that grades abruptly to a yellowish-red, firm sandy clay or clay subsoil. The lower part of the subsoil is dominantly red mottled with various shades of red, yellow, and brown. The subsoil is underlain by very slowly permeable, highly mottled, compact sandy clay parent material that is stratified with sandy loam or sandy clay in most areas.

Cuthbert soils generally occur with the Shubuta, Angie, and Lakeland soils. They have a thinner and more compact subsoil than the Shubuta soils. The Cuthbert soils are better drained and less friable than the Angie soils and have a thinner, more compact subsoil. The subsoil is dominantly red in the Cuthbert soils but is yellowish brown in the Angie soils. The subsoil is thin, yellowish red to red, compact, and fine textured in the Cuthbert soils but is thick, yellowish brown to yellow, loose, and coarse textured in the Lakeland soils.

Cuthbert soils have a moderate total acreage. They occur mainly in the central part of the county but are widely distributed in all parts except in the southeastern and south central. The native vegetation consists mainly of longleaf pine, slash pine, sweetgum, various oaks, dogwood, hickory, and wiregrass. Most of the acreage still remains in native vegetation. However, a few small areas have been cleared and are used for corn, small grain, and other cultivated crops and for improved pasture. Many areas that were cultivated have been abandoned and now are in broomsedge and scattered pines.

Cuthbert soils, 5 to 8 percent slopes (CuC).—These are moderately well drained soils of the uplands that have a dense, compact, clayey subsoil.

Representative profile in a wooded area:

0 to 9 inches, very friable, dark grayish-brown loamy sand.
9 to 13 inches, very firm, yellowish-red sandy clay.
13 to 21 inches, very firm, yellowish-red sandy clay mottled with brownish yellow and red.
21 to 42 inches +, firm, mottled sandy clay loam to sandy clay.

The plow layer ranges from very dark grayish-brown to dark-brown loamy sand to coarse sand. The subsoil is sandy clay to clay, 4 to 8 inches thick, that is not mottled in most areas but is mottled in some. The color of the subsoil is usually yellowish red but ranges to red. Underlying the subsoil in most places is highly mottled sandy clay loam to clay material. This material occurs at a depth of 11 to 24 inches and in most areas contains thin layers of sandy loam and sandy clay loam. In a few small areas the subsoil is underlain by very highly mottled, plastic clay.

Included with these soils are a few scattered areas that are moderately sheet eroded and have many shallow gullies or a few deep ones. Also included are small areas on slopes of 8 to 12 percent.

These soils are strongly acid and low in natural fertility and organic-matter content. Surface runoff is medium to rapid, and internal drainage is slow to medium. Permeability is rapid to moderately slow in the surface layer and is slow to very slow in the subsoil. Because the subsoil is dense and poorly aerated, it is not favorable for development of roots. A low available moisture capacity causes the soils to be droughty. These soils erode easily.

Under good management and intensive control of erosion, improved pasture is moderately good. These soils are best suited to pines, and they make good habitats for wildlife. (Capability unit VIes–1; woodland suitability group 5)

Cuthbert soils, 2 to 5 percent slopes (CuB).—These gently sloping soils are less susceptible to erosion than Cuthbert soils, 5 to 8 percent slopes.

Included with these soils are a few scattered areas that are moderately sheet eroded and have a few shallow gullies. The surface layer is thinner in these eroded areas and ranges from 3 to 7 inches in thickness. Also included with these soils are a few areas on slopes of 0 to 2 percent and some coarser textured areas that have numerous quartz pebbles throughout.

Cultivation on these soils is severely limited, but if cultivated the soils are best suited to shallow-rooted, close-growing crops. They are moderately well suited to improved pasture of bermudagrass and bahiagrass and are well suited as woodland and for wildlife habitats. (Capability unit IVes–2; woodland suitability group 5)

Cuthbert soils, 2 to 5 percent slopes, eroded (CuB2).—Although these soils are less sloping and more eroded than Cuthbert soils, 5 to 8 percent slopes, they are slightly less susceptible to further erosion. In most areas the surface layer is uniformly sheet eroded. The surface layer ranges from 3 to 7 inches in thickness but is generally about 5 inches thick. A few deep gullies occur in some areas. Included with these soils are a few, small, scattered areas that are only slightly eroded and a few that are severely eroded.

These soils have severe limitations for cultivated crops and, if cultivated, require intensive management that includes control of erosion. They can grow moderately good improved pasture, and they are well suited as woodland and for wildlife habitats. (Capability unit IVes–2; woodland suitability group 5)

Cuthbert soils, 5 to 8 percent slopes, eroded (CuC2).—These eroded soils generally have a thinner surface layer than Cuthbert soils, 5 to 8 percent slopes. In most areas the surface layer is uniformly sheet eroded, but there are some shallow gullies and a few deep ones. The surface layer is generally 5 inches thick, but the range is from 3 to 7 inches. Included with these soils are a few scattered areas that are severely eroded.

These soils are not suitable for cultivation. Under good management that provides intensive practices of erosion control, moderately good improved pasture can be grown. These soils are best suited to pines, and they make good habitats for wildlife. (Capability unit VIes–1; woodland suitability group 5)

Cuthbert sandy clay loam, 2 to 5 percent slopes, severely eroded (CtB3).—Although this soil is less sloping than Cuthbert soils, 5 to 8 percent slopes, it is much more eroded and has a much thinner surface layer. Nearly all of the surface soil has been removed by erosion, and only 1 to 3 inches remain in most areas. Consequently, subsoil material has been mixed with the remaining surface layer, and the plow layer is yellowish-brown to strong-brown sandy clay loam. In many areas small spots of the subsoil are exposed, and there are many shallow gullies and a few deep ones.

Most areas of this soil are no longer cultivated and have returned to native vegetation. This soil is not suited to cultivated crops or improved pasture. It is best suited as woodland and for wildlife habitats. (Capability unit VIIes–1; woodland suitability group 5)

Cuthbert sandy clay loam, 5 to 8 percent slopes, severely eroded (CtC3).—This severely eroded soil has a much thinner surface soil than Cuthbert soils, 5 to 8 percent slopes. Only 1 to 3 inches of the original surface soil remains in most areas. It has been mixed with material from the subsoil, and the plow layer is yellowish-brown to strong-brown sandy clay loam. In many areas small spots of the subsoil material are exposed, and there are many shallow gullies and a few deep ones.

Most areas of this soil are no longer cultivated and have returned to native vegetation. This soil is not suited to cultivated crops or improved pasture. It is best suited as woodland and for wildlife habitats. (Capability unit VIIes–1; woodland suitability group 5)

Cuthbert, Shubuta, and Lakeland soils, 5 to 12 percent slopes, severely eroded (CwD3).—One or more of these soils make up at least 75 percent of the mapped areas, but the proportion of each soil varies considerably from place to place. Most areas mapped contain lesser amounts of the Faceville, Norfolk, Ruston, Eustis, and Bowie soils, but the extent of these minor soils is highly variable. The Blanton, Klej, Lynchburg, Plummer, Rains, and Goldsboro soils also occur along drainageways within mapped areas of these soils. The dominant soils are on highly variable slopes and are in such intricate patterns that it is impractical to map them separately.

Because the soils differ greatly in texture and permeability, they vary somewhat in degree of erosion. Generally, the Lakeland and other deep sandy soils are less severely eroded than the Cuthbert, Shubuta, and other fine-textured soils. In the deep sandy soils, practically the only evidence of erosion is a few shallow or deep gullies. However, the fine-textured soils have had all or nearly all of the surface layer removed by sheet erosion. In these eroded areas the subsoil is exposed or has been mixed with the remaining surface layer. In some areas of the fine-textured soils much of the surface layer remains,

but many shallow and a few deep gullies occur. All these soils are susceptible to further erosion. Many hillsides on which these soils occur slope toward drainageways.

A representative profile of each soil in this unit is described in its respective series description.

The native vegetation consists principally of longleaf pine, slash pine, various oaks, low shrubs, and native grasses. Most areas that were cleared are no longer cultivated and are now almost entirely in trees.

These soils occur primarily in the west-central part of the county. Most areas are on or somewhat north of the highly dissected, generally north-facing escarpment that extends in an east-west direction between the higher, deep sandy soils to the south and the dominantly finer textured soils to the north. However, small areas occur in the eastern part of the county, principally on Orange, High, Oak, Rock, and Falling Water Hills.

Surface drainage ranges from medium to rapid, and internal drainage from very rapid to slow. Both surface drainage and internal drainage vary according to the various soils.

Included with these soils are small areas on slopes of 2 to 5 percent and small, scattered areas on slopes of 12 to 35 percent.

Because these soils are steep and severely eroded, they are not suited to cultivated crops or to pasture. The best uses are woodland and wildlife habitats. (Capability unit VIIes–1; woodland suitability group 5)

Dunbar Series

In the Dunbar series are deep, somewhat poorly drained, strongly acid soils that developed from thick beds of acid sandy clay material on nearly level to gently sloping uplands. These soils have a dark-gray to very dark grayish-brown loamy sand surface layer that, at a depth of less than 18 inches, is underlain by friable sandy clay loam. The sandy clay loam, in turn, is underlain by very firm clay to sandy clay. Under the surface layer, the material is light yellowish brown to olive brown mottled with various shades of yellow, brown, red, and gray. Mottling normally occurs at about 18 inches but is as shallow as 12 inches in some places, or as deep as 26 inches. The parent material is highly mottled sandy clay to clay that is stratified in some places with sandy clay loam.

The Dunbar soils generally occur with the Goldsboro, Lynchburg, Bowie, Bladen, and Eulonia soils. They are more poorly drained than the Goldsboro, Bowie, and Eulonia soils but are better drained than the Bladen soils. The subsoil of the Dunbar soils is finer textured and more slowly permeable than that of the Goldsboro and Lynchburg soils and is paler and more mottled than the subsoil of the Eulonia and Bowie soils. The Dunbar soils are less gray than the Bladen soils.

Dunbar soils have a small total acreage in this county. They are widely scattered in moderately large areas in the eastern and west-central parts of the county. The native vegetation consists mainly of longleaf pine, slash pine, a few scattered hardwoods, gallberry, low shrubs, and native grasses. Some areas have been cleared and are used for cultivated crops and improved pasture. This soil is well suited to improved pasture and to trees.

Dunbar loamy sand, 2 to 5 percent slopes (DuB).—This somewhat poorly drained soil of the uplands has a plastic, clayey subsoil.

Representative profile:

0 to 6 inches, very friable, dark-gray loamy sand.
6 to 13 inches, very friable, pale-brown loamy sand.
13 to 20 inches, friable, light yellowish-brown sandy clay loam.
20 to 52 inches +, very firm or plastic, mottled clay.

The top layer ranges from 2 to 6 inches in thickness and is dark-gray to very dark grayish-brown loamy sand that is underlain by pale-brown to light yellowish-brown loamy sand to sandy loam. Sandy clay loam is within 18 inches of the surface and is underlain by clay. Mottling normally occurs at a depth of 18 to 20 inches, but the depth to mottling ranges from 12 to 26 inches. The parent material is highly mottled sandy clay to clay that contains lenses of sandy clay loam in many places. It occurs at a depth ranging from 26 to more than 50 inches.

Included with this soil are a few, small, scattered areas that have slopes of 0 to 2 percent and a few areas that have a loamy fine sand surface layer.

This soil is strongly acid, is medium to low in organic-matter content and natural fertility, and is moderately high in available moisture capacity. External drainage is medium, and internal drainage is slow. Permeability is rapid in the surface layer and slow in the subsoil. This soil retains plant nutrients well and responds well to fertilizer.

Under good management, corn and small grain produce good yields. This soil is well suited to improved pasture and to trees, and it makes good wildlife habitats. (Capability unit IIIws–1; woodland suitability group 6)

Esto Series

In the Esto series are deep, moderately well drained to somewhat poorly drained, strongly acid soils that developed from clay and sandy clay on nearly level to sloping uplands. These soils have a grayish-brown to pale-brown sand to loamy sand surface layer 5 to 18 inches thick. Within 18 inches of the surface is a layer of pale-brown to light yellowish-brown, friable to firm sandy loam to sandy clay loam that is coarser textured in the upper part. This layer extends to a depth as great as 30 inches. The parent material is clay to sandy clay that is stratified with lenses of sandy clay loam in most places. It is highly mottled with various shades of yellow, brown, red, and gray.

The Esto soils occur mainly with the Cuthbert, Norfolk, Bowie, Angie, and Lynchburg soils. The subsoil of the Esto soils is less compact, more friable, and less red than that of the Cuthbert soils. The Esto soils are less well drained and have a much thinner solum than the Norfolk and Bowie soils. They have a slightly coarser textured subsoil than the Angie soils, and the transition from the surface layer to the subsoil is more gradual. The Esto soils have a much thinner solum and finer texture than the Lynchburg soils and are not so gray in the lower subsoil.

Esto soils have a very small total acreage in this county. They are in small, scattered areas throughout the northern half of the county and in a very small area in the southwestern part. The native vegetation consists

chiefly of longleaf pine, slash pine, various hardwoods, low shrubs, and native grasses. A few small areas are used for cultivated crops and improved pasture.

Esto loamy sand, 0 to 5 percent slopes (EaB).—This moderately well drained to somewhat poorly drained soil of the uplands has a sandy surface layer and a clayey subsoil.

Representative profile in a wooded area:

0 to 7 inches, loose, grayish-brown loamy sand.
7 to 15 inches, loose, pale-brown sand.
15 to 26 inches, friable, light yellowish-brown sandy clay loam.
26 to 36 inches, firm, pale-brown sandy clay that is mottled.
36 to 52 inches +, very firm, mottled clay that has lenses of sandy clay and sandy clay loam.

The plow layer ranges from grayish-brown to light grayish-brown sand to loamy sand. It is light grayish brown in most places and is underlain by pale-brown to light yellowish-brown sandy loam to fine sandy clay loam. At a depth that ranges from 12 to 30 inches, there is mottled clay to sandy clay that, in most places, is stratified with lenses of sand to sandy clay loam. Included with this soil are a few areas with slopes of 5 to 8 percent.

This soil is strongly acid and is low in natural fertility and organic-matter content. It has slow to medium surface drainage and slow internal drainage. Permeability is moderate in the surface layer and slow in the subsoil. Because the subsoil is moderately dense and poorly aerated, it is not favorable for the development of roots. The available moisture capacity is low in the surface layer and moderate in the subsoil. This soil does not retain plant nutrients well. Crops are damaged by excess water during periods of heavy rain and by drought during dry periods. The erosion hazard is serious because the soil is quickly saturated and runoff is rapid. This soil is poorly suited to most general farm crops, but moderately good improved pasture can be grown. It is well suited to pines and as a habitat for wildlife. (Capability unit IVes–2; woodland suitability group 5)

Eulonia Series

In the Eulonia series are deep, moderately well drained, strongly acid soils that developed from a thin deposit of sandy loam over clay to sandy clay. These soils are on nearly level to gently sloping uplands. The surface soil is black to dark grayish-brown loamy fine sand and is underlain by grayish-brown to light olive-brown loamy fine sand. Within 30 inches of the surface is light yellowish-brown to brownish-yellow, friable sandy loam to sandy clay loam. At a depth ranging from 18 to 38 inches is reticulately mottled yellowish-brown, gray, and red clay to sandy clay. The parent material is mottled red, yellow, and gray.

The Eulonia soils occur mainly with the Dunbar, Goldsboro, Bowie, Lynchburg, Bladen, and Rains soils. They are better drained than the Dunbar and Lynchburg soils, have a yellower subsoil, and are deeper to mottling. The Lynchburg soils do not have a fine-textured lower subsoil. Eulonia soils are similar to Goldsboro soils in the upper part of the profile but are finer textured and mottled with red in the lower part. They are less well drained than the Bowie soils and are more highly mottled in the lower subsoil. Eulonia soils are also better drained than the Bladen and Rains soils and are yellowish brown instead of gray.

Eulonia soils have a small total acreage in this county. They are in small to moderately large areas along and near Holmes Creek and the Choctawhatchee River. The native vegetation consists chiefly of longleaf pine, slash pine, various oaks, gallberry, low shrubs, and native grasses. A considerable part of the acreage has been cleared and is mostly used for improved pasture, but a few areas are used for corn, small grain, and other cultivated crops.

Eulonia loamy fine sand, 0 to 2 percent slopes (EfA).—This moderately well drained soil of the uplands has a compact, slowly permeable, clayey subsoil.

Representative profile in a moist wooded area:

0 to 6 inches, very friable, very dark gray loamy fine sand.
6 to 15 inches, very friable, light olive-brown loamy fine sand.
15 to 33 inches, friable, brownish-yellow fine sandy clay loam that is mottled below 25 inches.
33 to 65 inches +, very firm, mottled silty clay.

The plow layer ranges from black or very dark gray to dark grayish brown and from loamy fine sand to loamy sand. It is underlain by grayish-brown to light olive-brown loamy fine sand to loamy sand that extends to a depth of more than 18 inches in only a few places. Next in the profile is 10 to 30 inches of light yellowish-brown to brownish-yellow sandy loam to sandy clay loam underlain by compact sandy clay to clay that is highly mottled with gray, red, brown, and yellow. The parent material is also highly mottled and variable in texture. Included with this soil are small areas that have a fine sandy loam surface soil.

This soil is strongly acid, is low in natural fertility, and has a medium organic-matter content. The available moisture capacity is moderate in the surface layer and moderately high in the subsoil. Permeability is moderately rapid in the surface layer and slow in the subsoil. Surface drainage and internal drainage are medium to slow. During periods of high rainfall, deep-rooted crops may be damaged by excess water. The compact lower subsoil causes slow internal drainage and limits the effective root zone. Consequently, the kinds of crops that can be grown are somewhat limited.

If properly managed, this soil is moderately well suited to corn and small grain. It is well suited to improved pasture and to trees, and it makes good habitats for wildlife. (Capability unit IIws–3; woodland suitability group 6)

Eulonia loamy fine sand, 2 to 5 percent slopes (EfB).—This gently sloping soil has slightly faster runoff than Eulonia loamy fine sand, 0 to 2 percent slopes, and generally a lower water table. The steeper slopes make it slightly susceptible to erosion.

Included with this soil are small, scattered areas with a surface layer of fine sandy loam, loamy sand, or coarse sand.

This soil is suited to some cultivated crops, but the choice of crops is limited by a restricted root zone and slight wetness. Erosion is a hazard in unprotected areas. This soil is well suited to pasture and to trees. (Capability unit IIIew–1; woodland suitability group 6)

Eulonia loamy fine sand, thick surface, 0 to 2 percent slopes (EnA).—This moderately well drained soil of the uplands has a thick surface layer and a compact, clayey

subsoil that is mottled and slowly permeable. The surface layer is generally 18 to 30 inches thick, but it is less than 18 inches in some small areas and is slightly more than 30 inches thick in others.

Representative profile in a moist wooded site:

0 to 7 inches, very friable, very dark gray loamy fine sand.
7 to 20 inches, very friable, grayish-brown fine sand.
20 to 36 inches, friable, brownish-yellow light fine sandy clay loam that is mottled.
36 to 63 inches +, firm, mottled silty clay that is stratified with fine sandy clay loam below 45 inches.

This soil is strongly acid, is low in natural fertility, and has a medium organic-matter content. Available moisture capacity is moderate in the plow layer, low in the underlying layers, and moderately high in the subsoil. Permeability is moderately rapid in the surface layer and slow in the subsoil. Surface drainage and internal drainage are medium to slow. Because this soil remains slightly wet during periods of high rainfall, deep-rooted crops may be damaged.

Most locally grown crops can be grown on this soil, but it is best suited to corn and small grain. Because of periodic wetness, crop yields are sometimes low. The soil is well suited to improved pasture and trees, and it makes good wildlife habitats. (Capability unit IIws–3; woodland suitability group 6)

Eulonia loamy fine sand, thick surface, 2 to 5 percent slopes (EnB).—This gently sloping soil has more rapid runoff than Eulonia loamy fine sand, thick surface, 0 to 2 percent slopes, and generally a lower water table. It is more susceptible to erosion.

If properly managed, this soil is moderately well suited to some cultivated crops, but the choice of crops is limited by a shallow root zone and slight wetness. Periodic wetness causes low crop yields. This soil is well suited to improved pasture and trees and makes good habitats for wildlife. (Capability unit IIIew–1; woodland suitability group 6)

Eustis Series

In the Eustis series are deep, well-drained to excessively drained, strongly acid soils on nearly level to steep uplands. These soils developed from moderately thick beds of acid sand and loamy sand that are underlain by finer textured material at a depth of more than 30 inches. The surface layer of these soils is dark-gray to very dark grayish-brown coarse sand or sand. It is underlain by a layer of brown to dark-brown coarse sand or sand, and that, in turn, by strong-brown to yellowish-red coarse sand or sand. In the Eustis soils the coarse sand or sand generally extends from the surface to a depth of 60 inches or more. Some areas, however, have finer textured material at a depth of 30 to 42 inches. This material is normally strong-brown to red sandy loam to sandy clay loam.

Eustis soils occur mainly with the Lakeland, Ruston, and Norfolk soils. They are similar to the Lakeland soils in texture and consistence and to the Ruston soils in color. Eustis soils are strong brown to yellowish red instead of yellow to brownish yellow, as are the Lakeland and Norfolk soils. The coarse-textured layers extend to a greater depth in the Eustis soils than in the Norfolk and Ruston soils.

Eustis soils have a large total acreage in this county. They occur throughout the county but are mainly in the southern half. Areas with finer textured underlying material at a depth of 30 to 42 inches are most common in the central and northwestern parts of the county. The native vegetation consists chiefly of longleaf pine, turkey oak, bluejack oak, a few water oaks, and sparse native grasses. Most areas, especially those of coarse sand, remain in native vegetation. A fairly large acreage of the medium sand has been cleared and is cultivated.

Eustis coarse sand, 0 to 5 percent slopes (EsB).—This well-drained to excessively drained soil of the uplands is deep and rapidly permeable.

Representative profile in a wooded area:

0 to 5 inches, loose, very dark grayish-brown coarse sand
5 to 15 inches, loose, brown to dark-brown coarse sand.
15 to 96 inches +, loose, yellowish-red coarse sand.

The plow layer ranges from dark-gray to very dark grayish-brown coarse sand. It is underlain by brown to dark-brown coarse sand, and that, in turn, by strong-brown to yellowish-red coarse sand. Mottles normally occur below a depth of 60 inches, but in some areas they are as shallow as 48 inches. The finer textured material is generally at a depth of slightly more than 72 inches, but in some areas it is at 60 inches. It is normally yellowish red to red.

Included with this soil are a few small areas of sand and very coarse sand. In a few places water and wind have removed some of the surface soil.

This soil is droughty and very rapidly permeable. It is very low in content of organic matter, natural fertility, cation-exchange capacity, and available moisture capacity. It does not hold plant nutrients well. Because of poor soil qualities, this soil has severe limitations in producing general farm crops.

Except for watermelons and a few other special crops, this soil is not suitable for cultivated crops. It is only moderately well suited to improved pasture. Most areas are best suited to trees. (Capability unit VIse–1; woodland suitability group 1)

Eustis coarse sand, 5 to 8 percent slopes (EsC).—This sloping soil is more susceptible to erosion than Eustis coarse sand, 0 to 5 percent slopes. It has slightly lower available moisture capacity, organic-matter content, and natural fertility. A few scattered areas with shallow or deep gullies occur.

This soil is too droughty and too low in fertility for cultivated crops. Fair to good yields of bahiagrass and other drought-resistant grasses can be obtained under good management. Although natural reproduction of pines is poor on this soil, most areas are best suited to trees. (Capability unit VIse–1; woodland suitability group 1)

Eustis coarse sand, 8 to 12 percent slopes (EsD).—This soil occurs on moderately long, narrow slopes adjacent to sinks and drainageways. It is steeper than Eustis coarse sand, 0 to 5 percent slopes, and more susceptible to erosion. A few areas have a few shallow or deep gullies. The depth to finer textured material normally ranges from 60 to 72 inches.

This soil is not suited to cultivated crops, but under good management, fair yields of bahiagrass can be obtained. The soil is moderately well suited to pines, and most of it remains in trees. (Capability unit VIse–1; woodland suitability group 1)

Eustis coarse sand, 12 to 35 percent slopes (EsE).—This soil occurs on moderately steep to steep slopes that are generally adjacent to sinks and drainageways. It is much steeper than Eustis coarse sand, 0 to 5 percent slopes, and is much more susceptible to erosion.

Included with this soil are small areas that have slopes of 8 to 12 percent and of 35 to 50 percent. Also included are a few moderately eroded areas that have many shallow gullies, a few deep ones, or both.

This soil is not suited to cultivated crops and pasture; it is best suited as woodland and for wildlife habitats. (Capability unit VIIse–1; woodland suitability group 1)

Eustis sand, 0 to 5 percent slopes (EtB).—This soil has a higher available moisture capacity and a higher cation-exchange capacity than Eustis coarse sand, 0 to 5 percent slopes. Also, it is not so coarse textured as the coarse sand, and sandy loam to sandy clay is at a depth of 42 to 60 inches. Included with this soil are a few small areas of coarse sand and a few small areas of fine sand.

The use of this soil is limited to corn, watermelons, and a few other crops. It is moderately well suited to bahiagrass pasture, but most areas are best suited as woodland. (Capability unit IVse–2; woodland suitability group 2)

Eustis sand, 5 to 8 percent slopes (EtC).—Because this soil has stronger slopes than Eustis sand, 0 to 5 percent slopes, it is more susceptible to erosion.

Included are a few scattered areas that are moderately eroded and have a few scattered, shallow gullies. Also included are a few areas of fine sand and of coarse sand and a few scattered areas with slopes of 8 to 12 percent. In some of these strongly sloping areas, fine-textured material is at a depth of 30 to 42 inches.

Under good management that includes intensive practices to control erosion, this soil may be used occasionally for corn, small grain, watermelons, and other crops. It is moderately well suited to trees and to bahiagrass and other deep-rooted, drought-resistant pasture plants. It makes good habitats for wildlife. (Capability unit IVse–2; woodland suitability group 2)

Eustis sand, shallow, 0 to 5 percent slopes (EuB).—This deep, well-drained soil of the uplands has a sand surface layer and either sandy loam or sandy clay loam material at a depth of 30 to 42 inches.

Representative profile in an idle field:

0 to 7 inches, loose, dark grayish-brown sand.
7 to 24 inches, loose, strong-brown sand.
24 to 33 inches, very friable, strong-brown loamy sand.
33 to 65 inches +, friable, strong-brown, mottled sandy loam or sandy clay loam.

The plow layer ranges from gray to dark grayish brown and is underlain by a layer of strong brown to yellowish red. In most areas sand extends from the surface to a depth of 30 to 42 inches and is underlain by finer textured material. In a few areas the finer textured material is slightly less than 30 inches from the surface, and in others it is a little more than 42 inches. In some areas many medium-sized and small iron pebbles occur throughout the soil.

Included with this soil are a few areas that have a few shallow or deep gullies. Also included are areas of fine sand and areas of coarse sand.

This soil is strongly acid and is low in organic-matter content. It has a deep root zone, but water moves rapidly through the soil and causes rapid leaching of plant nutrients. The available moisture capacity and natural fertility are low. Permeability is rapid above the finer textured underlying materials, but it is generally moderately rapid through them.

This soil is only moderately well suited to most locally grown crops and is best suited to corn, small grain, and watermelons. It is well suited to deep-rooted pasture grasses and as woodland, and it makes good habitats for wildlife. (Capability unit IIIse–1; woodland suitability group 3)

Eustis sand, shallow, 5 to 8 percent slopes (EuC).—This sloping soil has more rapid runoff than Eustis sand, shallow, 0 to 5 percent slopes, and is slightly susceptible to erosion. Some small areas are moderately eroded and have scattered, shallow or deep gullies.

Under good management that includes intensive practices to control erosion, this soil may be used occasionally for corn, small grain, watermelons, and a few other crops. It is moderately well suited to trees and to bahiagrass and other deep-rooted, drought-resistant pasture plants. It makes good habitats for wildlife. (Capability unit IVse–2; woodland suitability group 3)

Faceville Series

In the Faceville series are deep, well-drained, strongly acid soils that developed from thick beds of acid sandy clay loam and sandy clay on nearly level to sloping uplands. These soils have a dark grayish-brown to brown loamy sand surface layer. Within a depth of 14 inches, the surface layer is underlain by a strong-brown to yellowish-red, moderately friable to firm layer. In most areas the upper few inches of this layer is light sandy clay loam, but most of it is heavy fine sandy clay loam to fine sandy clay. The parent material is clay loam to sandy clay loam that is highly variable in color but is generally yellowish brown to red mottled with gray or white.

Faceville soils occur mainly with the Carnegie, Tifton, Marlboro, Ruston, and Norfolk soils. They lack the large number of iron pebbles that characterize the Carnegie and Tifton soils. The subsoil of the Faceville soils is redder than that of the Marlboro, Norfolk, and Tifton soils. The Faceville soils are similar to the Ruston soils in color but have a less friable and finer textured subsoil than the Ruston and the Norfolk soils. The transition from the surface layer to the subsoil is generally more abrupt in the Faceville soils than in the Ruston.

Faceville soils have a small total acreage in this county. They are most common in the northeastern part near Chipley, but small areas are scattered in the northern part. The native vegetation is mainly longleaf pine, slash pine, various oaks, hickory, dogwood, and native grasses. The soils are well suited to many kinds of cultivated crops, to improved pasture, and to trees. Much of the acreage has been cleared and is planted to corn, cotton, peanuts, and small grain.

Faceville loamy sand, 2 to 5 percent slopes, eroded (FaB2).—This soil of the uplands is deep and well drained. It has a yellowish-red, firm, moderately fine textured subsoil.

Representative profile in a gently sloping pasture of bahiagrass:

0 to 8 inches, very friable, dark grayish-brown loamy sand.
8 to 16 inches, friable, strong-brown light sandy clay loam.
16 to 38 inches, firm or sticky, yellowish-red heavy fine sandy clay loam.
38 to 46 inches, firm or very sticky, yellowish-red heavy fine sandy clay loam that has few, dark-red and common, brownish-yellow mottles.
46 to 63 inches +, very firm or sticky, highly mottled heavy fine sandy clay loam.

The plow layer ranges from brown to dark grayish-brown loamy sand. The upper few inches of the subsoil is heavy sandy clay loam. The lower part is strong-brown to yellowish-red light sandy clay loam to fine sandy clay. Strong-brown and red mottles generally occur at a depth of 32 to 40 inches, but in some places they are at a depth of 28 inches. The underlying material is generally at a depth of 42 to 50 inches, but the range in depth is 32 to 62 inches. It is highly mottled sandy clay loam to sandy clay.

Included with this soil are a very few small areas that have a surface layer of loamy fine sand. Also included are a very few small spots that are severely sheet eroded. In these severely eroded areas the surface layer is fine sandy loam and is redder than normal because material from the subsoil has been mixed with it. The subsoil is red in a few small areas.

This soil is strongly acid, is moderately high in natural fertility, and responds well to fertilizer. The available moisture capacity is moderate in the surface layer and high in the subsoil. Permeability is moderately rapid in the surface layer and moderately slow in the subsoil. The root zone is deep, well aerated, and sufficiently loamy to have good tilth.

This soil is well suited to most crops grown in the county, but practices to control erosion and other good management are needed for high yields. This soil is also well suited to improved pasture and trees. It makes good habitats for wildlife. (Capability unit IIe–1; woodland suitability group 4)

Faceville loamy sand, 2 to 5 percent slopes (FaB).—This soil is less eroded than Faceville loamy sand, 2 to 5 percent slopes, eroded, and has a thicker surface layer. The surface layer is 10 to 14 inches thick. Mottling generally occurs at a depth of 36 to 48 inches, but in some areas it is as shallow as 30 to 36 inches.

Included with this soil are a few small areas with slopes of 0 to 2 percent and a very few small spots that are moderately eroded.

This soil requires less intensive management for high yields than Faceville loamy sand, 2 to 5 percent slopes, eroded. It is well suited to all general crops grown in the county and to improved pasture. (Capability unit IIe–1; woodland suitability group 4)

Faceville loamy sand, 5 to 8 percent slopes, eroded (FaC2).—Most areas of this soil are uniformly sheet eroded, but there are a few shallow gullies in some places. The surface layer ranges from 4 to 10 inches in thickness but is generally about 5 inches thick. Mottles normally are at a depth of 30 to 42 inches, and the mottled parent material generally is at 38 to 48 inches.

Included with this soil are a few small spots that are severely sheet eroded and a few areas that are only slightly eroded. Also included are a few small areas on slopes of 8 to 12 percent.

This soil requires good management that includes more intensive practices to control erosion than those required on Faceville loamy sand, 2 to 5 percent slopes, eroded. It has been eroded enough to lower crop yields, and it is only moderately well suited to cultivated crops. It is well suited to pasture and to trees. (Capability unit IIIe–1; woodland suitability group 4)

Goldsboro Series

In the Goldsboro series are deep, moderately well drained, strongly acid soils that developed from thick beds of acid sandy loam and sandy clay loam on nearly level to sloping uplands. The surface layer is loamy coarse sand to coarse sand that is very dark gray to dark grayish brown in the upper part and is grayish brown to light olive brown in the lower. Within 30 inches of the surface is yellow to yellowish-brown sandy loam to fine sandy clay loam. Faint mottles of pale brown, pale yellow, and strong brown normally occur about 24 inches below the surface. These mottles increase in intensity with depth, and gray mottles occur below 30 inches. The parent material is distinctly mottled sandy clay loam.

Goldsboro soils occur mainly with soils of the Norfolk, Klej, Bowie, Lynchburg, Marlboro, Tifton, and Ruston series. They are not so well drained as the Norfolk, Marlboro, Tifton, and Ruston soils but are better drained than the Lynchburg soils. The subsoil is yellow in the Goldsboro soils instead of strong brown to red, as it is in the Ruston soils. The yellow in the upper subsoil is similar to the yellow in the upper subsoil of the Norfolk, Bowie, Tifton, and Marlboro soils. The lower part of the subsoil is faintly mottled like the upper part of the subsoil in the Lynchburg soils. Goldsboro soils are finer textured than Klej soils.

Goldsboro soils have a moderately large total acreage in the county and are widely distributed except in the southern half. Some areas in the northeastern part are large. The native vegetation consists chiefly of longleaf pine, slash pine, sweetgum, various oaks, gallberry bushes, and native grasses. Only a moderately small part of these soils is used for cultivated crops, but the soils are well suited to crops that tolerate slight wetness. A considerable acreage is used for improved pasture.

Goldsboro loamy coarse sand, 0 to 2 percent slopes (GdA).—This moderately well drained soil of the uplands has a friable, moderately fine textured subsoil.

Representative profile in a wooded area:

0 to 6 inches, very friable, very dark gray loamy coarse sand.
6 to 11 inches, very friable, light olive-brown loamy coarse sand.
11 to 34 inches, friable, brownish-yellow sandy clay loam mottled with yellowish brown and very pale brown below 26 inches.
34 to 64 inches +, friable, mottled sandy clay loam.

The surface layer ranges from very dark gray to dark grayish brown and is underlain by light olive-brown to grayish-brown material. Sandy loam to sandy clay loam occurs within 18 inches of the surface. The subsoil is yellow to yellowish brown mottled with pale brown, pale yellow, and strong brown. Mottling normally begins at a depth of 24 to 30 inches, but in some areas it is as shallow as 20 inches or as deep as 36 inches. The mottles

increase with increasing depth. The underlying material is highly mottled sandy clay loam. Many small iron concretions occur throughout the subsoil in a few areas, especially where this soil is associated with the Tifton soils.

Included with this soil are a few small areas that have a loamy sand surface layer. In a few areas the layer is slightly thicker than 18 inches.

This soil is strongly acid and has moderate natural fertility and medium organic-matter content. It is sufficiently loamy to have good tilth, and the available moisture capacity is good. Permeability is rapid to moderately rapid in the surface layer and moderate in the subsoil. Runoff is slow to medium, and internal drainage is medium. The soil retains plant nutrients well and responds well to fertilizer.

This soil has a deep root zone and is well suited to most locally grown crops. Suitable crops are limited to those that tolerate periodic wetness. Improved pasture and pines grow well. (Capability unit IIws–2; woodland suitability group 6)

Goldsboro loamy coarse sand, 2 to 5 percent slopes (GdB).—This gently sloping soil has more rapid runoff than Goldsboro loamy coarse sand, 0 to 2 percent slopes, and generally has a lower water table. In a few scattered areas the surface layer is slightly thicker than 18 inches.

If properly managed, this soil is well suited to most locally grown crops, but yields of some crops are low because drainage is restricted. The soil is best suited to corn and small grain, but it is well suited to improved pasture and trees and makes good habitats for wildlife. (Capability unit IIws–2; woodland suitability group 6)

Goldsboro loamy coarse sand, 5 to 8 percent slopes (GdC).—This sloping soil has more rapid runoff than Goldsboro loamy coarse sand, 0 to 2 percent slopes, and a lower water table. It is susceptible to erosion. In a few scattered areas the surface layer is slightly thicker than 18 inches.

Under good management that includes intensive control of erosion, this soil may be used occasionally for corn, small grain, and other crops. It is well suited to trees and to improved pasture. Most of the locally grown pasture grasses and legumes are suitable on this soil. This soil makes good habitats for wildlife. (Capability unit IVew–1; woodland suitability group 6)

Goldsboro coarse sand, thick surface, 0 to 2 percent slopes (GcA).—This moderately well drained soil of the uplands has a surface layer that is generally 18 to 30 inches thick. It has a friable, moderately fine textured subsoil.

Representative profile in a wooded area:

0 to 8 inches, very friable, very dark gray coarse sand.
8 to 20 inches, very friable, light olive-brown loamy sand.
20 to 36 inches, friable, light yellowish-brown light sandy clay loam mottled below 24 inches with yellowish brown and very pale brown.
36 to 55 inches +, firm, mottled light yellowish-brown, yellowish-brown, strong-brown, and light brownish-gray sandy clay loam.

In a few areas the depth to sandy clay loam is slightly less than 18 inches. In other areas it is slightly more than 30 inches.

This soil is strongly acid, and it has moderate natural fertility and medium organic-matter content. Available moisture capacity is moderately high. Permeability is rapid in the surface layer and moderate in the subsoil. Runoff is slow to medium, and internal drainage is medium. Plant nutrients leach rapidly from the thick surface layer, but the response to fertilizer is good.

Most locally grown crops are suited to this soil, but corn and small grain are best suited. Because this soil is wet periodically, crop yields are sometimes low. Improved pasture, trees, and wildlife habitats are good uses. (Capability unit IIws–2; woodland suitability group 6)

Goldsboro coarse sand, thick surface, 2 to 5 percent slopes (GcB).—This gently sloping soil has more rapid runoff than Goldsboro coarse sand, thick surface, 0 to 2 percent slopes, and generally a lower water table. In a few small areas the sandy surface layer is slightly thinner than 18 inches or slightly thicker than 30 inches.

If properly managed, this soil is well suited to most locally grown crops, but yields of some crops are low because drainage is restricted. The soil is best suited to corn and small grain, but it is also well suited to improved pasture and trees. It makes good habitats for wildlife. (Capability unit IIws–2; woodland suitability group 6)

Goldsboro coarse sand, thick surface, 5 to 8 percent slopes (GcC).—This sloping soil has more rapid runoff than Goldsboro coarse sand, thick surface, 0 to 2 percent slopes, and normally a lower water table. Erosion is likely if the soil is cultivated. Under good management this soil may be used occasionally for corn, small grain, and other crops. The soil is well suited to most locally grown pasture grasses and to trees. It makes good habitats for wildlife. (Capability unit IVew–1; woodland suitability group 6)

Grady Series

In the Grady series are deep, poorly drained or very poorly drained, strongly acid soils that developed from thick beds of acid sandy clay and clay. These soils occur on uplands in low, nearly level depressions that have poor natural outlets for drainage. The surface layer is black to dark-gray fine sandy loam to loam that is 3 to 6 inches thick and is underlain in some areas by a thin layer of dark-gray to gray fine sandy loam to fine sandy clay loam. Normally this thin layer is abruptly underlain, at a depth of about 6 to 8 inches, by dark-gray to light-gray, tough, plastic fine sandy clay to clay that is mottled with yellowish brown and yellowish red. The parent material is highly mottled fine sandy clay to clay.

Grady soils generally occur with soils of the Rains, Lynchburg, Goldsboro, Tifton, Norfolk, and Marlboro series. They have a finer textured subsoil than the Rains soils but are similar in most other respects. Grady soils are more poorly drained than Lynchburg and Goldsboro soils and are much grayer and finer textured in the subsoil. They are much more poorly drained than Tifton, Norfolk, and Marlboro soils, and they have a much lighter colored, more plastic, and finer textured subsoil.

Grady soils occur in small, widely scattered areas throughout most of the county except the southern half. The total acreage is very small. These soils are most common in the northeastern part of the county. The native vegetation consists principally of blackgum, cy-

press, sweetgum, and various pond grasses. Most areas of these soils are still in native vegetation. A few small areas have been cleared but are now idle. These soils are not suitable for cultivation.

Grady loam (Gr).—This poorly drained soil of the uplands has a thin, loamy surface soil and a plastic, clayey subsoil.

Representative profile in a wet, wooded area:

0 to 6 inches, friable, black loam.
6 to 17 inches, very firm or sticky, dark-gray fine sandy clay.
17 to 49 inches, extremely firm or very plastic clay that is dark gray and gray mottled with yellowish brown in the upper part and is light gray mottled with yellowish brown and yellowish red in the lower part.
49 to 55 inches +, extremely firm or very plastic, mottled yellowish-red, strong-brown, yellowish-brown, very pale brown, and light-gray clay.

The surface layer is loam that ranges from black to dark gray in most places, but a few small spots of fine sandy loam are included. Normally the surface layer grades abruptly to tough, plastic fine sandy clay to clay. The subsoil is dark gray to gray in the upper part and is light gray in the lower part. A few mottles of yellowish brown and yellowish red normally occur throughout the subsoil. The subsoil is underlain by distinctly mottled fine sandy clay to clay.

This soil is strongly acid and has moderate natural fertility and high organic-matter content. Surface drainage is poor, and permeability is very slow in the subsoil. Aeration is very poor, and the root zone is shallow. Drainage from the small depressions is underground. Artificial drainage is difficult because this soil generally does not have suitable outlets. Flooding is likely, and most areas are covered with water much of the time. Tilth is generally poor.

This soil is not suited to cultivated crops. It produces fair pasture if it is adequately drained and intensively managed. Pines grow well in drained areas, but undrained areas are suitable only for water-tolerant hardwoods and wildlife habitats. (Capability unit Vws–1; woodland suitability group 9)

Gullied Land

This land type consists of soils that have been gullied to such an extent that they cannot be cultivated.

Gullied land (Gu).—The soils of this land type have an intricate network of many, recently formed, deep and shallow gullies. Except in small patches or in small narrow strips between the gullies, all the surface soil has been removed (fig. 2). Slopes range from 5 to more than 12 percent and generally are more than 12 percent. The gullies have cut into soils that range from sandy to clayey. They are more than 5 feet deep and have steep sides. In most areas erosion is still active, but a few of the gullied areas are stabilized.

Gullied land occurs with many kinds of soils and is principally in the central part of the county. The total acreage in the county is very small. The main vegetation is a few slash pines and various oaks. None of this land is tilled, and in its present condition it has little or no value for grazing. It can be used as wildlife habitats. (Capability unit VIIse–2; woodland suitability group 12)

Figure 2.—**Gullied land. This land has been destroyed for agricultural use by erosion.**

Klej Series

In the Klej series are deep, moderately well drained, strongly acid soils that occur on uplands in nearly level to sloping areas. These soils developed from thick beds of acid sand and loamy sand that are underlain by sandy clay loam and sandy clay. Sand or fine sand extends from the surface to a depth of more than 42 inches in most places, but in some places finer textured material occurs at a depth of 30 inches. The surface layer is gray or very dark gray to yellowish brown or yellow. Mottles of various shades of yellow and brown normally occur at a depth of 16 to 30 inches, but in some areas mottling is as shallow as 14 inches or as deep as 36 inches. As depth increases, the soil is more distinctly mottled with various shades of yellow, brown, white, and gray.

Klej soils most commonly occur with the Lakeland, Blanton, Goldsboro, Plummer, and Scranton soils. They are not so well drained as the Lakeland soils and are mottled much nearer the surface. The surface layer of the Klej soils is similar to that of the Blanton soils, but the underlying layer is dominantly yellow instead of gray. Coarse-textured material extends to a much greater depth in the Klej soils than in Goldsboro soils. The Klej soils are much better drained than Plummer soils. They are better drained than the Scranton soils, which have a thick, black or very dark gray, highly organic surface layer.

In this county Klej soils have a fairly large, widely distributed total acreage. Although most areas are relatively small, some large areas occur in the southern half of the county. The native vegetation consists chiefly of longleaf pine, slash pine, myrtle, gallberry bushes, various oaks, and wiregrass. Most areas, especially the more sandy ones, remain in native vegetation. Some areas, however, have been cleared and are used for corn, small

grain, and other crops. A moderate acreage is used for improved pasture.

Klej sand, 0 to 5 percent slopes (KgB).—This is a moderately well drained, deep sandy soil of the uplands.

Representative profile in a wooded area:

0 to 6 inches, loose, very dark gray sand.
6 to 16 inches, loose, light yellowish-brown sand.
16 to 32 inches, loose, brownish-yellow sand with strong-brown mottles and streaks of light gray.
32 to 90 inches +, loose, mottled brownish-yellow, light-gray, and strong-brown sand.

The plow layer ranges from very dark gray to dark gray. To a depth of about 30 inches it is underlain by layers that range from yellowish brown to yellow. Mottles of pale brown to strong brown normally occur at a depth of 14 to 30 inches, and there are a few streaks of gray in many places. Below 30 inches the number of mottles is variable, but the gray mottles normally increase with increasing depth.

Included with this soil are a few areas of fine sand and of coarse sand. In a few small areas the finer textured underlying material is slightly less than 42 inches from the surface. A few small spots are somewhat poorly drained.

This soil is strongly acid, has low natural fertility and organic-matter content, and does not retain plant nutrients well. Surface runoff is slow, and a shallow water table restricts internal drainage. However, only a little moisture is available above the water table. Water moves rapidly through the root zone and rapidly leaches plant nutrients. The permeability is very rapid, and the cation-exchange capacity is very low. Because of these poor soil qualities, this soil is limited in its suitability for cultivated crops.

Under good management, this soil produces moderate yields of corn and small grain. Bahiagrass and other drought-resistant, deep-rooted pasture grasses do well. This soil is well suited to trees, and it makes good habitats for wildlife. (Capability unit IIIse–2; woodland suitability group 7)

Klej sand, 5 to 8 percent slopes (KgC).—This sloping soil has better surface drainage than Klej sand, 0 to 5 percent slopes, and normally a lower water table.

Included with this soil are a few small areas of fine sand or coarse sand, and a few areas with scattered, shallow gullies and rills. In a few small, scattered areas the finer textured underlying material is slightly less than 42 inches from the surface.

This soil is more susceptible to erosion than Klej sand, 0 to 5 percent slopes, and requires more intensive management if cultivated. It is better suited to improved pasture and trees than to crops, and it makes good wildlife habitats. (Capability unit IVse–1; woodland suitability group 7)

Klej fine sand, 0 to 5 percent slopes (KaB).—This finer textured soil has a slightly higher available moisture capacity than Klej sand, 0 to 5 percent slopes, and plant nutrients do not leach quite so rapidly. It is better suited to cultivated crops and pasture grasses than the coarse sand.

Included with this soil are small, scattered areas that have slopes of 5 to 8 percent and scattered areas where finer textured material is at a depth of 30 to 42 inches.

Almost all of this soil is near the Choctawhatchee River. It is moderately well suited to corn, small grain, and other crops. Pasture grasses make good growth if well managed. The soil is well suited to trees and makes good wildlife habitats. (Capability unit IIIse–2; woodland suitability group 7)

Klej sand, shallow, 0 to 5 percent slopes (KsB).—This deep, moderately well drained soil of the uplands has sandy loam or sandy clay loam at a depth of 30 to 42 inches.

Representative profile in a carpetgrass pasture:

0 to 8 inches, very friable, dark-gray sand.
8 to 35 inches, loose, yellow sand mottled with brownish yellow and strong brown below 17 inches.
35 to 53 inches +, firm, highly mottled brownish-yellow sandy clay loam.

The sand plow layer ranges from gray to dark gray in color and is underlain by layers of sand that range from yellowish brown to yellow and extend to a depth of about 30 to 36 inches. Pale-brown to strong-brown mottles normally occur at a depth of 14 to 30 inches, but in a few small areas they are as deep as 36 inches. A few streaks of gray occur in the soil in many areas. A sandy loam to sandy clay loam begins 30 to 42 inches below the surface. This finer textured material varies considerably in color, but normally is yellow to pale brown and is highly mottled.

Included with this soil are a few areas of fine sand. In a few small areas the finer textured material is slightly above 30 inches or is slightly below 42 inches. A few small spots are somewhat poorly drained.

This soil is strongly acid and is low in organic-matter content, natural fertility, and available moisture capacity. Water moves rapidly through the root zone and rapidly leaches plant nutrients. However, the available moisture capacity is somewhat higher than in Klej sand, 0 to 5 percent slopes, because the finer textured material is nearer the surface. Permeability is very rapid in the sand but is only moderately rapid in the finer textured material. Poor soil qualities restrict the use of this soil for cultivated crops.

Under good management this soil produces moderate yields of corn and small grain. It is better suited to pasture grasses and to trees than to crops, and it makes good wildlife habitats. (Capability unit IIIse–2; woodland suitability group 7)

Klej sand, shallow, 5 to 8 percent slopes (KsC).—This stronger sloping soil has better surface drainage than Klej sand, shallow, 0 to 5 percent slopes, and normally a lower water table.

Included with this soil are a few small areas of fine sand and a few areas with scattered gullies and rills.

This soil is more susceptible to erosion than Klej sand, shallow, 0 to 5 percent slopes, and requires more intensive management if cultivated. Improved pasture, trees, and wildlife habitats are better on this soil than cultivated crops. (Capability unit IVse–1; woodland suitability group 7)

Lakeland Series

In the Lakeland series are deep, well-drained to excessively drained, strongly acid sandy soils on nearly level to steep uplands. These soils developed from thick beds of acid sand and loamy sand that are underlain by finer textured material at a depth of more than 30 inches.

In the Lakeland soils coarse sand to fine sand extends from the surface to a depth that ranges from about 30 inches to more than 72 inches and is more than 72 inches in most places. The surface layer, about 7 inches thick, is gray or dark gray to dark grayish brown and is underlain by 4 to 8 inches of light yellowish-brown material. Next in the soil profile is a thick layer that is yellow to yellowish brown. Below a depth of 42 inches in some areas, the sandy layers are pale brown mottled with yellowish brown, brownish yellow, light gray, or white. The fine-textured underlying material ranges from sandy loam to sandy clay. It varies in color and is highly mottled in most places.

Lakeland soils occur mainly with the Eustis, Blanton, Norfolk, and Klej soils. The deep sandy layer in the Lakeland soils is yellow to yellowish brown instead of strong brown to yellowish red as it is in the Eustis soils. To a depth of more than 30 inches the Lakeland soils are coarser textured than the Norfolk soils, but they are similar to the Norfolk soils in color. Lakeland soils are better drained than the Klej soils and are not mottled with so many colors. They are generally better drained than the Blanton soils and are yellow instead of light gray and very pale brown.

The Lakeland soils occur throughout the county in a large total acreage. Most of the acreage is in the southern half of the county and has a coarse sand surface layer. The areas of coarse sand are more droughty than areas of medium sand that occur elsewhere in the county. Most of the areas of medium sand are in the northern part of the county, but a moderately large acreage is near Ebro.

The native vegetation consists chiefly of turkey oak, blackjack oak, scattered longleaf pine, a few water oaks, and wiregrass. In the southwestern part of the county the stands of longleaf and slash pines are larger than in other parts, and they are almost pure stands with only a few scattered scrub oaks. A few areas have vegetation typical of hammocks. In the southern part of the county, most of these soils remain in forest. However, a considerable acreage of Lakeland soils has been cleared and is in cultivated crops and improved pasture. Cultivated areas occur particularly in the northern part of the county, where these soils occur with better soils.

Lakeland coarse sand, 0 to 5 percent slopes (LaB).—This well-drained to excessively drained soil of the uplands is deep and very rapidly permeable.

Representative profile in a wooded area:

0 to 5 inches, loose, dark-gray coarse sand.
5 to 14 inches, loose, light yellowish-brown coarse sand.
14 to 43 inches, loose, yellow coarse sand.
43 to 100 inches +, loose, very pale brown coarse sand mottled with brownish yellow and yellowish brown.

Coarse sand extends from the surface to a depth that ranges from 60 inches to many feet. The plow layer is gray or dark gray to grayish brown and is underlain by layers of light yellowish brown or yellow to brownish yellow. Generally, the light yellowish brown occurs in only the upper few inches. Mottles normally occur below a depth of 42 inches, but in the southwestern and northern parts of the county, splotches of pale brown, very pale brown, or yellowish brown are at a depth of 30 inches in some places. Fine-textured material is generally at a depth of many feet but is as shallow as 60 inches in some places (fig. 3).

Figure 3.—**Lakeland coarse sand, 0 to 5 percent slopes. In some Lakeland soils, sand is abruptly underlain by a sandy clay substratum 42 to 60 inches below the surface.**

Included with this soil are small, scattered areas of sand or very coarse sand.

This soil is droughty and very rapidly permeable throughout. It is very low in organic-matter content, natural fertility, cation-exchange capacity, and available moisture capacity. It does not retain plant nutrients well. Because of these poor qualities, this soil is severely limited in its production of general farm crops.

Except for watermelons and a few other special crops, the soil is not suitable for cultivation. It is only moderately well suited to improved pasture. Most areas are best suited to trees. (Capability unit VIse–1; woodland suitability group 1)

Lakeland coarse sand, 5 to 8 percent slopes (LaC).—This soil is steeper than Lakeland coarse sand, 0 to 5 percent slopes, and is more susceptible to erosion. It has slightly lower available moisture capacity, organic-matter content, and natural fertility. A few shallow or deep gullies occur in a few scattered areas.

This soil is too droughty and too low in fertility for cultivation. Fair to good yields of bahiagrass and other drought-resistant grasses can be obtained under good management. Although natural reproduction of pines is poor on this soil, the best use for most areas is trees. (Capability unit VIse–1; woodland suitability group 1)

Lakeland coarse sand, 8 to 12 percent slopes (LaD).—This soil occurs on moderately long, narrow slopes adjacent to sinks and drainageways. Because it is steeper than Lakeland coarse sand, 0 to 5 percent slopes, it is more susceptible to erosion. A few shallow or deep gullies occur in a few areas. The depth to finer textured material normally ranges from 60 to 72 inches.

This soil is not suited to cultivated crops, but under good management, fair yields of bahiagrass can be obtained. The soil is moderately well suited to pines, and

most areas remain in trees. (Capability unit VIse–1; woodland suitability group 1)

Lakeland coarse sand, 12 to 45 percent slopes (LaF).—This steep soil generally is adjacent to sinks and drainageways. Because it is much steeper than Lakeland coarse sand, 0 to 5 percent slopes, it is much more susceptible to erosion.

Included with this soil are small areas that have slopes of 8 to 12 percent and of 45 to 65 percent. Also included are a few moderately eroded areas that have many shallow gullies, a few deep ones, or both.

This soil is not suited to cultivated crops or pasture. It is best suited as woodland and for wildlife. (Capability unit VIIse–1; woodland suitability group 1)

Lakeland sand, 0 to 5 percent slopes (LdB).—This soil has a higher available moisture capacity and cation-exchange capacity than Lakeland coarse sand, 0 to 5 percent slopes. Its sandy loam to sandy clay underlying material is at a depth of 42 to 60 inches and is nearer the surface than that in the coarse sand. Included with this soil are a few small areas of coarse sand and a few small areas of fine sand.

This is a poor soil for most cultivated crops, but corn, watermelons, and a few other crops can be grown. The soil is moderately well suited to improved bahiagrass pasture, but most areas are best suited to trees. (Capability unit IVse–2; woodland suitability group 2)

Lakeland sand, 5 to 8 percent slopes (LdC).—This sloping soil is more susceptible to erosion than Lakeland sand, 0 to 5 percent slopes. It has slightly lower available moisture capacity, organic-matter content, and natural fertility. A few shallow or deep gullies occur in a few scattered areas.

Because this soil is droughty and low in fertility, it is not suited to most cultivated crops. Fair to good yields of bahiagrass and other drought-resistant grasses can be obtained under good management. Although pine trees do not reproduce well naturally, woodland is the best use for most areas. (Capability unit IVse–2; woodland suitability group 2)

Lakeland sand, shallow, 0 to 5 percent slopes (LkB).—This is a well-drained to excessively drained soil on broad ridges of the uplands. The sand is underlain by fine-textured material, generally below a depth of 30 to 42 inches.

Representative profile in a moist wooded site:

0 to 5 inches, loose, gray sand.
5 to 36 inches, loose, yellow fine sand with a few pockets of yellowish-brown loamy fine sand.
36 to 44 inches, friable, brownish-yellow fine sandy clay loam mottled with yellow, strong brown, and red.
44 to 50 inches +, firm, mottled light sandy clay.

The plow layer is sand that ranges from gray to dark gray. It is underlain by yellow to yellowish-brown layers that range from sand to loamy sand but are sand in most places. Yellow to yellowish-brown sandy loam to sandy clay occurs at a depth of 30 to 42 inches. Mottling is generally below a depth of 42 inches. In some areas many small and medium-sized pebbles of quartz occur on the surface and throughout the profile.

Included with this soil are areas that have a few shallow or deep gullies, and some areas of coarse sand, fine sand, or loamy sand. In small, scattered areas the finer textured material is slightly below 42 inches or is slightly above 30 inches.

This soil is strongly acid and low in organic-matter content. It has a deep root zone, through which water moves rapidly and rapidly leaches plant nutrients. The available moisture capacity and natural fertility are low. Permeability is rapid above the finer textured underlying material but is generally moderately rapid through them. Corn, small grain, and watermelons are the best suited crops. Most locally grown crops are only moderately well suited. Deep-rooted pasture grasses and trees grow well, and the soil makes good habitats for wildlife. (Capability unit IIIse–1; woodland suitability group 3)

Lakeland sand, shallow, 5 to 8 percent slopes (LkC).—This sloping soil has more rapid runoff than Lakeland sand, shallow, 0 to 5 percent slopes, and is more susceptible to erosion. Included with this soil are small moderately eroded areas that have scattered shallow or deep gullies.

Under good management that includes intensive control of erosion, this soil may be used occasionally for corn, small grain, and watermelons. It is moderately well suited to trees and to bahiagrass and other deep-rooted, drought-resistant pasture grasses. It makes good habitats for wildlife. (Capability unit IVse–2; woodland suitability group 3)

Lakeland, Cuthbert, and Shubuta soils, 5 to 12 percent slopes (LnD).—One or more of these soils make up at least 75 percent of mapped areas, but the proportion of each soil varies considerably from place to place. Most areas mapped contain lesser, highly variable amounts of the Eustis, Bowie, Ruston, Norfolk, and Faceville soils. There are also scattered, small areas of the Blanton, Klej, Lynchburg, Plummer, Rains, Rutlege, and Goldsboro soils, most of which are more poorly drained than the Lakeland, Cuthbert, or Shubuta soils. These more poorly drained soils generally occur on the crests of slopes, on toe slopes, along small drainageways, and in seepage spots on long slopes that have slowly permeable material near the surface. In many places these soils slope to drainageways. The dominant soils are in such intricate patterns that it is impractical to map them separately.

A representative profile of each soil in this unit is described with its respective series.

The native vegetation consists mainly of longleaf pine, slash pine, various oaks, low shrubs, and native grasses. Most areas that have been cleared are no longer cultivated and are almost entirely in trees.

These soils occur mainly in the northern half of the county. They are mainly on and somewhat north of the highly dissected north-facing escarpment that extends in an east-west direction between the higher, deep sandy soils to the south and the dominantly finer textured soils to the north. However, small, scattered areas occur in the southern part of the county.

Surface drainage is medium or rapid, and internal drainage ranges from very rapid to slow. Both surface drainage and internal drainage vary according to the various soils.

These soils generally are not suitable for cultivation, but scattered areas on gentle slopes can be cultivated occasionally. Use for pasture is limited. Because slopes are highly irregular, good pasture management is difficult, but the less sloping areas are moderately well suited to improved pasture. The best uses are for woodland

and wildlife habitats. (Capability unit VIes–1; woodland suitability group 5)

Lakeland, Cuthbert, and Shubuta soils, 12 to 45 percent slopes (LnF).—Included in mapped areas of these steep soils are slopes as steep as 55 percent. Also included are moderately sheet eroded areas, areas that have shallow and deep gullies, and a very few severely eroded areas.

These highly dissected, steep soils are not suited to cultivated crops, but if erosion is controlled, some areas may be suited to pasture. The best uses are for woodland or wildlife habitats. (Capability unit VIIes–1; woodland suitability group 5)

Leon Series

In the Leon series are deep, somewhat poorly drained, strongly acid soils that developed from moderately thick beds of acid sand under conditions favorable to the accumulation of an organic pan. These soils occur on nearly level uplands. The surface layer is gray or dark-gray coarse sand that is underlain by gray or light-gray coarse sand. The coarse sand is underlain abruptly by a very dark brown, dark reddish-brown, or black organic pan at a depth of 14 to 30 inches. This pan normally is weakly cemented. It is underlain by dark grayish-brown, yellowish-brown, or light-gray coarse sand that extends to a depth of 42 inches or more.

Leon soils occur mainly with the Plummer, Rutlege, and Blanton soils. They are better drained than the Plummer and Rutlege soils but are more poorly drained than the Blanton soils. Leon soils do not have a thick black surface layer like that in the Rutlege soils. The dark-brown organic pan in the Leon soils is missing in the Blanton, Plummer, and Rutlege soils.

The total acreage of Leon soils in the county is small. Almost all of it is in small areas that are widely scattered in the southern part of the county, but a few small areas are in the central part. In many areas these soils occur in narrow strips adjacent to swamps or drainageways. The native vegetation consists mainly of turkey oak, runner oak, longleaf pine, sparse slash pine, sawpalmetto, and native grasses. These soils are not suited to cultivated crops, and they remain entirely in native vegetation.

Leon coarse sand (Lo).—This somewhat poorly drained, nearly level, sandy soil of the uplands has a strongly cemented organic pan at a depth of 14 to 30 inches.

Representative profile in a wooded area:

0 to 2 inches, loose, dark-gray coarse sand.
2 to 23 inches, loose, gray coarse sand with a few light-gray splotches.
23 to 31 inches, weakly cemented, very dark brown coarse sand that is friable when wet and very hard when dry.
31 to 39 inches, loose, very dark grayish-brown coarse sand.
39 to 53 inches +, loose, yellowish-brown coarse sand.

The coarse sand plow layer ranges from gray to dark gray but is dark gray in most places. It is underlain by a light-gray or gray layer that is 6 to 18 inches thick and is underlain, in turn, by an organic pan. The organic pan normally is weakly cemented, but the degree of cementation, density, or compaction of this layer varies greatly within short distances. In some places, especially where this soil grades to another soil, there is a strongly stained layer instead of the pan. The organic pan is coarse sand and ranges from very dark brown and dark reddish brown to black. It is underlain by dark grayish-brown to light-gray coarse sand.

Included with this soil are a few areas of sand and a few areas that are better drained than normal. In these better drained areas the organic pan is 30 to 42 inches from the surface. Also included are a few areas that have slopes of 2 to 5 percent.

This soil is low in natural fertility and in organic-matter content. Surface runoff and internal drainage are slow. The water table normally fluctuates in the upper part of the soil. The surface layer is rapidly permeable. Because this soil is coarse textured, it does not retain plant nutrients well and its available moisture capacity is low.

This soil is not suited to cultivated crops, but it is suited to bahiagrass pasture. Unless the soil is intensively managed, yields are low. This soil is moderately well suited to trees, and it is well suited for wildlife habitats. (Capability unit Vsw–1; woodland suitability group 8)

Local Alluvial Land

This land type consists of alluvial and colluvial materials that washed or rolled from higher lying areas.

Local alluvial land (Lu).—This land consists of moderately well drained, acid sand and loamy sand and generally is in depressions on the uplands. In some areas it is at the base of long, normally gentle slopes. This land formed from material that washed or rolled from adjacent, higher lying, red and yellow soils that are coarse and medium textured and well drained or moderately well drained. Areas of Local alluvial land generally do not have natural drainage outlets. They are drained underground, and they may stay wet for short periods after heavy rains. However, they rarely become saturated near the surface except in the very lowest positions.

This land generally consists of a heterogeneous mixture of coarse-textured material. In many places the surface layer is slightly finer textured than the underlying material. The depth of the colluvial material varies considerably. The surface layer is 6 to 10 inches thick in most places. It is dark-gray or brownish-gray sandy material that is underlain by stratified coarse and loamy materials that are brown, yellowish brown, pale brown, or light gray. The color and texture of the soil material vary considerably because this land formed from deposits washed from many kinds of soils. In some places the lower layers are the upper part of a soil that has been buried with alluvial or colluvial deposits.

In a few areas, particularly near the north-facing escarpment that crosses the central part of the county, this land recently received deposits from eroded, higher lying soils. In many places these recent deposits consist of 3 to 8 inches of yellow to red fine sandy clay loam.

This land occurs closely with the Norfolk, Ruston, Lakeland, Eustis, and similar soils, but it differs from those soils in texture and color. Also, it is more poorly drained. Individual areas and the total acreage of this land are small. The areas are widely scattered throughout the county but are more common in the central part. Many areas are cultivated with adjacent soils. Some areas are used for improved pasture. The available mois-

ture capacity is variable but is generally moderate, and natural fertility is moderately high in most places. The organic-matter content of recent deposits is generally low, but that of older deposits is moderate.

Except where this land is used with other soils, only a small part is cleared. Much of the land that was once cleared is slowly returning to native vegetation, particularly in the central part of the county where farming has decreased. The native vegetation consists mainly of oak, pine, and native weeds and grasses. (Capability unit IIsw–1; woodland capability group 11)

Lynchburg Series

In the Lynchburg series are deep, somewhat poorly drained, strongly acid soils that developed from thick beds of sandy loam and sandy clay loam on nearly level to sloping uplands. These soils have a black to gray loamy fine sand surface layer. Within 30 inches of the surface is light olive-brown to light yellowish-brown sandy loam to fine sandy clay loam that is mottled with various shades of gray, yellow, brown, and red. This layer is less than 36 inches thick and is underlain by parent material of highly mottled fine sandy clay loam to sandy clay that is somewhat stratified in some places.

Lynchburg soils occur mainly with the Goldsboro, Norfolk, Marlboro, and Rains soils. They are not so well drained as the Norfolk and Marlboro soils, which have a uniformly yellowish-brown to brownish-yellow subsoil instead of one mottled with yellow, brown, gray, and red. The Lynchburg soils are more poorly drained than the Goldsboro soils and are paler and more mottled in the subsoil. They are better drained than Rains soils and are more yellow and less gray in the subsoil.

Lynchburg soils occur throughout the northern half of the county but are most extensive in the Chipley area. The total acreage is moderately large. The native vegetation consists principally of longleaf pine, slash pine, gallberry, and low shrubs; native grasses with scattered hickory; and various oaks and sweetgum. Most of these soils are still in forest, though some have been cleared and are used for improved pasture and for corn, small grain, and other cultivated crops. These soils are suited to cultivated crops but are limited to those that tolerate slight wetness. They are suited to most improved pasture grasses, are well suited to trees, and make good habitats for wildlife.

Lynchburg loamy fine sand, 0 to 2 percent slopes (LyA).—This somewhat poorly drained, deep, nearly level soil on uplands has a friable, moderately fine textured subsoil.

Representative profile in a carpetgrass pasture:

0 to 5 inches, very friable, black loamy fine sand.
5 to 10 inches, very friable, dark grayish-brown loamy fine sand.
10 to 30 inches, friable to firm, light olive-brown fine sandy clay loam that has common, yellowish-brown, gray, strong-brown, and light brownish-gray mottles.
30 to 42 inches, firm, mottled fine sandy clay loam.
42 to 72 inches +, very firm, mottled clay that contains thin lenses of fine sandy clay.

The loamy fine sand plow layer ranges from black to grayish brown. Generally within a depth of 18 inches, but slightly deeper in a few small areas, is sandy loam to fine sandy clay loam that ranges from light yellowish brown to olive brown and is mottled with yellow, brown, and gray. The subsoil is highly mottled in most places at a depth below 30 inches. Some areas of this soil along Holmes Creek are underlain by very pale brown to gray sand at a depth of more than 48 inches. These areas are occasionally flooded after heavy rains. In other areas near Holmes Creek, the underlying material is sandy clay that is 30 to 42 inches below the surface in most places but is as shallow as 24 inches in a few small areas. This soil is more poorly drained than normal in a few areas and somewhat resembles the Rains soils.

This soil is strongly acid, is moderate in natural fertility, and has medium organic-matter content. Surface runoff and internal drainage are slow. Permeability is moderately rapid to rapid in the surface layer and moderate to slow in the subsoil. The available moisture capacity is moderate. Soil aeration is poor because the water table is normally high and in some wet periods rises very close to the surface.

Much of this soil is in small areas or in long narrow bands that are adjacent to poorly drained soils along drainageways. These areas are poorly located for cultivation. The larger areas that can be drained and otherwise well managed are suited to most general crops. This soil is well suited to trees and to improved pasture of locally grown grasses and clovers, including white clover. It makes good habitats for wildlife. (Capability unit IIIws–1; woodland suitability group 6)

Lynchburg loamy fine sand, 2 to 5 percent slopes (LyB).—This gently sloping soil has more rapid runoff than Lynchburg loamy fine sand, 0 to 2 percent slopes, and a slightly thicker, less strongly mottled subsoil. The water table is at a slightly greater depth.

This soil is in narrow bands around small depressions or is in long, narrow areas adjacent to poorly drained soils along streams. Not many areas are located in positions favorable for cultivation. Included with this soil are a few small areas on slopes of 5 to 8 percent.

Crops that tolerate wetness are best suited to this soil, but most general crops can be grown if the soil is adequately drained. Improved pasture of bahiagrass and clover is well suited, and the soil makes good habitats for wildlife. (Capability unit IIIws–1; woodland suitability group 6)

Lynchburg loamy fine sand, thick surface, 0 to 2 percent slopes (LzA).—This somewhat poorly drained soil of the uplands has a surface layer that is 18 to 30 inches thick in most places. The subsoil is mottled sandy loam to sandy clay loam. In some areas near Holmes Creek, this soil is underlain by very pale brown to gray sand at a depth of about 48 inches or more. These areas are generally near the first bottoms and are occasionally flooded.

Representative profile in a wooded site:

0 to 6 inches, very friable, black loamy fine sand.
6 to 17 inches, loose, grayish-brown loamy sand.
17 to 24 inches, very friable, light brownish-gray loamy sand with common, yellowish-brown mottles.
24 to 45 inches, firm, mottled gray, yellowish-brown, and red sandy clay loam.
45 to 55 inches +, very firm, mottled fine sandy clay that contains lenses of fine sandy clay loam.

Included with this soil are small spots in which the surface layer is a little more than 30 inches thick or a little less than 18 inches thick.

This soil is strongly acid, is moderate in natural fertility, and has medium organic-matter content. Surface runoff and internal drainage are slow. Permeability is moderately rapid to rapid in the surface layer and moderate to slow in the subsoil. The available moisture capacity is moderate to low. Soil aeration is poor because the water table is normally high and in wet periods rises close to the surface.

This soil is well suited to cultivated crops if it is intensively managed and excess water is removed. Improved pasture plants and trees grow well, and wildlife habitats are well suited. (Capability unit IIIws–1; woodland suitability group 6)

Lynchburg loamy fine sand, thick surface, 2 to 5 percent slopes (LzB).—In this gently sloping soil, the water table is generally lower than that in Lynchburg loamy fine sand, thick surface, 0 to 2 percent slopes. A few areas with slopes of 5 to 8 percent are included with this soil. In some places the surface layer of these steeper areas is slightly thicker than 30 inches or is slightly thinner than 18 inches.

This soil generally is in small, narrow areas adjacent to streams. It is best suited to crops that tolerate wetness, but it is fairly well suited to other cultivated crops if adequately drained and otherwise well managed. It is moderately well suited to improved pasture and trees and as a habitat for wildlife. (Capability unit IIIws–1; woodland suitability group 6)

Marlboro Series

In the Marlboro series are deep, well-drained, strongly acid soils that developed from thick beds of sandy clay loam and sandy clay on nearly level to sloping uplands. The surface layer of these soils is gray to very dark grayish-brown loamy sand to sandy loam that is underlain by dark grayish-brown to dark yellowish-brown sandy loam. Within a depth of 14 inches the subsoil is heavy fine sandy clay loam to fine sandy clay that is friable, slightly sticky, and yellow to brownish yellow or yellowish brown. The upper few inches of the subsoil is light fine sandy clay loam in most places. The lower part normally is faintly mottled with strong brown, red, and yellow. Mottles increase with depth. The subsoil grades gradually to parent material of highly mottled sandy clay to sandy clay loam.

Marlboro soils occur mainly with the Norfolk, Tifton, and Faceville soils. They have a finer textured, more brownish-yellow, stickier subsoil than the Norfolk soils. Marlboro soils lack the high concentration of iron concretions that is conspicuous in the Tifton soils. The subsoil of the Marlboro soils is slightly more sticky than that of the Tifton soils. It is brownish yellow to yellowish brown instead of yellowish red as in the subsoil of the Faceville soils.

Marlboro soils occur in the northern part of the county, mainly in the northeastern part. The native vegetation is chiefly longleaf pine, hickory, various oaks, dogwood, sweetgum, low shrubs, and native grasses. These soils are well suited to many kinds of cultivated crops and to pasture and trees. Most of the acreage has been cleared and is planted to corn, cotton, peanuts, and small grain.

Marlboro loamy sand, 2 to 5 percent slopes (MaB).—This gently sloping, well-drained, deep soil of the uplands has a clayey subsoil.

Representative profile in a moist cultivated field:

0 to 7 inches, very friable, very dark grayish-brown loamy sand.
7 to 14 inches, friable, dark yellowish-brown sandy loam.
14 to 34 inches, friable, brownish-yellow heavy fine sandy clay loam.
34 to 63 inches, friable, brownish-yellow heavy fine sandy clay loam mottled with strong brown, pale brown, and red.
63 to 73 inches +, firm, highly mottled fine sandy clay loam.

The loamy sand plow layer ranges from gray to very dark grayish brown and is 4 to 7 inches thick. The plow layer is underlain by grayish-brown to dark yellowish-brown sandy loam. In most places the upper 2 to 4 inches of the subsoil is fine sandy loam to light fine sandy clay loam, and the rest is generally heavy fine sandy clay loam to sandy clay. The color of the subsoil is generally brownish yellow to yellowish brown but in some areas it is yellow. The subsoil is normally mottled with red and strong brown below 30 inches, but mottling is as shallow as 24 inches in a few areas. The underlying material is highly mottled sandy clay to sandy clay loam and is below a depth of 42 inches.

Included with this soil are a few small areas of sandy loam and a few small spots that are moderately eroded. Also included are a few small areas with slopes of 5 to 8 percent.

This soil is strongly acid, has moderately high natural fertility, and responds well to fertilizer. The available moisture capacity is moderate in the surface layer and high in the subsoil. Permeability is moderately rapid in the surface layer and moderately slow in the subsoil. This soil has a deep, well-aerated root zone and is sufficiently loamy to have good tilth.

This soil is well suited to improved pasture, to trees, and to most crops grown in the county. It makes good habitats for wildlife. (Capability unit IIe–1; woodland suitability group 4)

Marlboro loamy sand, 2 to 5 percent slopes, eroded (MaB2).—Because this soil is more eroded than Marlboro loamy sand, 2 to 5 percent slopes, it has a thinner surface layer. The surface layer ranges from 4 to 9 inches in thickness, but it generally is about 6 inches thick. This soil is dominantly sheet eroded, but there are a few areas with a few shallow gullies. For high yields of crops, this soil requires more intensive use of cover crops and green-manure crops than Marlboro loamy sand, 2 to 5 percent slopes.

Under good management that includes control of erosion, this soil is well suited to many kinds of cultivated crops. It is also well suited to improved pasture and to trees, and it makes good habitats for wildlife. (Capability unit IIe–1; woodland suitability group 4)

Norfolk Series

In the Norfolk series are deep, well-drained, strongly acid soils that developed from thick beds of acid sandy clay loam on nearly level to strongly sloping uplands. These soils have a dark grayish-brown to light brownish-gray loamy sand or sand surface layer that grades gradually to yellow to yellowish-brown sandy loam to sandy

clay loam at a depth of less than 30 inches. The subsoil is underlain by distinctly mottled sandy clay loam.

Norfolk soils occur mainly with Ruston, Bowie, Goldsboro, Tifton, Marlboro, and Lakeland soils. The subsoil of the Norfolk soils is yellow or brownish yellow, in contrast to the strong-brown to yellowish-red subsoil of the Ruston soils. Norfolk soils are better drained and have a greater depth to mottling than the Goldsboro soils. They lack the finer textured, mottled lower subsoil of the Bowie soils, but their subsoil is better developed and finer textured than that in the Lakeland soils. Although similar to the Tifton and Marlboro soils in color, the Norfolk soils have a coarser textured, less sticky subsoil. They generally do not contain so many iron concretions as the Tifton soils, but the amount of concretions is moderate in places where the Norfolk and Tifton soils are closely associated.

The Norfolk soils have a moderately large total acreage in the county and occur mainly in the northeastern part. The native vegetation is chiefly longleaf pine, hickory, oak, shrubs, and native grasses. These soils are well suited to many kinds of cultivated crops, and in large part they have been cleared and planted to corn, cotton, peanuts, small grain, and pasture grasses. They are well suited to trees.

Norfolk loamy sand, 2 to 5 percent slopes (NoB).—This well-drained soil of the uplands has a friable, yellowish-brown sandy loam to sandy clay loam subsoil.

Representative profile in a moist pasture:

0 to 5 inches, very friable, dark grayish-brown loamy sand.
5 to 17 inches, very friable, brown to yellowish-brown loamy sand.
17 to 53 inches, friable, yellowish-brown sandy loam and sandy clay loam with few strong-brown mottles below 44 inches.
53 to 65 inches +, friable to firm, brownish-yellow heavy sandy clay loam mottled with yellowish red, red, and gray.

The loamy sand plow layer ranges from 4 to 8 inches in thickness and from dark grayish brown to light brownish gray in color. Within 18 inches of the surface is yellow to yellowish-brown sandy loam to sandy clay loam. In most places the subsoil is mottled with brown to yellowish red at a depth of about 42 inches, but in some places mottling begins at 36 inches. Mottled underlying material normally occurs at a depth of 48 to 65 inches.

Included with this soil are spots that are moderately sheet eroded. In a few areas the surface layer is slightly thicker than 18 inches.

This soil is strongly acid and has moderate natural fertility and organic-matter content. Available moisture capacity is moderate, and permeability is moderately rapid in the surface layer and moderate in the subsoil. The soil is well aerated, retains plant nutrients well, and responds well to fertilizer.

This soil is well suited to many kinds of cultivated crops, to improved pasture, and to trees. It makes good habitats for wildlife. (Capability unit IIe–2; woodland suitability group 4)

Norfolk loamy sand, 0 to 2 percent slopes (NoA).—Because this soil is less sloping than Norfolk loamy sand, 2 to 5 percent slopes, it has little surface runoff. Erosion generally is not a problem. In a few small areas the surface layer is slightly thicker than 18 inches. It is slightly finer textured than normal in a few areas near the Choctawhatchee River.

This soil is well suited to cultivated crops and to most pasture grasses, but white clover may be damaged during dry periods. Trees grow well on this soil. (Capability unit I–1; woodland suitability group 4)

Norfolk loamy sand, 2 to 5 percent slopes, eroded (NoB2).—Because this soil is more eroded than Norfolk loamy sand, 2 to 5 percent slopes, it has a thinner surface layer. The surface layer ranges from 4 to 13 inches in thickness but is generally about 8 inches thick. This soil is sheet eroded and has shallow gullies in a few areas. The content of organic matter is lower than in Norfolk loamy sand, 2 to 5 percent slopes. Included with this soil are a few small spots that are severely sheet eroded.

Under good management that includes control of erosion, this soil is well suited to many kinds of cultivated crops, to improved pasture, and to trees. It makes good habitats for wildlife. (Capability unit IIe–2; woodlan suitability group 4)

Norfolk loamy sand, 5 to 8 percent slopes (NoC).—This sloping soil has more rapid runoff than Norfolk loamy sand, 2 to 5 percent slopes, and is more susceptible to erosion. In some areas this soil does not extend as deep as normal, and the underlying mottled parent material is only 42 to 56 inches from the surface. Included with this soil are a few small areas that are moderately eroded and a few small areas on slopes of 8 to 12 percent

This soil is suited to most cultivated crops grown in the county, but because it is susceptible to erosion, it is suited to only moderately intensive use. However, under good management that includes intensive control of erosion, good yields may be obtained. The soil is well suited to improved pasture and to trees, and it makes good wildlife habitats. (Capability unit IIIe–2; woodland suitability group 4)

Norfolk loamy sand, 5 to 8 percent slopes, eroded (NoC2).—Because this sloping soil is more eroded than Norfolk loamy sand, 2 to 5 percent slopes, it generally has a thinner surface layer. The underlying material is nearer the surface. The surface layer ranges from 4 to 1 inches in thickness but is about 7 inches thick in most places. Sheet erosion is dominant, and only a few areas are gullied. The surface layer in eroded areas is slightly browner than that in uneroded areas. Included with this soil are a few small, severely eroded areas that have a sandy loam surface layer.

This soil is only moderately well suited to cultivated crops, and it requires intensive management. It is well suited to most pasture grasses, but white clover may be damaged in dry periods. It is well suited as woodland. (Capability unit IIIe-2; woodland suitability group 4)

Norfolk sand, thick surface, 2 to 5 percent slopes (NrB).—This well-drained soil of the uplands has a surface layer 18 to 30 inches thick. The subsoil is yellowish-brown sandy loam to sandy clay loam.

Representative profile in a moist cultivated field:

0 to 5 inches, loose, dark grayish-brown sand.
5 to 24 inches, very friable, yellowish-brown sand or loamy sand.
24 to 52 inches, friable, yellowish-brown sandy loam to sandy clay loam mottled with yellowish red below 44 inches.
52 to 65 inches +, friable, brownish-yellow sandy clay loam mottled with yellowish red, red, and gray.

Included with this soil are areas that have a few shallow or deep gullies. In some areas the surface layer is slightly thinner than 18 inches or slightly thicker than 30 inches.

This soil is strongly acid and low in fertility and organic-matter content. Available moisture capacity is low, and permeability is rapid in the surface layer and moderate in the subsoil. The soil is well aerated, retains plant nutrients well, and responds well to fertilizer.

Most crops common in the county are grown on this soil, but yields are low unless intensive practices are used to improve the soil. Only moderate practices are needed to protect the soil from erosion. Most pasture plants do well, but legumes are difficult to establish and maintain. Trees grow well on this soil. (Capability unit IIse–1; woodland suitability group 4)

Norfolk sand, thick surface, 0 to 2 percent slopes (NrA).—This soil is similar to Norfolk sand, thick surface, 2 to 5 percent slopes. Erosion generally is not a problem and can be controlled by ordinary management. In small areas the surface layer is slightly thicker than 30 inches or slightly thinner than 18 inches.

Most crops common in the county are grown on this soil, but yields are low unless intensive practices are used to improve the soil. Most pasture grasses do well, but legumes are difficult to establish and maintain. Trees make good growth. (Capability unit IIse–1; woodland suitability group 4)

Norfolk sand, thick surface, 5 to 8 percent slopes (NrC).—Because this soil has steeper slopes than Norfolk sand, thick surface, 2 to 5 percent slopes, it has more rapid runoff and is more likely to erode. In some areas the underlying material is slightly nearer the surface. Although the surface layer ranges from 18 to 30 inches in thickness, it is normally 18 to 24 inches thick.

Included with this soil are small areas with slopes of 8 to 12 percent. In a few small areas the subsoil is slightly below a depth of 30 inches or is slightly above 18 inches.

To maintain high yields, this soil requires management that includes more intensive control of erosion than that needed on Norfolk sand, thick surface, 2 to 5 percent slopes. Cultivation, however, can be moderately intensive. If erosion is controlled, yields are good. This soil is well suited to improved pasture, to trees, and as a habitat for wildlife. (Capability unit IIIes–2; woodland suitability group 4)

Oktibbeha Series

In the Oktibbeha series are deep, moderately well drained, moderately acid soils that developed from beds of medium acid clay underlain by limestone. These soils occur on gently sloping to steep uplands, generally near limestone sinks. They have been influenced by limestone and in some areas have formed from a mixture of clay and underlying limestone residuum.

The surface layer is very dark gray to dark-brown loamy sand to clay loam that ranges from 3 to 10 inches in thickness. It is rather abruptly underlain by a subsoil of reddish-brown to red clay loam to clay. The lower part of the subsoil is mottled with various shades of red, gray, and brown. Below the subsoil is mottled very pale brown and white, moderately soft limestone. These soils are neutral to moderately alkaline at a depth of 32 to 36 inches.

Oktibbeha soils occur with the Cuthbert and Shubuta soils and are somewhat similar to them but differ because of the influence of the limestone. The subsoil of the Oktibbeha soils is more plastic than that of the Cuthbert and Shubuta soils. Oktibbeha soils are neutral to moderately alkaline in the lower part of the subsoil, but Cuthbert and Shubuta soils are strongly acid throughout.

Oktibbeha soils occur in the northeastern part of the county, south of Chipley in areas near Falling Water Hill and Piney Grove Church. They are almost entirely in small areas near limestone sinks. Most of the acreage is still in native vegetation, mainly various oaks, sweetgum, cedar, and scattered longleaf pine. However, a few scattered areas are used for cultivated crops and forage crops. These soils are moderately well suited to many kinds of shallow-rooted crops and are generally cultivated with more extensive soils.

Oktibbeha soils, 2 to 5 percent slopes (OkB).—These moderately well drained soils of the uplands have a plastic, clayey subsoil that is underlain by soft limestone.

Representative profile in a moist wooded site:

0 to 10 inches, very friable, dark grayish-brown loamy sand.
10 to 20 inches, firm, red clay loam.
20 to 44 inches, very firm, plastic, dark-red clay; pale-brown fragments of soft limestone below 34 inches.
44 to 50 inches +, very pale brown and white, moderately soft limestone.

The plow layer ranges from very dark gray to dark brown in color and from loamy sand to clay loam in texture. The subsoil is reddish-brown to red clay loam to plastic clay. Very pale brown, yellow, and gray mottles normally occur in the subsoil at a depth of 24 to 36 inches. The lower part of the subsoil contains many fragments of limestone and at a depth of 24 to 48 inches is underlain by moderately soft limestone. In many places limestone is near the surface or crops out in small areas and there is no subsoil development.

Included with these soils are a few small spots that are moderately eroded. Also included are a few small spots in which highly mottled clay is just beneath the surface layer. The soil in these spots has not developed from limestone and has not been influenced by it.

These soils are moderately acid, are moderately high in natural fertility, and contain a small amount of organic matter. Surface drainage is slow to rapid, and internal drainage is medium to slow. The available moisture capacity is high. The permeability of the surface layer depends on texture and ranges from rapid to moderate. The subsoil is slowly permeable.

These soils are moderately well suited to some cultivated crops, but the choice of crops is limited by the shallow root zone and the poorly aerated subsoil. Improved pasture is the best use. Unprotected areas of these soils are highly erodible. (Capability unit IIIes–1; woodland suitability group 5)

Oktibbeha soils, 5 to 8 percent slopes (OkC).—Because these sloping soils have faster surface runoff than Oktibbeha soils, 2 to 5 percent slopes, they are more likely to erode. Limestone is generally nearer the surface and is at a depth of 24 to 42 inches.

Included with these soils are a few small areas that are moderately eroded. Also included, on sides of limestone sinks, are small areas that have slopes of as much as 35 percent.

Because they erode easily and have a shallow root zone, these soils are not well suited to cultivated crops. Only a

few crops can be grown, and the best use is improved pasture. (Capability unit IVes–1; woodland suitability group 5)

Plummer Series

In the Plummer series are deep, poorly drained, strongly acid to very strongly acid soils. These soils occur on broad flats, in depressions along drainageways, in shallow intermittent ponds, and to some extent, in seeps on nearly level to sloping uplands. These soils developed from moderately thick to thick beds of acid sand that is underlain by sandy loam to sandy clay at a depth generally greater than 42 inches. The surface layer is sand to fine sand and ranges from gray to black. Where it is black, this layer is less than 6 inches thick. Underlying the surface are deep sandy layers. These range from dark gray to white and are mottled with various hues of gray, brown, and yellow where they are deepest.

Plummer soils occur with soils of the Rutlege, Leon, Klej, Blanton, Lynchburg, Rains, and Lakeland series. Plummer soils do not have a thick, black surface layer like that in Rutlege soils. They are more poorly drained than Leon soils and do not have a brown to black organic pan. Plummer soils are much more poorly drained than Blanton, Klej, and Lakeland soils. They are more poorly drained than Lynchburg soils and do not have a well-developed subsoil. The Plummer soils are similar to the Rains soils in drainage and in color, but the Rains soils have a finer textured, more developed subsoil.

Plummer soils have a moderate total acreage in the county. They occur throughout but are most extensive in the southern part, particularly on broad flats in the Deadening Lakes area. The native vegetation is mainly longleaf pine, low shrubs, pitcher plants, and wiregrass, but in the beds of intermittent lakes, it is dominantly pond cedar. These soils are poorly suited for cultivation. Most of the acreage is still in native vegetation, but some areas are used for pasture.

Plummer soils (Pm).—These deep, poorly drained soils of the uplands have a very shallow water table and consist of sand to fine sand throughout.

Representative profile in a nearly level wooded area:

0 to 5 inches, very friable, black sand.
5 to 16 inches, loose, dark-gray sand.
16 to 46 inches, loose, light-gray sand mottled with grayish brown.
46 to 60 inches +, loose sand mottled with pale yellow, light brownish gray, and gray.

The plow layer ranges from black to gray but is mostly very dark gray. It ranges from coarse sand to fine sand but is medium sand in most places. The underlying layers range from white to dark gray, but light gray dominates. These layers range from coarse sand to fine sand but are mostly medium sand. In places the deep underlying layers are mottled with gray, brown, and yellow.

In a few small areas a thin layer stained with grayish brown occurs in these soils. A few areas that are slightly higher than normal have a water table that generally fluctuates between 24 and 48 inches. In the southeastern part of the county some areas are in beds of intermittent lakes and are flooded much of the time. A few other areas, mostly in Holmes Valley, are underlain, at a depth of 30 to 42 inches, by fine-textured material that ranges from sandy loam to fine sandy clay loam and is highly mottled with various hues of gray, brown, yellow, and red.

These soils are strongly acid, are low in natural fertility, and contain little organic matter. Permeability is rapid, and the available moisture capacity is low. The root zone is restricted by the very shallow water table.

These soils are not well suited to cultivated crops, but under good management that includes adequate drainage, high yields of pasture grasses can be produced. These soils are suited to trees and for wildlife habitats. (Capability unit Vws–2; woodland suitability group 10)

Pocomoke Series

In the Pocomoke series are deep, very poorly drained, very strongly acid soils that developed from thick beds of acid sandy loam and sandy clay loam. These soils occur on nearly level, low, flat or depressed areas of the uplands and along poorly defined drainageways. The surface layer is black or very dark gray mucky loamy fine sand to loamy fine sand that is 8 to 14 inches thick and has a high organic-matter content. It is underlain by a dark-gray to gray layer in most places. Within 30 inches of the surface is dark-gray to light-gray sandy loam to light sandy clay loam. The subsoil is mottled with pale brown, yellowish brown, and strong brown in most places. It is underlain by mottled sandy clay to sandy clay loam.

Pocomoke soils occur mainly with the Rains soils and to a lesser extent with the Lynchburg and Rutlege soils. They have a thicker surface layer than the Rains soils and a coarser textured, less well developed subsoil. The Pocomoke soils are similar to the Rains soils in color. They are more poorly drained than the Lynchburg soils, have a much thicker surface layer, and are more gray and less yellow in the subsoil. The Pocomoke soils are similar to the Rutlege soils in color but are finer textured throughout the profile.

Pocomoke soils have a small acreage in the county and occur in the northern half. They are so closely intermingled with the Rains soils that they have been mapped with those soils in an undifferentiated unit. The native vegetation consists mainly of water-tolerant hardwoods and native wetland grasses. These soils are suited to a few cultivated crops or to improved pasture if excess water is removed. Drainage outlets, however, are scarce in many areas. Drainage is needed for best growth of trees.

Pocomoke and Rains soils (Pr).—This undifferentiated unit consists of poorly drained and very poorly drained soils, mainly Pocomoke and Rains. One or both of these soils make up at least 75 percent of the mapped areas, but the proportion of each soil varies considerably from place to place. The Grady, Bayboro, Rutlege, Plummer, and Lynchburg soils also generally occur, but to a lesser, highly variable extent.

Pocomoke and Rains soils are in low, nearly level, depressional or ponded areas of the uplands. These soils are wet or have water on the surface for long periods. They occur in such an intricate pattern that it is not feasible to map them separately. The Pocomoke soils usually occur in the lowest and wettest part of the mapped

726-719—65——3

areas. They are generally surrounded by Rains soils, which are on narrow rims that grade to better drained soils.

Elsewhere in this section is a description of the Rains series that includes a representative profile.

Representative profile for a nearly level Pocomoke soil in a wooded area:

0 to 8 inches, friable, black, mucky loamy fine sand.
8 to 16 inches, friable, very dark gray loamy fine sand.
16 to 31 inches, friable, gray sandy loam.
31 to 55 inches, firm, gray and dark-gray light sandy clay loam mottled with yellowish brown.

The surface layer of this soil ranges from mucky loamy fine sand to loamy sand. Pocomoke and Rains soils differ mainly in thickness of the surface layer. The surface layer of the Pocomoke soils is 8 inches or more thick and is dark colored and highly organic. The surface layer of the Rains soils is generally about 4 inches thick. The Rains soils are slightly finer textured in the subsoil than the Pocomoke soils.

These soils have a small total acreage in the county and are scattered throughout the northern half. The native vegetation consists mainly of water-tolerant hardwoods, scattered longleaf and slash pines, low shrubs, and native grasses.

The soils in this unit are strongly acid or very strongly acid, are low in natural fertility, and have high to medium organic-matter content. Their available moisture capacity is moderate to low. Drainage is very slow. The root zone is restricted because the water table is near the surface much of the time.

If excess water is removed, these soils are moderately well suited to pasture and a few kinds of crops. Outlets for drainage, however, are scarce in most places. Drainage is also needed for best growth of trees. (Capability unit IVws–1; woodland suitability group 9)

Pocomoke and Rains soils, thick surface (Pt).—These soils have a thicker surface layer than Pocomoke and Rains soils and underlying layers that are considerably thicker. The surface layer is 18 to 30 inches thick in most places, but it is thinner than 18 inches or thicker than 30 inches in a few places. Because the thicker surface layer is rapidly permeable, the available moisture capacity is lower and plant nutrients are leached more rapidly.

These soils require slightly better management than Pocomoke and Rains soils but are similar to those soils in use and capability. (Capability unit IVws–1; woodland suitability group 9)

Rains Series

In the Rains series are deep, poorly drained, strongly acid soils that developed from thick beds of sandy clay loam and sandy loam. These soils occur on nearly level, low, flat or depressed areas of the uplands and along poorly defined drainageways. They have a very dark gray or gray loamy sand surface layer that is underlain by gray loamy sand. Within 30 inches of the surface is gray or light-gray sandy loam to fine sandy clay loam. The lower part of the subsoil is mottled with various shades of pale brown, pale yellow, strong brown, yellowish brown, and yellowish red. The parent material is mottled gray, strong-brown, and brownish-yellow sandy clay loam to clay.

Rains soils occur with the Pocomoke, Rutlege, Plummer, and Lynchburg soils. The surface layer of the Rains soils is not so thick or so highly organic as that of the Pocomoke and Rutlege soils, but the subsoil is finer textured and better developed. The Rains soils are more poorly drained than the Lynchburg and do not have a yellow subsoil.

The Rains soils have a moderate total acreage in the county and occur mainly throughout the northern half, but a few small areas are in the southwestern part near Ebro. The native vegetation is mainly water-tolerant hardwoods, scattered longleaf and slash pines, low shrubs, and native grasses. These soils have limited use for cultivated crops. Some small areas are used for improved pasture. During wet periods, a simple drainage system is needed to remove excess water. Most of the acreage is still in trees.

Rains loamy sand (Ra).—This poorly drained soil of the uplands occurs in low areas and generally has a clayey subsoil.

Representative profile in a wet, wooded area:

0 to 6 inches, very friable, very dark gray loamy sand.
6 to 14 inches, friable, gray to light-gray sandy loam.
14 to 34 inches, friable, gray to light-gray light sandy clay loam mottled with pale yellow and strong brown below 20 inches.
34 to 51 inches +, firm, gray fine sandy clay loam mottled with strong brown and yellowish red above 42 inches; mottles increase below 42 inches.

The plow layer ranges from 3 to 6 inches in thickness and is generally black but ranges from black to gray. It is underlain by dark-gray to light-gray loamy sand. The subsoil ranges from gray to light gray in color and from sandy loam to fine sandy clay loam in texture. The lower part of the subsoil is generally mottled with pale yellow, strong brown, and yellowish red. The underlying material is highly mottled sandy clay loam to clay that is stratified in some places.

Included with this soil are a few areas that have a loamy fine sand surface layer. In a few areas the surface layer is slightly thicker than 18 inches, and in some small areas it is thick and black. Small spots have a sandy clay subsoil.

This soil is strongly acid, low in natural fertility, and medium in organic-matter content. The available moisture capacity is moderate to low, and drainage is slow. The root zone is restricted by a water table that is near or at the surface much of the time.

If excess water is removed, these soils are moderately well suited to pasture and to a few kinds of cultivated crops. Drainage is also needed for best growth of trees. (Capability unit IVws–1; woodland suitability group 9)

Ruston Series

In the Ruston series are deep, well-drained, strongly acid soils that developed from thick beds of acid sandy clay loam on nearly level to strongly sloping uplands. These soils have a dark-gray to very dark grayish-brown loamy sand to coarse sand surface layer. Within a depth of 30 inches is sandy loam to sandy clay loam that ranges from strong brown to red but is dominantly yellowish red. The parent material is distinctly mottled sandy clay loam.

The Ruston soils occur with the Norfolk, Shubuta, Faceville, and Eustis soils. The subsoil in the Ruston soils is generally yellowish red instead of yellowish brown, as it is in the Norfolk soils. It is more friable and coarser textured than the subsoil of the Shubuta soils and is developed to a greater depth. It is coarser textured and more friable than the subsoil of the Faceville soils. Ruston soils are similar to Eustis soils in color but have a well-developed, fine-textured subsoil.

Ruston soils have a small total acreage in the county and occur in moderately small areas throughout the northern and central parts. These soils occur in intricate patterns with other soils. The native vegetation consists mainly of longleaf pine, slash pine, red oak, live oak, hickory, wiregrass, and many shrubs. These soils are well suited to many kinds of field crops and to improved pasture. Much of the acreage has been cleared and is used for forage crops and for corn, cotton, peanuts, and other cultivated crops. The soils are well suited to trees.

Ruston loamy sand, 2 to 5 percent slopes (RsB).—This deep, well-drained soil of the uplands has a friable, strong-brown to yellowish-red sandy loam to sandy clay loam subsoil.

Representative profile in a moist pasture:

0 to 5 inches, very friable, dark-gray loamy sand.
5 to 10 inches, very friable, brown loamy sand.
10 to 18 inches, friable, yellowish-red light sandy clay loam.
18 to 38 inches, friable, yellowish-red sandy clay loam.
38 to 65 inches +, friable, strong-brown sandy clay loam mottled with yellowish red, brownish red, and dark red.

The loamy sand plow layer ranges from 4 to 6 inches in thickness and from gray to very dark grayish brown in color. It is underlain by brown to yellowish-brown loamy sand to sandy loam that is 7 to 12 inches thick. The surface layer grades gradually to the subsoil. The subsoil ranges from sandy loam to sandy clay loam in texture and from strong brown to red in color but is generally yellowish red. In most places the subsoil, below a depth of 36 inches, is mottled with various shades of yellow, red, and brown. The underlying material is highly mottled with yellow, brown, and red. It varies in texture but is generally sandy clay loam that is stratified with sandy loam or loamy sand in some places. In some areas many iron concretions and quartz pebbles occur throughout the soil, particularly in areas where it is closely associated with the Carnegie soils.

Included in mapped areas of this soil are small, moderately eroded spots and a few areas with slopes of 0 to 2 percent. In a few areas the surface layer is slightly more than 18 inches thick. Although mottling generally occurs below a depth of 36 inches, in some small areas it is at 24 inches.

This soil is strongly acid and has moderate natural fertility and organic-matter content. It is sufficiently loamy to have good tilth, and the available moisture capacity is high. Permeability is moderately rapid in the surface layer and moderate in the subsoil. Surface drainage and internal drainage are good, and the soil is well aerated throughout. It retains plant nutrients well and responds well to fertilizer.

This soil is well suited to many kinds of cultivated crops, to improved pasture, and to trees. It makes good habitats for wildlife. (Capability unit IIe–2; woodland suitability group 4)

Ruston loamy sand, 2 to 5 percent slopes, eroded (RsB2).—Because this soil is more eroded than Ruston loamy sand, 2 to 5 percent slopes, it has a thinner surface layer. The surface layer ranges from 4 to 13 inches in thickness but is generally about 8 inches thick. The erosion is mainly sheet erosion, but a few areas have a few shallow gullies. To maintain high crop yields on this soil, more intensive use of cover crops and green-manure crops is required than on Ruston loamy sand, 2 to 5 percent slopes. Included in mapped areas are a few small spots that are severely sheet eroded.

Under good management that includes control of erosion, this soil is well suited to many kinds of cultivated crops and to improved pasture and trees. It makes good habitats for wildlife. (Capability unit IIe–2; woodland suitability group 4)

Ruston loamy sand, 5 to 8 percent slopes (RsC).—This sloping soil has more rapid runoff than Ruston loamy sand, 2 to 5 percent slopes, and is more susceptible to erosion. In some areas it is not so deep as the more nearly level soil and the underlying mottled material is nearer the surface. In these less deep areas mottling normally occurs at a depth of less than 38 inches.

Included with this soil are a few moderately eroded areas that have a surface layer ranging from 4 to 13 inches in thickness. A few small areas on slopes of 8 to 12 percent have a surface layer slightly thicker than 18 inches.

This soil is suited to most cultivated crops grown in the county, but the erosion hazard limits it to only moderately intensive use. However, yields are good under management that includes control of erosion. The soil is well suited to improved pasture and to trees, and it makes good wildlife habitats. (Capability unit IIIe–2; woodland suitability group 4)

Ruston loamy sand, 5 to 8 percent slopes, eroded (RsC2).—This sloping, moderately eroded soil generally has a thinner surface layer than Ruston loamy sand, 2 to 5 percent slopes. The surface layer ranges from 4 to 13 inches in thickness but is generally about 7 inches thick. The parent material is nearer the surface, or at a depth of 38 to 46 inches. This soil is mostly sheet eroded, but a few shallow or deep gullies occur in a few areas. Partly because this soil is sheet eroded, the surface layer is slightly browner than that in uneroded areas of Ruston soils.

Included with this soil are a few small areas that are severely eroded and have a sandy loam surface soil. The surface layer in these areas is browner than that in uneroded areas. In some places the subsoil is red.

This soil is only moderately well suited to cultivated crops. Under intensive management, it is well suited to most improved pasture plants, but white clover may be damaged in dry weather. It is also well suited to trees, and it makes good wildlife habitats. (Capability unit IIIe–2; woodland suitability group 4)

Ruston coarse sand, 2 to 5 percent slopes (RcB).—This soil has a coarser textured surface layer and subsoil than Ruston loamy sand, 2 to 5 percent slopes. In most places the surface layer is underlain by coarse sandy clay loam at a depth of less than 18 inches. This soil is similar to Ruston loamy sand, 2 to 5 percent slopes, in thickness and color, but it has lower available moisture capacity in the surface layer and subsoil. In most places many quartz pebbles occur on the surface and

throughout the soil. Permeability is very rapid in the surface layer and moderate in the subsoil. Natural fertility is low, but response to fertilizer is good. This soil is well suited to cultivated crops, to improved pasture, and to trees. (Capability unit IIe–2; woodland suitability group 4)

Ruston coarse sand, thick surface, 2 to 5 percent slopes (RdB).—This well-drained soil of the uplands has a surface layer 18 to 30 inches thick. The subsoil is yellowish-red sandy loam to sandy clay loam.

Representative profile in a moist wooded site:

0 to 6 inches, loose, very dark grayish-brown coarse sand.
6 to 25 inches, loose, strong-brown coarse sand.
25 to 36 inches, friable, yellowish-red coarse sandy loam.
36 to 42 inches, friable, yellowish-red light sandy clay loam mottled with strong brown and red.
42 to 56 inches +, friable sandy clay loam mottled with yellowish red, red, strong brown, and yellowish brown.

Included with this soil are a few areas that have slopes of 0 to 2 percent. In some small areas the subsoil is slightly below a depth of 30 inches or is slightly above 18 inches.

This soil is strongly acid and has moderate to low fertility and low organic-matter content. The available moisture capacity is low, and permeability is rapid in the surface layer and moderate in the subsoil. The soil is well aerated, retains plant nutrients well, and responds well to fertilizer.

This soil is suited to most locally grown crops, but yields are low unless intensive practices are used. If moderate practices are used to control erosion, the soil can be cultivated safely. Most plants used in improved pastures do well, but legumes are difficult to establish and maintain. The growth of trees is good. (Capability unit IIse–1; woodland suitability group 4)

Ruston coarse sand, thick surface, 5 to 8 percent slopes (RdC).—This sloping soil has more rapid runoff than Ruston coarse sand, thick surface, 2 to 5 percent slopes, and is more likely to erode. The parent material is nearer the surface in some areas.

Included with this soil are some small areas with slopes of 8 to 12 percent. In a few small areas the subsoil is slightly below a depth of 30 inches or slightly above 18 inches.

If high yields are to be maintained, this soil requires more intensive control of erosion and other good management than Ruston coarse sand, thick surface, 2 to 5 percent slopes. Cultivation can be moderately intensive under good management that includes control of erosion. The soil is suited to improved pasture and trees and as a habitat for wildlife. (Capability unit IIIes–2; woodland suitability group 4)

Rutlege Series

In the Rutlege series are deep, poorly drained to very poorly drained, strongly acid soils that developed from thick beds of sand and loamy sand. These soils normally occur on the uplands in low, nearly level areas, but in the central part of the county, a few small areas are on steeper slopes that receive seepage from the hillsides. The surface layer is highly organic, black or very dark gray fine sand to loamy fine sand that is underlain by dark-gray or white coarse sand to loamy sand. Some areas have finer textured material at a depth of 30 to 42 inches.

Rutlege soils occur mainly with the Plummer, Klej, and Blanton soils and developed from parent material similar to that of those soils. Rutlege soils, however, have a thicker, darker surface layer that is higher in organic-matter content. They are similar to the Plummer soils in drainage but are more poorly drained than the Klej and Blanton soils.

Rutlege soils are widely scattered in all parts of the county except the extreme southeastern. They are most extensive in the southern part. The native vegetation consists mainly of cypress, blackgum, sweetgum, myrtle, bay, scattered longleaf and slash pines, and various water-tolerant grasses. Most of this soil is still in native vegetation, but some areas are used as rangeland.

Rutlege loamy fine sand (Ru).—This poorly drained to very poorly drained soil of the uplands has a loose, dark-gray and black coarse sand surface layer and subsoil.

Representative profile:

0 to 9 inches, loose, black loamy fine sand.
9 to 17 inches, loose, very dark gray or dark-gray sand.
17 to 54 inches +, loose, gray coarse sand.

The surface layer ranges from 8 to 18 inches in thickness and from black to very dark gray in color. Some areas have a dark, highly organic surface layer that is as much as 24 inches thick. The underlying layers range from dark gray to white but are mainly dark gray to light gray. In some areas the underlying layers are loamy fine sand mottled with yellow and yellowish brown. In a few areas sandy loam to fine sandy clay loam occurs at a depth of 30 to 42 inches.

This soil is strongly acid and has moderate natural fertility and high organic-matter content. Permeability is rapid. Because the water table is very shallow, aeration is poor and the root zone is shallow.

This soil is not well suited to cultivated crops. Under good management that includes adequate drainage, high yields of improved pasture grasses can be produced. The soil is suited as woodland and for wildlife habitats. (Capability unit Vws–2; woodland suitability group 10)

Scranton Series

In the Scranton series are deep, somewhat poorly drained, strongly acid soils. They developed from thick beds of acid sand and loamy sand that overlie sandy clay loam and sandy clay. These soils occur on low, nearly level to gently sloping uplands. The surface layer is black or very dark gray fine sand that is high in content of organic matter. It is underlain by fine sand that is grayish brown or dark grayish brown in the upper part and is grayish brown to light yellowish brown or very pale brown in the lower part. The lower part is mottled with yellow, brown, and gray. In some areas fine-textured material occurs at a depth of 30 to 42 inches.

Scranton soils occur with the Klej, Blanton, Rutlege, Plummer, and Lynchburg soils. They are more poorly drained than the Klej and Blanton soils. Scranton soils are better drained than the Rutlege and Plummer soils. Scranton soils, however, lack a well-developed, fine-textured subsoil like that in the Lynchburg soils.

In this county Scranton soils have a small total acreage and are generally in small areas. They are widely scattered throughout the county but are mainly in the central

part. The native vegetation consists principally of longleaf pine, slash pine, myrtle, gallberry, native grasses, and a few scattered palmettos. Only a few scattered areas have been cleared and are used for improved pasture.

Scranton fine sand (Sc).—This somewhat poorly drained, deep sandy soil of the uplands has a thick surface layer that is high in organic-matter content.

Representative profile in a moist wooded site:

0 to 8 inches, very friable, black fine sand.
8 to 15 inches, loose, grayish-brown fine sand mottled with olive gray and light yellowish brown.
15 to 45 inches, loose, light yellowish-brown fine sand mottled with brownish yellow and very pale brown.
45 to 52 inches +, loose, mottled light yellowish-brown and very pale brown fine sand.

Fine sand extends from the surface to a depth of more than 52 inches. The surface layer ranges from 8 to 14 inches in thickness and is black to very dark gray. It is underlain by grayish-brown to dark grayish-brown fine sand. The underlying layers range from light yellowish brown to very pale brown, and the yellow, brown, and gray mottles vary in number.

Included with this soil are a few areas on slopes of 2 to 5 percent. In small spots finer textured material occurs at a depth of 30 to 42 inches.

This soil is strongly acid. It is moderately low in natural fertility and contains a large amount of organic matter in the surface layer. Because permeability is very rapid, plant nutrients leach rapidly. The available moisture capacity is low. For best crop growth, simple practices of drainage may be needed. In wet seasons the water table rises to within a few inches of the surface.

These soils are well suited to cultivated crops that are tolerant of slight wetness. They are excellent for improved pasture, and they are good for trees. (Capability unit IIws–1; woodland suitability group 7)

Scranton fine sand, shallow (Sf).—This deep, somewhat poorly drained sandy soil of the uplands has a thick surface layer that is high in organic-matter content. Finer textured material is at a depth of 30 to 42 inches.

Representative profile in a wet, wooded area:

0 to 10 inches, very friable, black fine sand.
10 to 23 inches, loose, brownish-yellow fine sand with few yellowish-brown mottles.
23 to 32 inches, very friable, very pale brown loamy fine sand mottled with yellowish red and yellowish brown.
32 to 53 inches +, friable sandy clay loam that is mottled strong brown, light gray, yellowish red, and yellowish brown in the upper part and is grayer below 42 inches.

The fine sand surface layer ranges from 8 to 14 inches in thickness and is black to very dark gray. It is underlain by a layer of grayish-brown to dark grayish-brown fine sand, and that, in turn, by fine sand or loamy fine sand that ranges from brownish yellow to very pale brown. The finer textured substratum is at a depth of 30 to 42 inches and is mottled strong brown, light gray, yellowish red, yellowish brown, and gray. Gray increases with depth. The substratum ranges from fine sandy loam to fine sandy clay loam but is sandy clay loam in most places.

This soil is strongly acid and is moderately low in natural fertility. It contains a large amount of organic matter in the surface layer. Because permeability is very rapid, plant nutrients leach rapidly. The available moisture capacity is low. For best crop growth, simple practices of drainage may be needed. In wet periods the water table rises to within a few inches of the surface.

These soils are well suited to cultivated crops that are tolerant of slight wetness. They are excellent for improved pasture and are good for trees. (Capability unit IIws–1; woodland suitability group 7)

Shubuta Series

Soils of the Shubuta series are deep, moderately well drained to well drained, and strongly acid. They developed from thick beds of acid sandy clay and clay on nearly level to steep uplands. The surface layer is very dark grayish-brown loamy sand and is underlain by a layer of dark-brown to light yellowish-brown loamy sand to fine sandy loam. The transition from the surface layer to the subsoil is rather abrupt. The subsoil is yellowish-red to dark-red fine sandy clay loam or fine sandy clay in the upper part and is fine sandy clay mottled with yellowish brown, red, and very pale brown in the lower part. At a depth of 20 to 30 inches is mottled fine sandy clay to fine sandy clay loam.

The Shubuta soils occur with the Cuthbert, Faceville, and Ruston soils. The subsoil of the Shubuta soils is more uniform, less compact, and thicker than that of the Cuthbert soils, but it is thinner, finer textured, and less friable than that of the Faceville and Ruston soils.

Shubuta soils have a moderately large total acreage in the county. They occur mainly in the central part, on and somewhat north of the north-facing escarpment that extends in an east-west direction between the higher, deeper, sandy soils to the south and the dominantly finer textured soils to the north. In the northern half of the county small areas of Shubuta soils occur with other soils in intricate patterns. A few small areas are around Ebro in the southwestern part of the county.

The native vegetation consists mainly of longleaf pine, slash pine, loblolly pine, various hardwoods, low shrubs, and native grasses. Most of the acreage is still in forest, but a few scattered areas are used for improved pasture and cultivated crops. These soils are moderately well suited to many kinds of shallow-rooted crops. In most places they are cultivated with more extensive soils.

Shubuta loamy sand, 2 to 5 percent slopes (ShB).—This deep, well-drained soil of the uplands has a firm, yellowish-red, clayey upper subsoil and a slowly permeable, mottled lower subsoil.

Representative profile in a moist wooded site:

0 to 7 inches, very friable, very dark grayish-brown loamy sand.
7 to 11 inches, friable, dark yellowish-brown fine sandy loam.
11 to 35 inches, very firm, yellowish-red fine sandy clay with few yellowish-brown and red mottles below 21 inches.
35 to 75 inches +, very firm, mottled dark-red, brownish-yellow, and light-gray fine sandy clay that grades to fine sandy clay loam below 52 inches.

The loamy sand plow layer ranges from 5 to 6 inches in thickness. It is very dark grayish brown and is underlain by dark-brown to light yellowish-brown loamy fine sand or fine sandy loam. Within 14 inches of the surface is sandy clay to clay that ranges from yellowish red to red and is mottled at a depth of 23 to 35 inches. The underlying material occurs at a depth of 32 to 42 inches and is generally highly mottled with red, yellow, brown, and gray. It varies in texture but is stratified sandy clay loam

to clay in most places. In a few areas near the Choctawhatchee River, the underlying material is fine sandy loam to fine sand.

Included with this soil are a few small areas that have a loamy fine sand and sand surface soil. Also included are a few scattered areas with slopes of 0 to 2 percent and of 5 to 8 percent and a few areas that are moderately eroded.

This soil is strongly acid and is low in natural fertility and in organic-matter content. It is sufficiently loamy to have good tilth, and the available moisture capacity is moderate. Permeability is moderate in the surface layer and slow in the subsoil. Surface runoff is rapid, and internal drainage is medium. A moderately deep to shallow root zone somewhat limits the kinds of crops that can be grown on this easily eroded soil.

This soil is moderately well suited to some shallow-rooted crops, and moderately good improved pasture can be grown. It is well suited as woodland and for wildlife habitats. (Capability unit IIIes–1; woodland suitability group 5)

Shubuta loamy sand, 2 to 5 percent slopes, eroded (ShB2).—This moderately eroded soil has faster runoff than Shubuta loamy sand, 2 to 5 percent slopes, and requires more intensive control of erosion, including the use of more cover crops. It is mainly sheet eroded, but some areas have scattered shallow and deep gullies. Although the surface layer ranges from 3 to 8 inches in thickness, it is about 6 inches thick in most places.

Included with this soil are small, severely eroded spots. These spots are generally browner than the uneroded soil and have a sandy loam surface layer.

This soil is moderately well suited to some shallow-rooted crops, and moderately good improved pasture can be grown. It is well suited as woodland and for wildlife habitats. (Capability unit IIIes–1; woodland suitability group 5)

Shubuta loamy sand, 5 to 8 percent slopes (ShC).—This sloping soil has faster runoff than Shubuta loamy sand, 2 to 5 percent slopes, and, therefore, is more susceptible to erosion. It requires more intensive erosion control, including the use of more cover crops. It is shallower to the parent material, which is at a depth of 24 to 36 inches. Included with this soil are small, scattered, moderately eroded areas.

This soil is poorly suited to cultivated crops, but some shallow-rooted crops can be grown occasionally. It is best suited to pasture grasses and trees and as a habitat for wildlife. (Capability unit IVes–1; woodland suitability group 5)

Shubuta loamy sand, 5 to 8 percent slopes, eroded (ShC2).—This sloping, moderately eroded soil has faster runoff than Shubuta loamy sand, 2 to 5 percent slopes, and, therefore, is more susceptible to erosion. Cultivated areas require more intensive erosion control, including the use of more cover crops. Erosion is mainly sheet erosion, but some areas have shallow and deep gullies. The surface layer ranges from 3 to 8 inches in thickness but is about 6 inches thick in most places. The parent material is at a depth of 24 to 36 inches.

Included with this soil are small, severely eroded areas. In most places these areas are browner than the uneroded soil and have a sandy loam surface layer.

This soil is poorly suited to cultivated crops, but some shallow-rooted crops can be grown occasionally. Its best use is for improved pasture, woodland, and wildlife habitats. (Capability unit IVes–1; woodland suitability group 5)

Swamp

This land type consists of very poorly drained areas not commonly used for agriculture.

Swamp (Sw).—Swamp is covered with water except during periods of extreme drought. It occurs along streams, at the head of bays, and in depressions that have no outlets. General alluvium is deposited in the areas along streams. Small amounts of material are washed from adjacent uplands into the areas at the head of bays and in depressions. The few places that do not receive deposits are mostly along the edge of Swamp.

Swamp is generally inaccessible because of the water and the dense vegetation. The soil material varies and is in intricate patterns. It is strongly acid. The soil is mainly mineral, but it contains a large amount of organic matter. Small areas of organic soils are included.

The native vegetation consists mainly of a mixture of sweetgum, blackgum, cypress, scattered slash pine, various oaks, bay, low shrubs, and vines. Because drainage is very poor and flooding is likely, the use of this land is limited to forest. (Woodland suitability group 12)

Tifton Series

In the Tifton series are deep, well-drained, strongly acid soils that developed from thick beds of reticulately mottled acid sandy clay and sandy clay loam on nearly level to sloping uplands. These soils have a very dark gray to dark grayish-brown loamy sand surface layer that is underlain by yellowish-brown loamy fine sand. Within 14 inches of the surface is yellowish-brown to brownish-yellow fine sandy loam to fine sandy clay. The upper few inches of the subsoil is fine sandy loam. Mottles of strong brown and yellow normally occur below 32 inches and increase in number as depth increases. The parent material is mottled fine sandy clay loam and fine sandy clay.

Tifton soils occur with soils of the Norfolk, Marlboro, Goldsboro, Faceville, and Carnegie series. The subsoil of the Tifton soils is yellower than that of the Carnegie, Goldsboro, and Faceville soils and is finer textured than that of the Goldsboro and Norfolk soils. It is more sticky than the subsoil of the Norfolk soil and is slightly less sticky and more friable than the subsoil of the Marlboro soils. The Tifton soils are better drained than the Goldsboro soils. They have more iron concretions than the Marlboro, Norfolk, Faceville, and Goldsboro soils.

The Tifton soils have a small total acreage in the county. They are widely distributed throughout the northern half but are mainly in the northeastern part near Chipley. The native vegetation consists principally of longleaf pine, slash pine, various oaks, dogwood, native grasses, and a few low shrubs. Much of the acreage is used for cultivated crops and improved pasture. These soils are well suited to cultivated crops, to improved pasture, and to trees.

Tifton loamy sand, 2 to 5 percent slopes (TfB).—This well-drained, deep soil of the uplands has a well-developed,

clayey subsoil. Iron pebbles are abundant throughout the profile.

Representative profile in a wooded area:

0 to 6 inches, very friable, dark grayish-brown loamy sand.
6 to 14 inches, very friable, yellowish-brown loamy fine sand.
14 to 33 inches, friable, yellowish-brown heavy fine sandy clay loam to clay loam.
33 to 61 inches +, friable to firm, brownish-yellow heavy fine sandy clay loam mottled with strong brown above 46 inches and with strong brown, red, and yellowish brown below 46 inches.

The loamy sand plow layer ranges from 5 to 7 inches in thickness and from dark gray to dark grayish brown in color. It is underlain by a yellowish-brown to brownish-yellow layer. The subsoil is yellowish-brown to brownish-yellow heavy sandy clay loam to fine sandy clay but is heavy fine sandy clay loam in most places. Mottles of strong brown and yellow normally occur in the subsoil at a depth of 32 to 44 inches, but they are as near the surface as 30 inches in some areas. The underlying material is highly mottled with brown, yellow, and red, and it occurs at a depth of 44 to 64 inches.

Included with this soil are a few areas that have a fine sandy loam surface layer. Also included are small areas that are moderately sheet eroded and have a surface layer 4 to 10 inches thick. A few areas are on slopes of 0 to 2 percent.

This soil is strongly acid and has moderately high natural fertility and organic-matter content. It is sufficiently loamy to have good tilth, and the available moisture capacity is high. Permeability is moderately rapid in the surface layer and moderately slow in the subsoil. Surface drainage and internal drainage are good. If it is not protected, this soil is moderately susceptible to erosion. It retains plant nutrients well and responds well to fertilizer. The root zone is deep and well aerated.

This soil is well suited to all locally grown crops, pasture grasses, and clovers. It is well suited as woodland, and it makes good habitats for wildlife. (Capability unit IIe–1; woodland suitability group 4)

Tifton loamy sand, 2 to 5 percent slopes, eroded (TfB2).—This moderately eroded soil generally has a thinner surface layer than Tifton loamy sand, 2 to 5 percent slopes. It is mainly sheet eroded, but there are a few deep or shallow gullies in some places. The surface layer ranges from 4 to 10 inches in thickness but is generally about 7 inches thick. Mottling in the subsoil normally occurs at a depth of 32 to 40 inches, but in a few areas it occurs at 30 to 34 inches. The parent material is generally at a depth of 40 to 60 inches but in a few areas is at 38 to 42 inches.

Included with this soil are a few, small, severely eroded areas that have a fine sandy loam surface layer.

This soil is well suited to all crops grown in the county and to improved pasture. To maintain high yields of cultivated crops, more intensive use of soil-improving crops is required on this soil than on Tifton loamy sand, 2 to 5 percent slopes, and more intensive practices for control of erosion are necessary. It is well suited as woodland, and it makes good habitats for wildlife. (Capability unit IIe–1; woodland suitability group 4)

Tifton loamy sand, 5 to 8 percent slopes, eroded (TfC2).—This sloping, moderately eroded soil generally has a thinner surface layer than Tifton loamy sand, 2 to 5 percent slopes. As a result of erosion, the parent material is generally nearer the surface and occurs at a depth of 38 to 50 inches. Most areas have been uniformly sheet eroded, but some areas have a few deep or shallow gullies. The surface layer ranges from 4 to 10 inches in thickness but is generally about 6 inches thick. Mottling normally occurs at a depth of 30 to 38 inches.

Included with this soil are a few areas that are slightly eroded or are severely sheet eroded. In the slightly eroded areas, the surface layer ranges from 10 to 14 inches in thickness. Also included are a few small areas on slopes of 8 to 12 percent.

For high yields of cultivated crops, more intensive management is required on this soil than on Tifton loamy sand, 2 to 5 percent slopes. Under good management that includes control of erosion, this soil is suited for most locally grown crops. It is well suited to improved pasture and to trees, and it makes good habitats for wildlife. (Capability unit IIIe–1; woodland suitability group 4)

Use and Management of Soils

This section discusses the use and management of soils for crops and pasture, as woodland, for wildlife, and in engineering works.

Use of Soils for Agriculture

This subsection contains four main parts. In the first part, general practices of soil management are discussed, and in the second part, capability grouping is explained. In the third part, the soils of the county are placed in capability units and the use and management of these capability units are discussed. The fourth part contains a table that lists estimated yields of crops and pasture.

General practices of soil management [3]

When soils are cultivated or planted to pasture plants, good management practices are necessary if the productivity of the soils is to be maintained. This subsection discusses some of the practices needed for cultivated crops and for pasture.

CULTIVATED CROPS

The productivity of most soils in Washington County is limited by (1) low organic-matter content, (2) deficiency in plant nutrients, (3) susceptibility to erosion, (4) excess water in the root zone, or (5) insufficient moisture. Practices are needed that reduce the effects of these adverse characteristics.

Supplying organic matter.—A continuous supply of plant residue mixed into the soil is needed to maintain the content of organic matter. The organic material can be provided by returning all crop residue to the soil, by planting and turning under cover crops, and by using the soil for pasture part of the time and for cultivated crops part of the time. A high content of organic matter increases the effectiveness of applied fertilizer and lime, increases the available moisture capacity, and releases plant food as the organic matter decays.

[3] H. E. VANARSDALL, management agronomist, and E. D. HOLCOMBE, woodland conservationist, Soil Conservation Service, assisted in preparing this subsection.

Returning crop residue to the soil, rather than burning or otherwise removing it, is a simple practice that helps maintain organic matter. The effectiveness of this practice depends on the kind of crops grown and the amount of residue produced.

Cover crops provide organic material and protect the soil from erosion. The crops may be legumes or nonlegumes, but legumes provide more residue and release more nitrogen as they decay. Legumes suitable for most soils in the county are lupine, vetch, indigo, and southern peas. Lupine and vetch are cool-season plants and can be grown after most of the summer crops are harvested. Indigo and southern peas are summer legumes. Small grain is the principal nonlegume grown as a cover crop (fig. 4). The small grains generally do not produce as much residue as legumes and are, therefore, less effective in maintaining organic matter. The common practice of grazing livestock on small grain reduces the amount of residue returned to the soil.

Organic matter is also maintained by using the soils for pasture for a few years and then cultivating them for a short time. Pasture sod produces large amounts of organic material.

The available moisture capacity of soils is affected by the content of organic matter. The thick-surface phases of the Bowie, Norfolk, and Ruston soils and the Lakeland and Eustis soils are droughty. Crops on these soils are damaged more often by drought than are crops on the loamy sands that have a thinner surface layer. The effects of drought can be reduced by frequently returning crop residue to these soils and by planting drought-resistant crops.

***Figure 4.*—Oats planted in the fall make a good cover crop during the winter and are plowed under in the spring as green manure.**

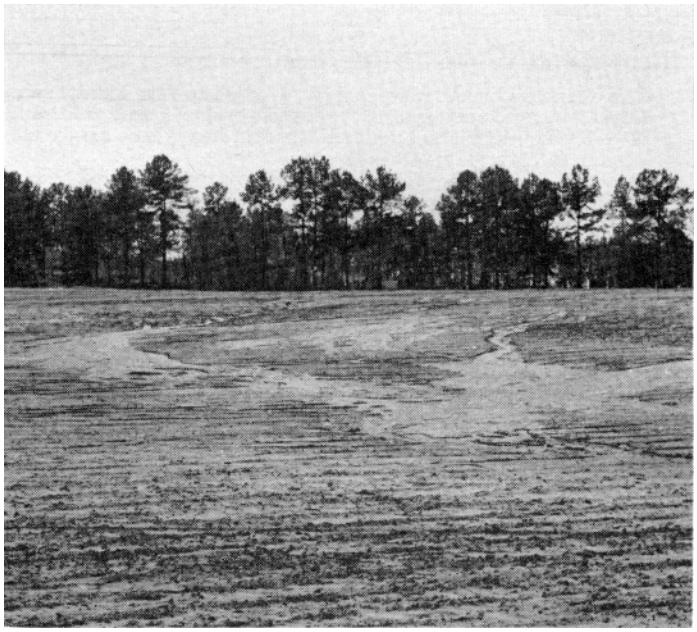

***Figure 5.*—Norfolk loamy sand, 5 to 8 percent slopes, eroded. A cover of vegetation, terraces, and contour tillage would have protected this soil.**

Fertilization and liming.—The soils in Washington County are acid. Lime is needed to reduce this acidity and to provide the calcium and magnesium that crops need. Nonlegumes also need applications of fertilizer that contains the primary plant nutrients, nitrogen, phosphate, and potash. Legumes need applications of phosphate and potash, but they supply their own nitrogen and generally do not need this nutrient.

The county agriculture agent, by interpreting soil tests, can supply information on amounts of fertilizer and lime needed by specified crops.

Erosion control.—Surface runoff from bare soils must be controlled so that it does not wash away the soil. Figure 5 shows a severely eroded, unprotected field. If runoff is slowed, the hazard of erosion is reduced and water has more time to soak into the soil. Terraces, contour cultivation, and wide strips of close-growing plants can be used to control runoff and erosion.

Channel-type terraces are suited to most of the better soils in the county that have uniform slopes of not more than 8 percent. This kind of terrace is made by digging a broad, shallow channel and by using the spoil to form a broad-base ridge on the lower side. These terraces should be nearly level and constructed across the slope on a predetermined grade. They intercept the water moving down the slope and conduct it from the field slowly. Terraces are generally 50 to 110 feet apart, but the space between them varies according to the kind of soil and the slope. The water from the terraces should be discharged into well-stabilized waterways or into areas with dense vegetation. Figure 6 shows a step in the construction of a channel-type terrace.

Natural draws make the best waterways. If draws are not available, dig wide, shallow channels and protect them with sod crops or with other close-growing plants. These

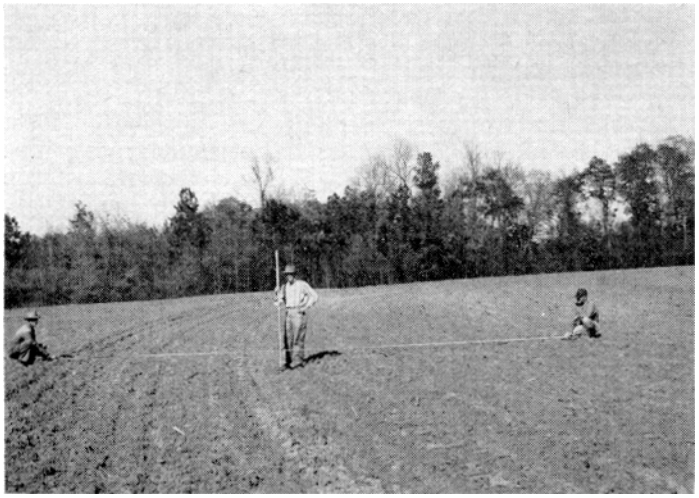

Figure 6.—**Checking the construction of a channel-type terrace on Tifton loamy sand, 2 to 5 percent slopes.**

channels should be stabilized before water is discharged into them. To prevent channel cutting, the characteristics of the soil and the amount of water to be discharged should be known so that the channel velocity and the capacity of the waterway can be determined. Figure 7 shows a well-protected waterway.

In contour cultivation the soils are plowed across the slope in the same direction that the terraces extend. The furrows act as small terraces by slowing the water as it moves down the slope. On the gently sloping, more porous sandy soils, contour cultivation is generally sufficient to control runoff water. On other soils, terraces are needed to supplement contour cultivation. On the field shown in figure 8, the contour furrows are plowed across the slope, parallel to terraces.

Water is also intercepted and spread by wide strips of close-growing plants at intervals across the slope. These strips supplement terraces and contour cultivation. When they alternate with strips of row crops, they improve the soil.

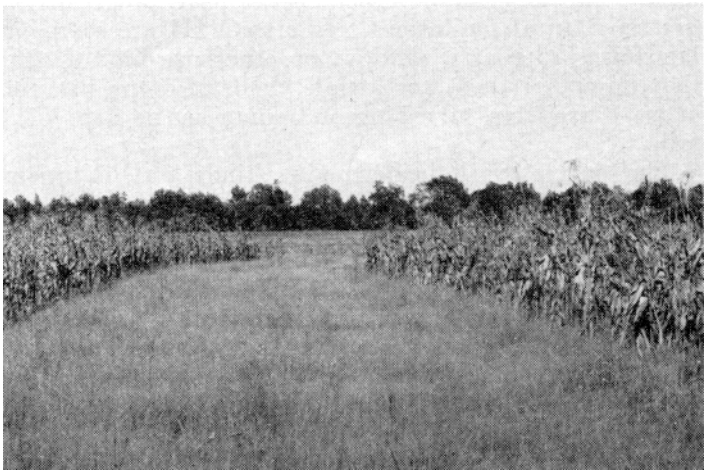

Figure 7.—**This grassed waterway has a wide, shallow channel and is well protected by a good sod of bahiagrass.**

726-719—65——4

Figure 8.—**Peanuts planted on the contour on Ruston loamy sand, 2 to 5 percent slopes. (Capability unit IIe–2)**

The soils in the county are not so susceptible to wind erosion as they are to water erosion, but some soils planted to clean-tilled crops are damaged by the wind during spring. Generally, enough protection from wind is provided in spring by returning crop residue to the soil and by keeping the residue on or near the surface.

Artificial drainage.—Many naturally wet soils are highly productive if water is controlled (fig. 9). In draining low-lying areas, the main problem is locating or constructing outlet ditches and finding areas into which the water can be drained safely. Although erosion is generally not a problem, cover crops and sod should be used to supply organic matter. The soils also need applications of fertilizer and lime. Figure 10 shows a low area that has been drained.

Figure 9.—**This excess water on Lynchburg loamy fine sand, 0 to 2 percent slopes, can be removed by simple practices of drainage.**

Figure 10.—**Surface drainage has removed excess water from this pasture on a depressed area of Rains loamy sand. Water control is essential on soils in capability unit IVws-1.**

Irrigation.—Although there is usually enough rainfall to supply the moisture needs of most general crops, the use of sprinklers to irrigate crops of high value is increasing. Irrigation is profitable only at a high level of management that provides for adding large amounts of fertilizer, for returning crop residue to the soil, and for planting cover crops.

Water for irrigation can be stored in small farm ponds that are constructed in natural drains having small watersheds. The pond site should be carefully studied before a site is selected because it is necessary to know the suitability of the foundation material, the amount of water available, and the storage capacity of the proposed pond. Dams and spillways should be carefully designed and constructed. Figure 11 shows a pond in Washington County.

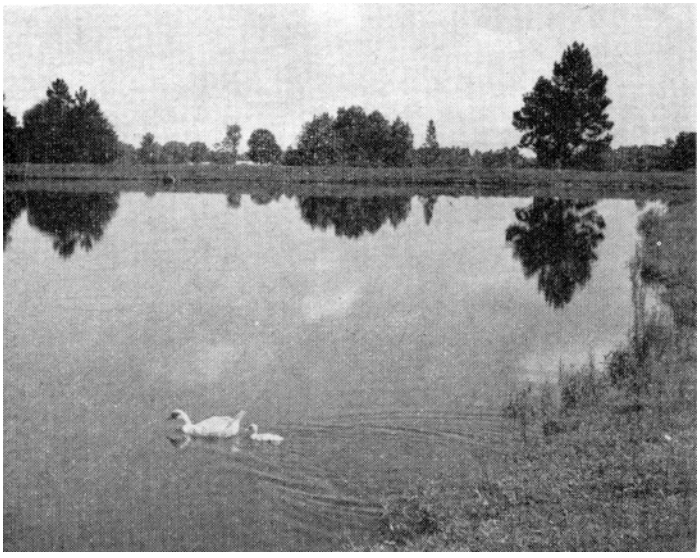

Figure 11.—**This farm pond stores water for irrigation, helps to control floods downstream, and is excellent for fishing.**

PASTURE

Pasture usually provides the least expensive feed for livestock and at the same time adds organic matter to the soil and protects it from erosion.

Several kinds of pasture plants are suitable on most soils in the county. Bahiagrass and bermudagrass can be grown on many kinds of soils. White clover and crimson clover, the principal legumes grown in the county, are suited to soils that have a high available moisture capacity and to soils that have a high water table. Either of these clovers grows well in a mixture with bahiagrass or bermudagrass, but a stand of clover is more difficult to maintain with bahiagrass than with bermudagrass. Clipping pasture early in fall and removing the clippings help to obtain a good growth of clover.

Additions of phosphate and potash help the growth of clover, and nitrogen added in summer increases the growth of grasses. Nitrogen, phosphate, and potash should be added to droughty soils that are not suited to clover but are suited to grasses. The capacity for grazing depends to a large extent on the amount of fertilizer applied. Additions of lime are needed to obtain satisfactory growth of pasture plants. A pasture in clover generally requires more lime than one in grasses. Soil tests indicate how much and how often lime and fertilizer should be applied.

Grazing should be regulated so that pasture plants have time to recover after they are grazed. Then the plants produce more forage and provide better protection for the soil. Figure 12 shows a well-managed pasture.

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 soils are grouped at three levels, the capability class, subclass, and unit. Eight capability classes are in the broadest grouping and are designated by Roman numerals I through VIII. In class I are the soils that have few limitations, the widest range of use, and the least risk of damage when they are used. The soils in the other classes have progressively greater natural limitations. In class VIII are soils and landforms so rough, shallow, or otherwise limited that they do not produce worthwhile yields of crops, pasture, or wood products. Washington County has no class VIII soils.

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 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 and not in Washington County, indicates that the chief limitation is climate that is too cold or too dry.

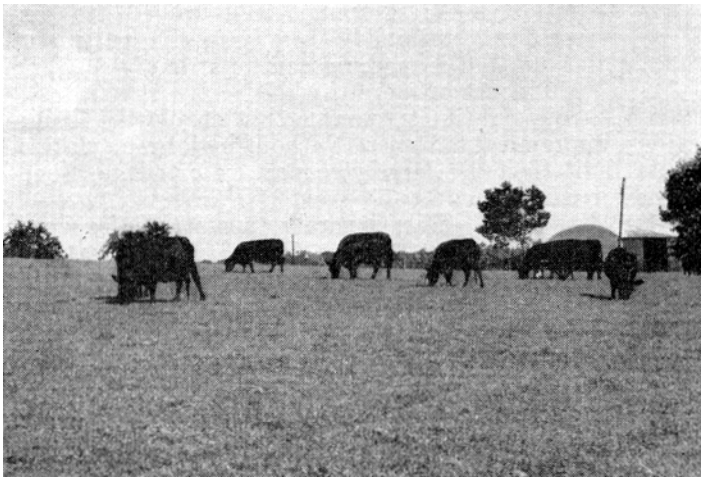

Figure 12.—**Well-managed pasture on Shubuta loamy sand, 2 to 5 percent slopes, eroded, in foreground, and Cuthbert soils, 5 to 8 percent slopes, eroded, in background. Soils in classes III and VI.**

Most soils of Washington County have two kinds of limitations that affect use and management about equally. Excessively drained soils on slopes generally are both droughty and subject to erosion; many soils that have poor soil qualities also have seasonal problems of excess water; and many wet soils have serious limitations even if properly drained. These soils with two kinds of limitations are placed in units that have two small letters designating the subclass. The first letter stands for the more severe limitation.

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 are susceptible to little or no erosion but have other limitations that limit their use largely to pasture, range, woodland, or wildlife.

Within the subclasses are the capability units, which are 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.

Soils are placed 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: Nearly level, well-drained, deep soils that are on uplands and have a loamy sand surface layer and a moderately permeable subsoil.

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

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

Unit IIe–1: Gently sloping, deep, well-drained soils that are acid, are not more than moderately eroded, and have a loamy sand surface layer and a moderately slowly permeable, clayey subsoil.

Unit IIe–2: Gently sloping, deep, well-drained soils that are acid, are no more than moderately eroded, and have a loamy sand or sandy surface layer and a moderately permeable, clayey subsoil.

Subclass IIws: Soils that have moderate limitations because of excess water and poor soil qualities.

Unit IIws–1: Nearly level, somewhat poorly drained, sandy soils that are deep, are strongly acid, and have a high organic-matter content.

Unit IIws–2: Nearly level to gently sloping, moderately well drained, deep soils that are acid and have a loamy coarse sand or thick sandy surface layer and a moderately permeable to slowly permeable subsoil.

Unit IIws–3: Nearly level, moderately well drained soils that have a moderately thick loamy fine sand surface layer and a very compact, slowly permeable, clayey subsoil.

Subclass IIse: Soils that have moderate limitations because of poor soil qualities and a moderate erosion hazard if not protected.

Unit IIse–1: Nearly level and gently sloping, well-drained, uneroded soils that are deep, are strongly acid, and have a thick sandy surface layer and a friable, moderately permeable subsoil.

Subclass IIsw: Soils that have moderate limitations because of low available moisture capacity, poor tilth, or excess water.

Unit IIsw–1: Nearly level, slightly wet soils that are in depressions and consist of material moved from adjacent areas.

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

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

Unit IIIe–1: Sloping, moderately eroded, well-drained soils that are deep, are acid, and have a loamy sand surface layer and a moderately permeable to slowly permeable, clayey subsoil.

Unit IIIe–2: Sloping, well-drained, deep soils that are acid, are no more than moderately eroded, and have a moderately permeable, friable subsoil.

Subclass IIIew: Soils that have severe limitations because of risk of erosion and excess water.

Unit IIIew–1: Gently sloping, moderately well drained, no more than slightly eroded soils that have a moderately deep, acid loamy fine sand surface layer and a very compact, slowly permeable, clayey subsoil.

Subclass IIIes: Soils that have severe limitations because of risk of erosion, low available moisture capacity, and low fertility.
Unit IIIes–1: Gently sloping, well-drained, acid soils that are no more than moderately eroded and have a loamy surface layer and a clayey subsoil.
Unit IIIes–2: Sloping, well-drained, deep soils that are no more than slightly eroded and have a thick, sandy surface layer and a friable subsoil.
Subclass IIIws: Soils that have severe limitations because of excess water, low available moisture capacity, or low fertility.
Unit IIIws–1: Nearly level and gently sloping, strongly acid, somewhat poorly drained soils that have a loamy surface layer and a slowly or moderately permeable, clayey subsoil.
Unit IIIws–2: Nearly level, strongly acid, wet soils that have a loamy surface layer and a very slowly permeable, plastic, clayey subsoil.
Subclass IIIse: Soils that have severe limitations because of low available moisture capacity, low fertility, or risk of erosion.
Unit IIIse–1: Nearly level to gently sloping, very rapidly permeable, deep sands.
Unit IIIse–2: Nearly level to gently sloping, moderately well drained sands that are strongly acid, rapidly permeable, and moderately deep to deep.

Class IV.—Soils that have very severe limitations that restrict the choice of plants, require very careful management, or both.
Subclass IVew: Soils that have very severe limitations because of risk of erosion and excess water.
Unit IVew–1: Sloping, moderately well drained and somewhat poorly drained, acid soils that are moderately deep to deep, are no more than slightly eroded, and have a thick, loamy or sandy surface layer and a well-developed, clayey subsoil.
Subclass IVes: Soils that have very severe limitations because of risk of erosion, low available moisture capacity, or low fertility.
Unit IVes–1: Sloping, no more than moderately eroded, well-drained soils that have a loamy sand surface layer and a dense clay subsoil.
Unit IVes–2: Nearly level to gently sloping, shallow, moderately well drained and somewhat poorly drained soils that are no more than moderately eroded and have a sandy or loamy surface layer and a slowly permeable, clayey subsoil.
Subclass IVws: Soils that have very severe limitations because of excess water, moderate available moisture capacity, or low fertility.
Unit IVws–1: Nearly level, wet soils that have a loamy sand surface layer and a slowly permeable subsoil.
Subclass IVse: Soils that have very severe limitations because of low available moisture capacity, low fertility, or risk of erosion.
Unit IVse–1: Sloping, slightly wet, deep sands that are strongly acid, rapidly permeable, and 30 inches or more thick.
Unit IVse–2: Sloping, well-drained to excessively drained, very rapidly permeable sand that is medium acid to strongly acid and 30 inches or more thick.

Class V.—Soils not likely to erode that have other limitations, impractical to remove without major reclamation, that limit their use largely to pasture or range, woodland, or wildlife food and cover.
Subclass Vws: Soils generally unsuitable for cultivation because of excess water and low fertility.
Unit Vws–1: Nearly level, strongly acid, wet soils that have a thin, loamy surface layer and a plastic, very slowly permeable clay subsoil.
Unit Vws–2: Nearly level, strongly acid sands that are deep and very wet.
Subclass Vsw: Soils generally unsuitable for cultivation because of low available moisture capacity, low fertility, or excess water.
Unit Vsw–1: Nearly level, somewhat poorly drained, strongly acid, sandy soils that are underlain by a pan stained with organic matter.

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 VIes: Soils that have severe limitations because of risk of erosion, low available moisture capacity, and poor soil qualities.
Unit VIes–1: Sloping to strongly sloping, slightly eroded, deep sands that are well drained to excessively drained and strongly acid; and moderately well drained, slightly eroded soils that have a sandy or loamy surface layer and a thin to moderately thick, dense clay subsoil.
Subclass VIse: Soils that have severe limitations because of low available moisture capacity, low fertility, or severe risk of erosion.
Unit VIse–1: Nearly level to strongly sloping, well-drained to excessively drained, very deep coarse sands that are strongly acid and no more than slightly eroded.

Class VII.—Soils that have very severe limitations that make them unsuitable for cultivation without major reclamation and that restrict their use largely to grazing, woodland, or wildlife.
Subclass VIIes: Soils that have very severe limitations because of risk of erosion, very low fertility, or very low available moisture capacity.
Unit VIIes–1: Gently sloping to strongly sloping, severely eroded soils and very steep, excessively drained to moderately well drained soils that are no more than moderately eroded and have a sandy to clayey surface layer and a deep sand to dense clay subsoil.
Subclass VIIws: Soils that have very severe limitations because of excess water and poor soil qualities.
Unit VIIws–1: Moderately well drained to very poorly drained soils that lie adjacent to streams and are subject to frequent overflow.
Subclass VIIse: Soils that have severe limitations because of steep slopes, low natural fertility, low available moisture capacity, or risk of erosion.

Unit VIIse–1: Moderately steep or steep, well-drained to excessively drained, very deep coarse sands.

Unit VIIse–2: Miscellaneous land types that have very little agricultural value.

Class VIII.—Soils and landforms that have limitations that preclude their use, without major reclamation, for commercial production of plants; and that restrict their use to recreation, wildlife, water supply, or esthetic purposes. (No class VIII soils in this county.)

Management by capability units

In this subsection, the soils of the county are listed in capability units and the use and management of these units are discussed. A capability unit is a group of soils that are suitable for the same uses and that respond to management in about the same way.

CAPABILITY UNIT I-1

In this capability unit are nearly level, well-drained, deep soils that have a loamy sand surface layer 13 to 18 inches thick. The subsoil is friable sandy loam to sandy clay loam 30 to 48 inches thick. It is underlain by moderately friable to firm, mottled sandy clay loam.

These soils have a deep, well-aerated root zone, low to moderate organic-matter content in the surface layer, and good tilth that is easy to maintain. They have moderate to high available moisture capacity and good ability to hold plant nutrients in available form. They are strongly acid throughout. Permeability is moderate to rapid in the surface layer and moderate in the subsoil. The soils are—

BoA Bowie loamy sand, 0 to 2 percent slopes.
NoA Norfolk loamy sand, 0 to 2 percent slopes.

These soils have few permanent limitations when cultivated. They are eroded only slightly or not at all, and they can be cultivated safely by using ordinary methods of good farming. These methods include good tillage and adding organic matter and fertilizer. Although erosion is not likely, diverting water from higher soils occasionally may be needed. These soils are well suited to many kinds of cultivated crops because the available moisture capacity is moderate to high, the internal movement of air and water is favorable, the root zone is deep, and plant nutrients are retained well.

These soils are among the most productive in the county. They are well suited to all crops grown in the area. They can be made highly productive by managing crop residue well; by planting soil-improving perennials, annual cover crops, or green-manure crops; and by adding lime and fertilizer. Partly because of the high available moisture capacity, good yields of most crops can normally be expected without irrigation. Irrigation, however, is practical in maintaining the uniform moisture needed to insure optimum growth of truck crops and other crops of high value.

These soils are well suited to most pasture grasses and legumes grown in the county. If fertilizer and lime are added, both cool-season and warm-season plants grow well. Suitable cool-season plants are tall fescue, sweetclover, white clover, and crimson clover. The white clover may be injured by drought more often than the other cool-season plants. Warm-season plants that grow well are bahiagrass and improved bermudagrass. If enough fertilizer and lime are added, hay is produced in large quantities and grazing is good.

These soils are not extensive. Most areas have been cleared and are cultivated or are in pasture. Originally, these soils supported excellent stands of mixed pines and oaks.

CAPABILITY UNIT IIe-1

In this capability unit are deep, acid, well-drained soils that have a loamy sand surface layer 4 to 14 inches thick. All these soils are gently sloping, and some of them are moderately eroded. The loamy sand surface layer grades to a friable heavy sandy clay loam to sandy clay subsoil that is 30 to 48 inches thick. Underlying the subsoil is moderately friable to firm sandy clay loam and sandy clay. These soils have a deep, well-aerated root zone and a surface soil that contains a moderate amount of organic matter and is generally in good tilth. They have a high available moisture capacity and good ability to hold plant nutrients in available form. Permeability is moderately rapid to moderately slow. The soils are—

CaB Carnegie loamy sand, 2 to 5 percent slopes.
CaB2 Carnegie loamy sand, 2 to 5 percent slopes, eroded.
FaB Faceville loamy sand, 2 to 5 percent slopes.
FaB2 Faceville loamy sand, 2 to 5 percent slopes, eroded.
MaB Marlboro loamy sand, 2 to 5 percent slopes.
MaB2 Marlboro loamy sand, 2 to 5 percent slopes, eroded.
TfB Tifton loamy sand, 2 to 5 percent slopes.
TfB2 Tifton loamy sand, 2 to 5 percent slopes, eroded.

These soils have few permanent limitations to cultivation. They are well suited to crops, pasture, trees, and wildlife but are moderately susceptible to erosion. They can be cultivated safely, however, if they receive ordinary management that provides moderate practices of erosion control, good tillage, and additions of organic matter and fertilizer. These soils are well suited to many kinds of crops because available moisture capacity is high, the internal movement of air and water is favorable, the root zone is deep, and plant nutrients are retained well.

These soils are well suited to all cultivated crops grown in the county and are among the most productive soils. Nevertheless, they erode readily when cultivated, unless practices of erosion control are used. To control erosion, use a cropping system that provides cover crops at least half the time and maintain a water-disposal system that has terraces and stabilized outlets. Keep the content of organic matter high by planting green-manure crops and by conserving all crop residue. To obtain high yields, alternate cultivated crops and pasture. Keep pasture on these soils for at least 2 successive years and cultivated crops for not more than 2 successive years. Because these soils retain a large amount of moisture, crops can be grown without irrigation. Sprinkler irrigation, however, is practical for maintaining the uniform moisture needed for optimum growth of some crops of high value.

These soils are well suited to most pasture grasses and legumes grown in the county. If fertilizer and lime are added, both cool-season and warm-season plants grow well. Suitable cool-season plants are tall fescue, sweetclover, white clover, and crimson clover. The white clover may be injured by drought more often than other cool-season plants. Warm-season plants that grow well are bahiagrass and improved bermudagrass. If enough fertilizer and lime are added, hay is produced in large quantities and grazing is good.

These soils are not extensive. Most areas have been cleared and are cultivated or are in pasture.

CAPABILITY UNIT IIe-2

In this capability unit are deep, acid, well-drained soils that have a loamy sand or sandy surface layer about 18 inches thick. All these soils are gently sloping, and some are moderately eroded. The sandy surface layer grades to a friable sandy loam to fine sandy clay loam subsoil that is 30 to 48 inches thick. Underlying this subsoil is moderately friable to firm sandy loam to sandy clay loam. These soils have a deep, well-aerated root zone and a surface soil that is generally moderate to low in organic-matter content and is generally in good tilth that can be easily maintained. Although water moves freely through these soils, they have a medium to high available moisture capacity. They can retain fertilizer in a form available to plants. Permeability is moderate to rapid in the surface layer and moderate in the subsoil. The soils are—

BoB Bowie loamy sand, 2 to 5 percent slopes.
BoB2 Bowie loamy sand, 2 to 5 percent slopes, eroded.
NoB Norfolk loamy sand, 2 to 5 percent slopes.
NoB2 Norfolk loamy sand, 2 to 5 percent slopes, eroded.
RsB Ruston loamy sand, 2 to 5 percent slopes.
RsB2 Ruston loamy sand, 2 to 5 percent slopes, eroded.
RcB Ruston coarse sand, 2 to 5 percent slopes.

These soils have few permanent limitations. They are well suited to cultivated crops, pasture, trees, and wildlife, but they are moderately susceptible to erosion. They can be cultivated safely, however, if they receive ordinary management that provides moderate practices of erosion control, good tillage, and additions of organic matter and fertilizer. These soils are well suited to many kinds of crops because the available moisture capacity is moderate to high, the internal movement of air and water is favorable, the root zone is deep, and the plant nutrients are retained well.

These soils are among the most productive ones in the county, and they are well suited to all crops grown there. Nevertheless, cultivated fields erode readily unless erosion control practices are used. To control erosion, use a cropping system that provides a cover crop for at least half of the time and a water-disposal system that has terraces and stabilized outlets. Keep the content of organic matter high by planting green-manure crops and by conserving all crop residue. Alternate pasture and crops to obtain high yields. The soils should be in pasture for at least 2 successive years and in cultivated crops for not more than 2 successive years. Because these soils retain a large amount of moisture, crops can be grown without irrigation. Sprinkler irrigation, however, is practical for maintaining the uniform moisture needed for optimum growth of some crops of high value.

These soils are well suited to most pasture grasses and legumes grown in the county. If fertilizer and lime are added, both cool-season and warm-season plants grow well. Suitable cool-season plants are tall fescue, white clover, sweetclover, and crimson clover. White clover may be injured by drought more often than the other cool-season plants. Warm-season plants that grow well are bahiagrass and improved bermudagrass. If enough fertilizer and lime are added, hay is produced in large quantities and grazing is good.

These soils are moderately extensive. Many areas have been cleared and are cultivated or are in pasture. Some areas that were cultivated have returned to native vegetation or have been planted to pines.

CAPABILITY UNIT IIws-1

In this capability unit are nearly level, somewhat poorly drained, deep soils in which fine sand extends from the surface to a depth of more than 30 inches. Surface runoff is slow, but the soils are very permeable and permit rapid internal movement of water. In wet periods the water table rises to within a few inches of the surface, but in dry periods it may recede below 60 inches. The surface layer of these soils is black to very dark gray fine sand that is high in organic-matter content. It is 8 to 15 inches thick and is underlain by a porous fine sand. In some areas fine sandy loam to fine sandy clay loam is 30 to 42 inches below the surface. These soils are strongly acid throughout. They are—

Sc Scranton fine sand.
Sf Scranton fine sand, shallow.

These soils have few permanent limitations and, under only moderate management, can be used safely to produce good yields of many kinds of crops. A deep sandy surface layer, rapid permeability, and rapid leaching place minor restrictions on their use. Imperfect drainage causes periodic wetness and restricts the variety of crops that can be grown, or makes special drainage practices necessary.

These are good soils for cultivated crops, but only crops tolerant of slight wetness are suited. Among these are truck crops, small grain, and corn. These soils are moderately low in natural fertility, and good management is required to obtain high yields. They can be made highly productive by management that includes using crop residue well, planting green-manure crops, and adding lime and fertilizer. Damage by excess water generally can be prevented for most crops by surface drainage, by tile drainage, or by bedding. Cropping systems should provide a soil-improving crop at least half of the time. Good yields of cultivated crops are obtained if improved pasture of a high-quality sod is used at least 2 years out of every 4.

These soils produce excellent improved pasture. After heavy rains, simple drainage is required to remove excess surface water. If fertilizer and lime are applied, both cool-season and warm-season plants grow well. Suitable cool-season plants are tall fescue, white clover, sweetclover, and crimson clover. Warm-season plants that grow well are bahiagrass and improved bermudagrass. If enough fertilizer and lime are added, large quantities of hay are produced and grazing is good.

These soils are not extensive, and most areas are in trees or pasture.

CAPABILITY UNIT IIws-2

In this capability unit are moderately well drained, acid soils that are nearly level to gently sloping. These soils have a loamy coarse sand or coarse sand surface layer 10 to 30 inches thick. The surface layer grades to a friable sandy loam or sandy clay loam that is 18 to 30 inches thick. In most places the subsoil is underlain by moderately permeable to slowly permeable sandy clay loam, but in a few places the underlying material is sandy clay. The root zone generally is deep. In some of these soils drainage is restricted by the slowly permeable sub-

soil, and in others by a high water table that lies above impervious layers in the substratum. These soils have moderate available moisture capacity and low natural fertility. They are—

GdA Goldsboro loamy coarse sand, 0 to 2 percent slopes.
GdB Goldsboro loamy coarse sand, 2 to 5 percent slopes.
GcA Goldsboro coarse sand, thick surface, 0 to 2 percent slopes.
GcB Goldsboro coarse sand, thick surface, 2 to 5 percent slopes.

These soils have few permanent limitations, and they can be cultivated safely under moderate management. The limited root zone, slow permeability, low natural fertility, and other characteristics slightly limit the capability of these soils. Restricted drainage limits the kinds of crops that can be grown or makes special drainage practices necessary. The more sloping areas are likely to erode if they are not protected.

If these soils are fertilized and otherwise well managed, they are well suited to crops that tolerate slight wetness. They are best suited to corn, small grain, and truck crops. Surface drainage or tile drainage generally is enough to prevent damage to most crops. Management should include planting green-manure crops, using crop residue well, and adding fertilizer and lime. Some of the large steeper areas need terraces that have stabilized outlets. The cropping system should provide a cover crop on the soils at least half of the time or should alternate pasture with tilled crops. A good practice is to keep a full sod on these soils 2 years in every 4. Before a tilled crop is planted, the sod crop should be plowed under. Grow cover crops between successive clean-tilled crops.

These soils are well suited to most pasture plants grown in the county. Suitable cool-season plants are tall fescue, sweetclover, crimson clover, and white clover. Suitable warm-season plants are bahiagrass and improved bermudagrass. If yields are to be high, pasture plants need large additions of fertilizer, as well as other good pasture management.

These soils are extensive, and many areas are cultivated or are in pasture.

CAPABILITY UNIT IIws-3

The soils in this capability unit are moderately well drained, acid, and nearly level. They have a loamy fine sand surface layer 10 to 20 inches thick. The upper part of the subsoil is friable to firm fine sandy clay loam to silty clay loam 8 to 20 inches thick. It grades to very compact, slowly permeable, mottled sandy clay, silty clay, or clay, which restricts drainage and the root zone. In the surface layer and the upper part of the subsoil, the root zone is favorable for the growth of roots. These soils have moderately high available moisture capacity. They are—

EfA Eulonia loamy fine sand, 0 to 2 percent slopes.
EnA Eulonia loamy fine sand, thick surface, 0 to 2 percent slopes.

These soils are moderately restricted for crop production by low natural fertility, slow permeability, wetness, and a shallow root zone. They are similar to the soils of capability unit IIws–2 but are suited to fewer kinds of crops because they have slower permeability and a shallower root zone.

If these soils are fertilized and otherwise well managed, they are suited to crops that tolerate slight wetness. They are best suited to corn and small grain. Ordinary practices of surface drainage are generally enough to prevent damage to most crops. Management of these soils should provide planting green-manure crops, using crop residue well, and adding fertilizer and lime. The cropping system should keep a cover crop on the soil at least half of the time or should alternate pasture with tilled crops. A good practice is to keep the soils in full sod 2 years in every 4.

These soils are suited to cultivated crops and to pasture or hay. Suitable cool-season plants are tall fescue, crimson clover, sweetclover, and white clover. Suitable warm-season plants are bahiagrass and improved bermudagrass. For high yields of pasture, large applications of fertilizer are needed, as well as other good management.

These soils are not extensive, and most areas are still in trees.

CAPABILITY UNIT IIse-1

In this capability unit are deep, well-drained, nearly level and gently sloping soils on uplands. The surface layer of these soils is loamy sand, sand, or coarse sand 18 to 30 inches thick. It is underlain by friable, porous, well-aerated sandy loam or sandy clay loam that is 30 to 60 inches thick and is normally underlain by sandy clay loam. Permeability is rapid in the surface layer and moderate in the subsoil. The available moisture capacity is low in the surface layer and moderately high in the subsoil. These soils are strongly acid and generally low in organic-matter content. They are low in natural fertility but respond well to fertilizer. These soils are similar to those in capability unit IIe–2, but they have a thicker surface layer, are more droughty, and are more rapidly leached of plant nutrients. The soils are—

BwB Bowie loamy sand, thick surface, 2 to 5 percent slopes.
NrA Norfolk sand, thick surface, 0 to 2 percent slopes.
NrB Norfolk sand, thick surface, 2 to 5 percent slopes.
RdB Ruston coarse sand, thick surface, 2 to 5 percent slopes.

These soils have few permanent limitations, and they can be cultivated safely if management is moderate. They are only slightly susceptible to erosion, but use for cultivated crops is somewhat limited by low available moisture capacity and rapid leaching of plant nutrients.

Most local crops are grown on these soils, but yields are low unless intensive practices are used to improve the soil. Maintain a high supply of organic matter by planting green-manure crops and using all crop residue well. Alternate improved pasture with cultivated crops, and keep well-managed pasture in full sod at least 2 years in every 3. These soils are not so susceptible to erosion as those in capability unit IIe–2, but terraces are frequently needed. All terraces should drain into stabilized outlets. Crops of high value need to be irrigated and highly fertilized if yields are to be high.

These soils are well suited to most of the pasture grasses and legumes grown in the county, and they produce good yields if they are well fertilized and limed. Crimson clover is a suitable cool-season plant, but the soils are too droughty for white clover. Bahiagrass and bermudagrass are suitable warm-season plants. Pasture plants need large additions of fertilizer and other good pasture management.

These soils are moderately extensive, and many areas have been cleared and are cultivated or are in pasture.

CAPABILITY UNIT IIsw-1

Local alluvial land (Lu) is the only mapping unit in this capability unit. This land consists of small isolated areas of local alluvium in pockets or other low positions at the bottom of slopes. Most areas are moderately well drained. The soil material is mixed and has characteristics somewhat similar to those of the soils from which the alluvium washed. The soil material ranges from sand to sandy clay loam and differs in the amount of stratification. In some areas the material is coarse textured and has been recently washed from adjacent sandy soils. The material is finer textured in other areas and has been accumulating a long time. Organic-matter content in recent deposits is generally low, and that in older deposits is high. The available moisture capacity varies but is generally high. Natural fertility is generally moderately high to high.

Local alluvial land is suitable for intensive cultivation. Although it is occasionally flooded by runoff from adjacent soils, water in most places can be controlled by ordinary drainage or diversion from higher land. Erosion is not a problem.

Areas of this land are usually small and are included in fields dominated by soils from which the alluvium washed. Most common crops are well suited, and most areas of this land produce higher yields than the adjacent soils because they have better moisture content and are more fertile. Crops are occasionally damaged by runoff from adjacent slopes. Because surface outlets are seldom available, most drainage is internal. Clean-tilled crops should be alternated with green-manure crops but should not occupy this land more than half of the time. All crop residue should be plowed under. In a cropping system that includes improved pasture, keep well-managed sod crops on the land at least 2 years in every 4. Yields are increased by large applications of fertilizer.

This land is well suited to improved pasture consisting of all locally grown plants. These plants do well if the soil is well fertilized and limed and if grazing is controlled. Suitable cool-season plants are tall fescue, sweetclover, white clover, and crimson clover. Pensacola bahiagrass and bermudagrass are the most widely grown warm-season grasses. Good management of pasture is needed.

Local alluvial land is not extensive. Most areas have been cleared for cultivation, but only a few are now cultivated. Many areas have returned to native vegetation.

CAPABILITY UNIT IIIe-1

In this capability unit are well-drained, deep, acid soils that have a loamy sand surface layer 4 to 10 inches thick. The surface layer grades to a friable heavy sandy clay loam to sandy clay subsoil that is 30 to 48 inches thick. The subsoil is underlain by moderately friable to firm sandy clay loam and sandy clay. Tilth is generally good, the root zone is well aerated, and the surface layer has moderate organic-matter content. The soils have high available moisture capacity and can hold plant nutrients in a form available to plants. Permeability is moderately rapid to moderately slow. The soils are moderately eroded and are highly susceptible to further erosion. They are—

CaC2 Carnegie loamy sand, 5 to 8 percent slopes, eroded.
FaC2 Faceville loamy sand, 5 to 8 percent slopes, eroded.
TfC2 Tifton loamy sand, 5 to 8 percent slopes, eroded.

A severe hazard of erosion limits the capability of these soils. In unprotected areas the steep slopes and low infiltration cause rapid runoff and severe erosion. The soils are well suited to cultivation if intensive practices of erosion control are used. These soils are suited to many kinds of crops because the available moisture capacity is high, aeration is good, the root zone is deep, and plant nutrients are retained well.

These soils are well suited to all crops grown in the county, but they require intensive management if erosion is to be controlled. The cropping system should keep cover crops or pasture on the soils at least two-thirds of the time. Also needed is a complete water-disposal system that provides terraces and vegetated outlets. Plant crops in strips across the slope. To help maintain organic matter and tilth, plow or disk into the soils cover crops, green-manure crops, and all crop residue. General crops normally receive enough moisture without irrigation, but crops of high value should be irrigated with sprinklers that are carefully controlled to prevent surface runoff.

These soils are well suited to most locally grown pasture grasses and legumes. Both cool-season and warm-season plants grow well if the soils are fertilized and limed. Suitable cool-season plants are tall fescue, sweetclover, white clover, and crimson clover. Bahiagrass and bermudagrass are suitable warm-season plants. Because these soils are highly erodible, they need pasture plants that form a full sod soon after seeding. Because response to fertilizer is good, large applications are practical.

These soils are not extensive, and most areas are cleared and cultivated or are in pasture.

CAPABILITY UNIT IIIe-2

The soils in this capability unit are well drained, deep, acid, and sloping. They have a loamy sand surface layer 4 to 18 inches thick. These soils are low in most plant nutrients, but they retain fertilizer well in a form that plants can use. Although water moves freely through them, the soils have a moderate to high available moisture capacity. They are highly susceptible to erosion. The soils are—

BoC Bowie loamy sand, 5 to 8 percent slopes.
BoC2 Bowie loamy sand, 5 to 8 percent slopes, eroded.
NoC Norfolk loamy sand, 5 to 8 percent slopes.
NoC2 Norfolk loamy sand, 5 to 8 percent slopes, eroded.
RsC Ruston loamy sand, 5 to 8 percent slopes.
RsC2 Ruston loamy sand, 5 to 8 percent slopes, eroded.

A hazard of erosion limits the capability of these soils. Because slopes are steep and infiltration is restricted, runoff is rapid and erosion is likely in unprotected areas. The soils are well suited to cultivation if intensive practices of erosion control are used. These soils are suited to many kinds of crops because the available moisture capacity is moderate to high, aeration is good, the root zone is deep, and plant nutrients are retained well.

Although these soils are well suited to all crops grown in the county, intensive management is needed to control erosion. The cropping system should keep cover crops or pasture on the soils at least two-thirds of the time. Also needed is a complete system of water disposal that provides terraces and vegetated outlets. Plant crops in strips

across the slope. Plowing or disking cover crops and crop residue into the soils helps to maintain organic matter and good tilth. General crops normally receive enough moisture without irrigation, but crops of high value should be irrigated with sprinklers that are carefully controlled to prevent surface runoff.

These soils are well suited to most pasture grasses and legumes grown in the county. Both cool-season and warm-season plants grow well if fertilizer and lime are added. Suitable cool-season plants are tall fescue, sweetclover, white clover, and crimson clover, but white clover may be damaged by drought more often than other cool-season plants. Bahiagrass and improved bermudagrass are suitable warm-season plants. Because these soils are highly erodible, they need to be protected by pasture plants that form a full sod soon after seeding. Pasture plants need fairly large additions of fertilizer.

These soils are not extensive. Many areas have been cleared for cultivation, but only a few areas are now cultivated. Many fields that were cultivated have returned to native vegetation or have been planted to pines.

CAPABILITY UNIT IIIew-1

The soils in this capability unit are moderately well drained, acid, and gently sloping. They are only slightly eroded but are subject to further erosion if they are not protected by adequate cover. These soils have a loamy fine sand surface layer 10 to 30 inches thick. The upper part of the subsoil is friable to firm fine sandy clay loam to silty clay loam 8 to 20 inches thick. The lower part is very compact, slowly permeable, mottled sandy clay, silty clay, or clay. Organic-matter content is moderate, and natural fertility is low. The root zone is favorable in the surface layer and the upper part of the subsoil. Root development, however, is restricted by the compact, poorly aerated, slowly permeable lower subsoil, which also restricts drainage. These soils have moderately high available moisture capacity. They are—

EfB Eulonia loamy fine sand, 2 to 5 percent slopes.
EnB Eulonia loamy fine sand, thick surface, 2 to 5 percent slopes.

A hazard of erosion severely limits the use of these soils for cultivated crops. Wetness and other soil characteristics also restrict their use. Because permeability and internal drainage are slow, these soils remain wet and poorly aerated during wet periods. Surface runoff is rapid during these periods, and unprotected areas erode easily. Plants suited to these soils are few because of the compact, poorly aerated lower subsoil.

If these soils are fertilized and otherwise well managed, they are suited to crops that tolerate slight wetness. They are best suited to corn and small grain. The soils erode rapidly unless they are protected by good cover. Management should provide for planting green-manure crops, using crop residue well, and adding fertilizer and lime. Also needed is a water-disposal system that includes terraces and stabilized outlets. A suitable cropping system provides cover crops at least two-thirds of the time or alternates pasture with tilled crops. Keeping the soils in full sod 4 years in every 6 is a good practice.

Although these soils are suited to cultivated crops, they are better suited to pasture or hay. Suitable cool-season plants are tall fescue, white clover, and crimson clover. Suitable warm-season plants are bahiagrass and improved bermudagrass. If yields are to be high, pasture plants need large additions of fertilizer, as well as other good management.

These soils are not extensive, and most areas are still in trees.

CAPABILITY UNIT IIIes-1

The soils in this capability unit are well drained, gently sloping, and acid. Some of them are moderately eroded, and all are susceptible to erosion unless protected. The surface layer is loamy sand 3 to 14 inches thick, and the subsoil is sandy clay loam to fine sandy clay 12 to 30 inches thick. The lower part of the subsoil is mottled and is usually denser than the upper part. In the surface layer, permeability is rapid and available moisture capacity is moderately low. The upper part of the subsoil has moderate to low permeability and moderately high available moisture capacity. Permeability is very slow in the lower subsoil and substratum. Because water and air move slowly through the lower part of these soils, the root zone is restricted. The soils have low natural fertility. They are—

OkB Oktibbeha soils, 2 to 5 percent slopes.
ShB Shubuta loamy sand, 2 to 5 percent slopes.
ShB2 Shubuta loamy sand, 2 to 5 percent slopes, eroded.

These soils are moderately well suited to many uses but are susceptible to erosion if not protected. Runoff is rapid, partly because the subsoil is slowly permeable. This dense, poorly aerated subsoil is unfavorable for development of roots. Because fertility and the available moisture capacity are low, productivity is low and practices of erosion control are hard to establish and maintain.

Most areas of these soils are moderately well suited to cultivated crops, but the choice of crops is limited because of the moderately shallow root zone. Yields are low unless these soils are well managed. Management should provide for planting cover crops, returning crop residue to the soils, and adding lime and fertilizer. Cultivated crops should not be grown more than one-third of the time. If tilled crops are alternated with pasture, these soils should be in pasture 4 years in every 6. Where practical, establish a complete system of water control that includes terraces and stabilized outlets. Keep a dense cover on small areas, areas dissected by natural draws and drainageways, and other areas not suited to terracing.

Moderately good improved pasture can be grown on these soils. Most local tame grasses are suitable, but growth is stunted in dry periods because roots do not penetrate the soils deeply. Most legumes are not well suited. If management is good, the more drought-resistant legumes can be grown successfully on the deeper soils. A full sod is needed soon after seeding or sprigging to prevent severe erosion before the pasture is established. Prepare the seedbed carefully, use enough seed or sprigs, apply adequate fertilizer and lime, and control grazing.

These soils have a small total acreage in the county. Some areas have been cleared and are cultivated or are in pasture.

CAPABILITY UNIT IIIes-2

In this capability unit are sloping, deep, well-drained soils on uplands. These soils are only slightly eroded but, if cultivated, are susceptible to moderately severe erosion. They have a loamy sand, sand, or coarse sand

surface layer 18 to 30 inches thick. The subsoil is friable, porous, well-aerated sandy loam or sandy clay loam 30 to 60 inches thick. It is underlain by sandy clay loam. Permeability is rapid in the surface layer and moderate in the subsoil. The available moisture capacity is low in the surface layer and moderate to moderately high in the subsoil. These soils are strongly acid. The content of organic matter and natural fertility are low, but response to fertilizer is good. These soils are similar to those in capability unit IIIe–2, but they have a thicker surface layer, are more droughty, and are more rapidly leached. The soils are—

BwC Bowie loamy sand, thick surface, 5 to 8 percent slopes.
NrC Norfolk sand, thick surface, 5 to 8 percent slopes.
RdC Ruston coarse sand, thick surface, 5 to 8 percent slopes.

The use of these soils is limited by an erosion hazard and by the thick sandy surface layer that is droughty and rapidly leached. The rapid runoff on the steep slopes causes the loose sandy surface layer to erode easily. The soils are well suited to cultivation if intensive practices are used to control erosion and to improve the soils.

Under good soil management, use for general crops can be moderately intensive. Good yields can be obtained if the content of organic matter is maintained and the soils are liberally fertilized and limed. The cropping system should provide cover crops at least two-thirds of the time or should alternate pasture with tilled crops. A good practice is to keep the soils in full sod at least 4 years in every 6. Also needed is a complete water-disposal system that includes terraces and protected outlets. Cultivate on the contour, and plant rotation crops in contour strips. Although most crops can be grown without irrigation, sprinkler irrigation is needed to maintain uniform moisture for crops of high value.

These soils are well suited to pasture. Most warm-season and cool-season grasses and legumes that are grown in northern Florida are suitable. Crimson clover grows well, but the soils are too sandy and too droughty for white clover. The most suitable warm-season plants are bahiagrass and improved varieties of bermudagrass. Pasture needs to be well fertilized and limed. To prevent erosion, a full sod is needed soon after seeding. By controlling grazing, the stunting of the grasses can be prevented.

These soils are not extensive. Many areas that were cultivated or in pasture have returned to native vegetation or have been planted to pines.

CAPABILITY UNIT IIIws-1

In this capability unit are somewhat poorly drained, strongly acid soils that have a high water table. These soils occur on low, nearly level and gently sloping areas. Their surface layer is loamy sand or loamy fine sand that is 12 to 30 inches thick, and their subsoil is sandy loam to sandy clay. Permeability is rapid to moderately rapid in the surface layer but is slow in the lower part of the subsoil. The water table normally fluctuates between depths of 20 and 40 inches but, after a heavy rain, sometimes rises to within 20 inches of the surface. Aeration is moderately good above the water table, and root penetration is moderately deep. These soils contain a medium amount of organic matter, are moderately low in fertility, and have a moderately high available moisture capacity. They are—

DuB Dunbar loamy sand, 2 to 5 percent slopes.
LyA Lynchburg loamy fine sand, 0 to 2 percent slopes.
LyB Lynchburg loamy fine sand, 2 to 5 percent slopes.
LzA Lynchburg loamy fine sand, thick surface, 0 to 2 percent slopes.
LzB Lynchburg loamy fine sand, thick surface, 2 to 5 percent slopes.

The use of these soils is limited mainly by wetness. Control of water, especially in the lowest lying areas, is difficult. These soils are suitable for cultivation because the texture of the surface layer is good, available moisture capacity is moderately high, and when, the soils are drained, aeration is good.

If these soils are fertilized and otherwise well managed, they are well suited to crops that tolerate wetness. Truck crops, potatoes, corn, small grain, and soybeans grow well. High fertility and organic matter should be maintained by returning all crop residue to the soils, by planting green-manure crops, and by adding adequate lime and fertilizer. Water can be drained quickly from the surface by bedding and open ditches. The cropping system should provide a cover crop on the soils at least half of the time. If cultivated crops are alternated with improved pasture, the soils should be kept in pasture for at least 2 years after each cultivated crop is harvested.

The soils of this unit are suited to most pasture grasses and legumes grown in the county, but drains are needed to remove water quickly in wet periods. Both cool-season and warm-season plants grow well if the soils are fertilized and limed. Tall fescue, white clover, crimson clover, and sweetclover are suitable warm-season plants. Ordinary practices of good pasture management are needed.

These soils are extensive. Some areas have been cleared for cultivation, but many areas are planted to improved pasture.

CAPABILITY UNIT IIIws-2

Only Bladen soils (Bd) are in this capability unit. These soils are poorly drained, deep, and strongly acid. Their surface layer is loamy sand to clay loam, and their subsoil is firm, plastic sandy clay to clay. Unless they are artificially drained, these soils are wet most of the time. The surface layer contains a moderate amount of organic matter. Permeability is rapid to moderately slow in the surface layer and very slow in the subsoil. The available moisture capacity is moderate to high, and natural fertility is moderate.

Wetness is the main limitation to the use of these soils. Control of water is difficult because the subsoil is very slowly permeable, and even if drainage is well established, these soils waterlog in wet periods. The subsoil is very poorly aerated, and the root zone is restricted.

If these soils are adequately drained and otherwise well managed, they are suited to crops that tolerate slight wetness. Water can be removed from the surface by properly spaced ditches or by bedding. A good cropping system is one in which deep-rooted, green-manure crops are used frequently to improve soil structure and tilth and the permeability of the subsoil. For high yields large additions of lime and fertilizer are needed.

If they are intensively managed, these soils are well suited to improved pasture. Drains are needed to remove

excess water after heavy rains. Pasture of grass and clover is good in winter if the soils are limed and fertilized. Pasture of warm-season grasses is also well suited.

These soils are not extensive. Many areas have been cleared and are in pasture. A few areas have been cultivated but are now idle.

CAPABILITY UNIT IIIse-1

In this unit are deep, well-drained sandy soils on high, broad, nearly level to gently sloping uplands. These soils are uneroded or are only slightly eroded, but if cultivated, they are susceptible to erosion. They have a deep sand surface layer that is porous and very rapidly permeable to water and air. In many places sandy loam to sandy clay loam is at a depth of 30 to 60 inches. The available moisture capacity is low, and added plant nutrients leach rapidly. These soils are medium to strongly acid and are low in organic-matter content. They are—

EuB Eustis sand, shallow, 0 to 5 percent slopes.
LkB Lakeland sand, shallow, 0 to 5 percent slopes.

These soils are limited in their suitability for agriculture because their low available moisture capacity and rapid leaching make them droughty and low in plant nutrients. Water erosion is a minor problem, though these soils are subject to gullying and wind erosion if they are not protected.

These soils are moderately well suited to cultivated crops. Watermelons and a few other special crops produce fair yields if management is intensive. Maintain the organic-matter content and fertility by returning all crop residue to the soils, by planting green-manure crops, and by applying adequate fertilizer and lime. The cropping system should provide cover crops for the soils at least two-thirds of the time, or it should alternate improved pasture with clean-tilled crops. A good practice is to keep full sod on these soils at least 4 years in every 6. Before planting the clean-tilled crops, plow under the sod. After the tilled crops are harvested, annual cover crops should be planted.

These soils are suited to improved pasture grasses, but clover does not grow well. Deep-rooted bahiagrass and improved varieties of bermudagrass grow well if these soils are well fertilized, limed, and otherwise well managed. Management should provide a firm seedbed, enough sprigs or seed, adequate fertilizer and lime, and controlled grazing.

These soils are extensive. Some areas have been cleared and are used for cultivated crops or for pasture. The original vegetation was an open forest of longleaf pine and scrub oaks, but most areas have been cut over and are now in scrub oaks.

CAPABILITY UNIT IIIse-2

In this capability unit are nearly level to gently sloping, moderately well drained, moderately deep to deep sandy soils in which sand or fine sand extends from the surface to a depth of more than 30 inches. Some of the soils are underlain by sandy loam to sandy clay loam at a depth of 30 to 42 inches. The available moisture capacity, the natural fertility, and the amount of organic matter are low. These soils are strongly acid. They are porous, permeable, and well aerated. The depth to the water table varies but normally is high enough to bring moisture to within 42 inches of the surface. In some areas these soils are isolated and are surrounded by wetter or dryer soils. The soils are—

BfB Blanton fine sand, 0 to 5 percent slopes.
BnB Blanton sand, 0 to 5 percent slopes.
KaB Klej fine sand, 0 to 5 percent slopes.
KgB Klej sand, 0 to 5 percent slopes.
KsB Klej sand, shallow, 0 to 5 percent slopes.

These soils are droughty and low in fertility because water moves through them so rapidly. Droughtiness, however, is somewhat offset by the high water table. Water and wind erosion are active in unprotected areas, but ordinary management generally is adequate to control erosion. Excess water occasionally is a problem in the wetter areas.

These soils are only moderately well suited to most general crops. Intensive soil-improving practices are needed for good yields. Maintain fertility and organic matter by returning all crop residue to the soils, by planting green-manure crops, and by applying adequate fertilizer and lime. The cropping system should keep cover crops, green-manure crops, or pasture on the soils at least two-thirds of the time. Before cultivated crops are harvested, plant cover crops. Wetter soils that surround these soils need surface drainage in wet periods.

These soils are suited to improved pasture grasses. Deep-rooted grasses grow well if the soils are fertilized, limed, and otherwise well managed. The roots of these grasses penetrate the moist zone above the water table.

These soils are extensive. Some areas are cleared and cultivated or are in pasture. Most areas are still in trees.

CAPABILITY UNIT IVew-1

The soils of this capability unit are acid, sloping, and moderately well drained and somewhat poorly drained. In most areas these soils are on long, narrow slopes and are adjacent to similar soils on more gentle slopes. They have a loamy coarse sand, coarse sand, or loamy sand surface layer 10 to 30 inches thick. The surface layer is underlain by friable sandy loam or sandy clay loam that is 18 to 30 inches thick. The subsoil is mottled and is moderate to slow in permeability. It is underlain by moderately permeable to slowly permeable sandy clay loam. The root zone is moderately deep to deep. Drainage is restricted by the slowly permeable subsoil. These soils have moderate available moisture capacity and low natural fertility. They are—

GdC Goldsboro loamy coarse sand, 5 to 8 percent slopes.
GcC Goldsboro coarse sand, thick surface, 5 to 8 percent slopes.

Because slopes are steep and permeability is slow, erosion is likely and limits these soils to only occasional cultivation unless intensive practices are used to control erosion. Unless special practices are used to remove excess water, the wetness caused by slow internal drainage limits the kinds of crops suited to these soils.

These soils are moderately good for crops that tolerate slight wetness, but they erode rapidly unless intensive practices of erosion control are followed. They produce good yields under intensive management. Large additions of lime and fertilizer, applied regularly, are needed. Organic matter can be maintained by planting cover crops and using plant residue well. Clean-tilled crops

should be grown not more than one-fourth of the time, and green-manure crops or pasture should be on these soils the rest of the time.

These soils are well suited to most pasture plants grown in the county. Suitable cool-season plants are tall fescue, sweetclover, crimson clover, and white clover. Suitable warm-season plants are bahiagrass and improved bermudagrass. Pasture plants need large applications of fertilizer if yields are to be high. They also need ordinary practices of good pasture management.

These soils have a small total acreage in the county. A few areas are cleared and used for cultivated crops or are in pasture, but most areas are in trees.

CAPABILITY UNIT IVes-1

The soils in this capability unit are well drained, acid, and sloping. Some of them are moderately eroded, and all are highly susceptible to erosion unless protected. The surface layer is loamy sand 3 to 14 inches thick. It is underlain by sandy clay loam to fine sandy clay 12 to 20 inches thick. The lower part of the subsoil is mottled and, in most places, is denser than the upper part. Permeability is rapid in the surface layer, and available moisture capacity is moderately low. In the upper part the subsoil has moderate to slow permeability and moderately high available moisture capacity. The lower subsoil and the substratum have very slow permeability that permits very little movement of water and air and restricts root penetration. The soils are low in natural fertility. They are—

OkC	Oktibbeha soils, 5 to 8 percent slopes.
ShC	Shubuta loamy sand, 5 to 8 percent slopes.
ShC2	Shubuta loamy sand, 5 to 8 percent slopes, eroded.

A severe erosion hazard limits the use of these soils in unprotected areas. Runoff is rapid because slopes are steep and the subsoil is slowly permeable. The root zone is restricted by the dense, poorly aerated subsoil. Low fertility and low available water capacity limit productivity and make erosion control difficult.

Partly because these soils have a shallow root zone, only a few crops are suited. Cultivated crops are only moderately well suited, and yields are low unless the soils are well managed. Maintain fertility and increase crop yields by returning all crop residue to the soils, by planting green-manure crops, and by applying adequate fertilizer and lime. Cultivated crops should be planted not more than one-fourth of the time, for these soils erode rapidly unless they are protected by close-growing plants. Keep the soils in well-managed pasture or in close-growing cover crops 6 years in every 8.

These soils are moderately well suited to most locally grown pasture plants. Bahiagrass and bermudagrass are suitable, but growth is retarded in dry periods because the roots do not penetrate deeply. Some of the more drought-resistant legumes can be grown on the deeper soils if they are well managed. Pasture needs large additions of fertilizer and lime so that a full sod is formed to protect these highly erodible soils. In addition, water should be diverted from active gullies, and other good practices of management followed.

These soils are not extensive in the county. Some areas are cleared and cultivated or are in pasture. Many areas are in cutover woodland, some of which has been replanted to pines.

CAPABILITY UNIT IVes-2

In this capability unit are strongly acid, nearly level to gently sloping soils that are moderately well drained and somewhat poorly drained. Some of these soils are only slightly eroded, and others are moderately eroded, but all are very susceptible to erosion unless protected. Shallow gullies are common in most eroded areas. Many small areas are highly dissected by natural drains. The soils have a sand to loamy sand surface layer 3 to 18 inches thick. It is underlain by compact, slowly permeable sandy clay to clay that is underlain, in turn, by moderately fine textured, compact, very slowly permeable material. The root zone is shallow because the fine-textured subsoil is poorly aerated and does not permit penetration of roots. It has low available moisture capacity. These soils have a low organic-matter content and fertility. They are—

AnA	Angie loamy sand, 0 to 2 percent slopes.
AnB	Angie loamy sand, 2 to 5 percent slopes.
CuB	Cuthbert soils, 2 to 5 percent slopes.
CuB2	Cuthbert soils, 2 to 5 percent slopes, eroded.
EaB	Esto loamy sand, 0 to 5 percent slopes.

The use of these soils for cultivated crops is severely limited by unfavorable internal soil characteristics. These include low available moisture capacity and low fertility of the surface layer and a root zone restricted by compact, fine-textured material. Crops are damaged by excess water in wet periods and by drought in dry periods. The soils are quickly saturated when it rains, and the erosion hazard is severe because runoff is rapid. Tilth is generally poor.

Partly because these soils have a shallow root zone, only a few crops are suitable. Cultivated crops are only moderately well suited. Most areas of these soils are not suitable for laying out fields or for terracing. To control water, use grassed strips and contour cultivation. Maintain fertility and increase crop yields by returning all residue to the soil, by planting green-manure crops, and by applying adequate fertilizer and lime. Cultivated crops should occupy these soils for not more than one-fourth of the time. Keep these soils in well-managed pasture or in close-growing crops for 6 years in every 8. Yields are low unless these soils are well managed.

These soils are moderately well suited to most locally grown pasture plants. Although bahiagrass and bermudagrass are suitable, their growth is retarded in dry periods because the roots do not penetrate deeply. Because these soils are highly erodible, add large quantities of fertilizer and lime to pasture so that the cover is dense, divert water from active gullies until a full sod is formed, and use other good management.

These soils originally were forested with longleaf pine, oak, and hickory. They are well suited to pines.

CAPABILITY UNIT IVws-1

In this capability unit are nearly level, deep, acid soils that are poorly drained and very poorly drained. These soils occur in low, flat or depressed areas. They have a mucky loamy fine sand to loamy sand surface layer 8 to 30 inches thick. The top 8 to 12 inches is black to gray and contains a large amount of organic matter in many places. The surface layer is underlain by sandy loam to sandy clay loam. These soils have a moderate available moisture capacity. The water table fluctuates between a

level near the surface and a depth of about 24 inches. Some areas are saturated most of the time. The content of organic matter is generally moderate but is high in many places. Natural fertility is low, and aeration is poor. The subsoil is slowly or moderately permeable. The soils are—

Pr Pocomoke and Rains soils.
Pt Pocomoke and Rains soils, thick surface.
Ra Rains loamy sand.

These wet soils are suited to cultivated crops or improved pasture only after excess water has been removed. Adequately drained areas are moderately well suited to a few cultivated crops.

Good management is needed to maintain high yields. Yields can be increased by regularly applying large amounts of lime and fertilizer. Plant cover crops and use plant residue to maintain organic matter. Clean-tilled crops should be grown for not more than one-fourth of the time, and the rest of the time cover crops or perennial sod should be kept on the soils.

CAPABILITY UNIT IVse-1

In this capability unit are sloping, moderately well drained, deep soils in which sand extends from the surface to a depth of more than 30 inches. Some of the soils are underlain by sandy loam to sandy clay loam at a depth of 30 to 42 inches. The available moisture capacity, natural fertility, and content of organic matter are low. These soils are strongly acid. They are well aerated and are porous and permeable. The depth to the water table varies greatly, but normally it is high enough to bring moisture above a depth of 42 inches. These soils are generally on long, narrow slopes adjacent to similar soils on more gentle slopes. Because of a high water table and seepage, some of these soils are at least slightly wet most of the time. The soils are—

BnC Blanton sand, 5 to 8 percent slopes.
KgC Klej sand, 5 to 8 percent slopes.
KsC Klej sand, shallow, 5 to 8 percent slopes.

These deep sandy soils have poor qualities that restrict their suitability for cultivated crops. Water moves rapidly through them and leaches plant nutrients rapidly. The soils retain little water and are droughty. These soils are similar to those of capability unit IIIse-2 but are on steeper slopes and are more susceptible to erosion.

These soils are not well suited to cultivated crops. Under intensive management, general crops can be grown but yields are low. Large additions of lime and fertilizer, applied regularly, increase yields. Maintain organic matter by planting cover crops and using plant residue well. Clean-tilled crops should not be grown more than one-fourth of the time, and the rest of the time green-manure crops or pasture should be on these soils.

These soils are well suited to improved pasture. Bahiagrass and other deep-rooted grasses grow well because their roots penetrate to the moist layer above the water table.

These soils are not extensive. A few areas have been cleared and are used for cultivated crops or improved pasture, but most areas are in trees.

CAPABILITY UNIT IVse-2

In this capability unit are deep, well-drained to excessively drained sandy soils that are on sloping uplands. In many places these soils are underlain by sandy loam to sandy clay loam at a depth of 30 to 60 inches. These soils are uneroded or are only slightly eroded, but they are moderately susceptible to erosion if cultivated. Because their surface layer is deep sand, they are porous and very rapidly permeable to water and air. The available moisture capacity is low, and the soils are somewhat droughty in dry periods. The soils are medium acid to strongly acid and are low in organic matter. They are—

EtB Eustis sand, 0 to 5 percent slopes.
EtC Eustis sand, 5 to 8 percent slopes.
EuC Eustis sand, shallow, 5 to 8 percent slopes.
LdB Lakeland sand, 0 to 5 percent slopes.
LdC Lakeland sand, 5 to 8 percent slopes.
LkC Lakeland sand, shallow, 5 to 8 percent slopes.

These soils are very severely limited for farming because low available moisture capacity and rapid leaching make them both droughty and low in plant nutrients. On unprotected slopes, erosion is a minor hazard, but management that overcomes other limitations also controls erosion.

These soils can be cultivated occasionally if erosion is controlled, but the choice of crops is limited. Watermelons can be grown successfully under good management. To maintain organic matter and produce good yields, plant green-manure crops, return all crop residue to the soil, and apply adequate fertilizer and lime. Good yields of cultivated crops can be obtained if these soils are kept in improved pasture at least three-fourths of the time, or 6 years in every 8. Plant cultivated crops and pasture in alternate strips across the slope, and plant annual cover crops after cultivated crops are harvested. Keep natural draws and waterways in close-growing perennial plants.

These soils are moderately well suited to improved grass pasture. Because they are loose, sandy, and droughty, they are not well suited to clover. Deep-rooted bahiagrass and improved varieties of bermudagrass grow well if the soils are well fertilized, limed, and otherwise well managed. Management should provide a firm seedbed, enough seed or sprigs, adequate fertilizer and lime, and controlled grazing.

These soils are not extensive. Some areas have been cleared and are used for cultivated crops or for pasture. The native vegetation on these soils was an open forest of longleaf pine and scrub oaks, but the pine has been cut in most areas, and only scrub oaks remain.

CAPABILITY UNIT Vws-1

The soils in this capability unit are nearly level, poorly drained to very poorly drained, and strongly acid. They occur on the uplands in low, excessively wet depressions that have very poor natural outlets and are difficult to drain. Most areas are frequently flooded. The surface layer of these soils is loamy sand to clay loam that is less than 18 inches thick. The subsoil is very slowly permeable, plastic fine sandy clay to clay. These soils have a moderately high to high available moisture capacity and a moderate to high content of organic matter. They are poorly aerated. The soils are—

Ba Bayboro soils.
Gr Grady loam.

Excess water is the dominant limitation of these soils. Even if drained, the soils are poorly suited to cultivation

because of their shallow root zone and other poor qualities.

Partly because they are flooded frequently, these soils are not suited to cultivated crops. If they could be drained and protected from flooding, a few areas would be suited to truck crops and other crops of high value. Reclamation of these areas, however, is not feasible, because of the high cost of draining them and protecting them from flooding.

Under intensive management, these soils are suited to improved pasture, but drainage is needed to remove excess water in rainy periods. If adequate fertilizer and lime are added, both cool-season and warm-season plants grow well. Tall fescue, crimson clover, white clover, and sweetclover are suitable cool-season plants. Bahiagrass and improved bermudagrass are suitable warm-season plants. Because they are puddled by trampling, these soils should be grazed only in drier periods.

Almost all areas of these soils in this county are in native vegetation. A few areas have been cleared but are now idle. The native vegetation consists chiefly of hardwoods, which are well suited to these soils.

CAPABILITY UNIT Vws-2

The soils in this capability unit are nearly level, poorly drained to very poorly drained, deep, and sandy. A few acres of the poorly drained soils are gently sloping. Coarse sand to loamy fine sand extends from the surface to a depth of more than 42 inches. In the surface layer the content of organic matter ranges from high to low. Generally, the water table is near or at the surface most of the time, and some areas are flooded. These soils are very porous and have a low available moisture capacity. They are strongly acid. Natural fertility is low, and tilth is poor. The soils are—

Pm Plummer soils.
Ru Rutlege loamy fine sand.

Excess water is the main limitation to the use of these soils for agriculture. The water must be controlled before the soils can be used for improved pasture. Other characteristics that limit the use of these soils are sandy texture, low natural fertility, and low available moisture capacity.

Partly because they are wet, these soils are not suited to cultivated crops. If adequately drained and intensively managed, some areas may be suitable for truck crops or other special crops. Under intensive management, these soils can be used for pasture, but the choice of plants is limited. Excess water should be drained in rainy periods. If adequate fertilizer and lime are applied, yields are moderately high. Bahiagrass grows well, but bermudagrass does not. Clover can be grown with grass for winter pasture, but irrigation in dry weather is needed for best growth.

These soils are moderately extensive. Most areas are in native vegetation, but a few acres are used for improved pasture. The native vegetation is mostly scattered longleaf pine and native grasses.

CAPABILITY UNIT Vsw-1

Leon coarse sand (Lo) is the only soil in this unit. It is nearly level, deep, strongly acid, sandy, and somewhat poorly drained. The surface soil is 2 to 6 inches thick and is underlain by a layer of highly leached coarse sand 6 to 8 inches thick. In the subsoil, at a depth of 42 inches, is a pan of brown to black coarse sand that is weakly to strongly cemented with organic matter. This soil is affected by a seasonally high, fluctuating water table, but it has a very low available moisture capacity. It is very rapidly permeable and is rapidly leached of plant nutrients. It is low in natural fertility and does not hold plant nutrients well in a form available to plants. Aeration is poor.

Because of these poor soil characteristics, and because of periodic wetness, this soil is of somewhat limited use for cultivated crops. It is poorly suited to general farm crops. If intensively managed, some areas can be used for truck crops and other special crops.

Productive pasture of improved grasses can be maintained. Ordinary practices of drainage are necessary to remove excess surface water during wet periods. If yields are to be high, liberal applications of fertilizer and lime are required. If clover is irrigated, it can be grown successfully with grass for winter pasture.

The small total acreage of this soil in the county is in native vegetation consisting of scattered longleaf pine, palmetto, and native grasses.

CAPABILITY UNIT VIes-1

The soils in this capability unit are sloping to strongly sloping and excessively drained to well drained. The characteristics of these soils differ widely. The surface layer is sand that is deep and porous in some of these soils but is less than 18 inches thick in others. It is underlain by a sandy clay or clay subsoil. Most of these soils are highly susceptible to erosion. The soils are—

AnC Angie loamy sand, 5 to 8 percent slopes.
CuC Cuthbert soils, 5 to 8 percent slopes.
CuC2 Cuthbert soils, 5 to 8 percent slopes, eroded.
LnD Lakeland, Cuthbert, and Shubuta soils, 5 to 12 percent slopes.

These soils are generally too steep and too eroded for cultivation. Some of them have a subsoil that retards root development. Available moisture capacity and natural fertility are generally low.

Most areas of these soils are susceptible to erosion and should not be used for clean-tilled crops. Close-growing cover crops can be grown on carefully selected slopes, but in these areas intensive management is required to control erosion. A cultivated crop should be followed by several years of pasture. Stabilize gullies and divert excess water by ditches.

These soils are moderately well suited to pasture grasses. Most local grasses can be grown, but growth is retarded in dry seasons because roots do not penetrate deeply or the soils are droughty. The steep and irregular slopes make good management difficult. Grazing should be controlled so that a good sod is maintained all the time. Large amounts of fertilizer and lime are needed for good yields.

These soils have a moderate acreage in the county. Many areas have been cleared and cultivated but have returned to native vegetation. A few areas are in improved pasture.

CAPABILITY UNIT VIse-1

The soils in this capability unit are well-drained to excessively drained, very deep coarse sands in nearly level to strongly sloping areas. Coarse sand extends from the

surface to a depth of more than 60 inches. These soils are very porous, rapidly permeable, and well aerated throughout. They are droughty and very low in available moisture capacity. Natural fertility is very low, and added plant nutrients leach rapidly. These soils are strongly acid and contain little organic matter. Erosion is a serious hazard on the steeper slopes if these soils are not protected. The soils are—

EsB Eustis coarse sand, 0 to 5 percent slopes.
EsC Eustis coarse sand, 5 to 8 percent slopes.
EsD Eustis coarse sand, 8 to 12 percent slopes.
LaB Lakeland coarse sand, 0 to 5 percent slopes.
LaC Lakeland coarse sand, 5 to 8 percent slopes.
LaD Lakeland coarse sand, 8 to 12 percent slopes.

These soils are limited mainly by low organic-matter content, low available moisture capacity, low fertility, and rapid leaching of plant nutrients. Some of them are so steep that erosion is a serious hazard.

These soils are not suited to cultivated crops. In addition to poor soil qualities, the hazard of severe erosion prevents cultivation.

These soils are only moderately suited to improved pasture. If the soils are limed, fertilized, and otherwise well managed, bahiagrass, lovegrass, and other deep-rooted grasses grow fairly well. Supplemental pasture is a good use, but a heavy application of fertilizer is needed several days before grazing is started. Ordinary practices of good management should be followed.

These soils are moderately extensive in this county. Most areas are in native vegetation, but a few are in pasture. The native vegetation consisted of an open forest of scattered longleaf pine and scrub oaks with a ground cover of grasses and forbs. The present vegetation is thick scrub oaks and a ground cover of native grasses.

CAPABILITY UNIT VIIes-1

The soils in this capability unit differ widely in many characteristics. They are gently sloping to very steep and are excessively drained to moderately well drained. In most areas they are on long breaks between more gentle slopes. Most of them are severely eroded. In some soils the surface layer is deep, porous sand, but in others it is sandy and less than 18 inches thick. The subsoil is sandy clay or clay. Most of these soils are highly susceptible to erosion. The soils are—

CtB3 Cuthbert sandy clay loam, 2 to 5 percent slopes, severely eroded.
CtC3 Cuthbert sandy clay loam, 5 to 8 percent slopes, severely eroded.
CwD3 Cuthbert, Shubuta, and Lakeland soils, 5 to 12 percent slopes, severely eroded.
LnF Lakeland, Cuthbert, and Shubuta soils, 12 to 45 percent slopes.

These soils are so steep and so erodible or severely eroded that they are not suitable for cultivation. Because of their poor internal characteristics and their irregular or highly dissected slopes, they are suited only to trees.

These soils are poorly suited to pasture. Most areas are too steep for good pasture management. If these soils have to be used for pasture, they should receive the best management possible, including fertilizing, liming, seeding, and controlling water. Apply enough lime and fertilizer to produce a full sod soon after seeding. Plant in contour strips, stabilize gullies, and dig diversion ditches to control erosion. Grazing should be rigidly controlled to prevent overgrazing and excessive trampling.

These soils do not have a large total acreage in the county. Most areas are native woodland or improved pasture. Many areas that were once cleared and cultivated are now in native vegetation.

CAPABILITY UNIT VIIws-1

Only Alluvial land (Al) is in this capability unit. This land consists of moderately well drained to very poorly drained soils of the stream bottoms that are periodically flooded. It varies widely in texture and organic-matter content and in most areas is made up of small intermingled areas of contrasting soils.

Although flooding may be controlled, the highly variable texture and poor soil qualities severely restrict the kinds of crops that can be grown.

This land is suited to cultivated crops only if flooding is prevented by major reclamation. It has little value for improved pasture. Good stands of improved grass and clover can be grown in most areas, but serious damage by floods is likely.

This land is extensive. It is still in native vegetation consisting of a dense growth of swamp hardwoods, vines, and shrubs.

CAPABILITY UNIT VIIse-1

This capability unit consists of deep coarse sands that are moderately steep or steep and well drained to excessively drained. The coarse sand extends from the surface to a depth of more than 60 inches. These soils are very porous, rapidly permeable, and well aerated throughout. They are strongly acid and very low in organic-matter content. They have very low available moisture capacity and are droughty. Natural fertility is very low, and plant nutrients leach rapidly. The soils are—

EsE Eustis coarse sand, 12 to 35 percent slopes.
LaF Lakeland coarse sand, 12 to 45 percent slopes.

Use of these soils is severely restricted by the low natural fertility, the low available moisture capacity, and other poor soil qualities. Steep slopes also restrict use. The slopes are so steep that adequate practices for erosion control cannot be applied and farm equipment cannot be used effectively.

These soils are not suited to cultivated crops or improved pasture. Pine trees grow moderately well in most places, but good stands are obtained only by planting seedlings and protecting them from fire and grazing. Generally, pines grow best near the base of slopes where moisture content is best.

CAPABILITY UNIT VIIse-2

In this capability unit are miscellaneous land types in which so much soil material has been removed by severe gullying and open excavating that the land is practically useless for agriculture. The land types vary widely in soil characteristics. They are—

Bp Borrow pits.
Gu Gullied land.

These land types are not suitable for cultivated crops or improved pasture, but pines grow moderately well in some areas. Establishing pine plantings on Gullied land is difficult because it is generally steep and erodes severely with each rain.

Estimated yields

Table 2 gives estimates of average yields that can be expected on each soil in the county under two levels of management. In columns A are yields to be expected under the management commonly practiced in the county. In columns B are yields obtained by farmers who used improved management. The estimates are based on records of yields on individual farms, on yields obtained in long-term experiments, and on estimates made by agronomists who have had experience with the crops and with the soils.

Estimated yields have not been given for certain crops on some of the soils. Dashes have been entered in the column instead of figures if the expected yields are so low, or the management needed is so exacting, that it is not practical to grow the crop on the soil indicated.

TABLE 2.—*Estimated acre yields of principal crops and*

[In columns A are estimated yields of crops and pasture under common management; in columns B are those obtained

Map symbol	Soil	Corn		Cotton		Peanuts	
		A	B	A	B	A	B
		Bu.	*Bu.*	*Lb.*	*Lb.*	*Lb.*	*Lb.*
Al	Alluvial land						
AnA	Angie loamy sand, 0 to 2 percent slopes	15	45				
AnB	Angie loamy sand, 2 to 5 percent slopes	15	45				
AnC	Angie loamy sand, 5 to 8 percent slopes	10	40				
Ba	Bayboro soils						
Bd	Bladen soils	15	45				
BfB	Blanton fine sand, 0 to 5 percent slopes	20	45				
BnB	Blanton sand, 0 to 5 percent slopes	15	40				
BnC	Blanton sand, 5 to 8 percent slopes	10	35				
Bp	Borrow pits						
BoA	Bowie loamy sand, 0 to 2 percent slopes	45	70	250	520	600	1, 500
BoB	Bowie loamy sand, 2 to 5 percent slopes	45	70	250	520	600	1, 500
BoB2	Bowie loamy sand, 2 to 5 percent slopes, eroded	40	70	225	520	540	1, 500
BoC	Bowie loamy sand, 5 to 8 percent slopes	40	60	225	470	540	1, 350
BoC2	Bowie loamy sand, 5 to 8 percent slopes, eroded	35	60	215	470	500	1, 350
BwB	Bowie loamy sand, thick surface, 2 to 5 percent slopes	35	55	230	475	550	1, 425
BwC	Bowie loamy sand, thick surface, 5 to 8 percent slopes	30	50	210	425	495	1, 280
CaB	Carnegie loamy sand, 2 to 5 percent slopes	50	75	300	600	650	1, 600
CaB2	Carnegie loamy sand, 2 to 5 percent slopes, eroded	45	75	270	600	585	1, 600
CaC2	Carnegie loamy sand, 5 to 8 percent slopes, eroded	40	65	250	540	550	1, 440
CtB3	Cuthbert sandy clay loam, 2 to 5 percent slopes, severely eroded						
CtC3	Cuthbert sandy clay loam, 5 to 8 percent slopes, severely eroded						
CuB	Cuthbert soils, 2 to 5 percent slopes	20	35				
CuB2	Cuthbert soils, 2 to 5 percent slopes, eroded	15	30				
CuC	Cuthbert soils, 5 to 8 percent slopes						
CuC2	Cuthbert soils, 5 to 8 percent slopes, eroded						
CwD3	Cuthbert, Shubuta, and Lakeland soils, 5 to 12 percent slopes, severely eroded						
DuB	Dunbar loamy sand, 2 to 5 percent slopes	30	70				
EaB	Esto loamy sand, 0 to 5 percent slopes	15	30				
EfA	Eulonia loamy fine sand, 0 to 2 percent slopes	35	65	105	450	800	1, 400
EfB	Eulonia loamy fine sand, 2 to 5 percent slopes	35	65	150	450	800	1, 400
EnA	Eulonia loamy fine sand, thick surface, 0 to 2 percent slopes	30	60	135	405	720	1, 260
EnB	Eulonia loamy fine sand, thick surface, 2 to 5 percent slopes	30	60	135	405	720	1, 260
EtB	Eustis sand, 0 to 5 percent slopes	15	30	100	250	500	1, 000
EtC	Eustis sand, 5 to 8 percent slopes	10	25	90	225	450	900
EsB	Eustis coarse sand, 0 to 5 percent slopes						
EsC	Eustis coarse sand, 5 to 8 percent slopes						
EsD	Eustis coarse sand, 8 to 12 percent slopes						
EsE	Eustis coarse sand, 12 to 35 percent slopes						
EuB	Eustis sand, shallow, 0 to 5 percent slopes	15	30	100	250	500	1, 000
EuC	Eustis sand, shallow, 5 to 8 percent slopes	10	25	90	225	450	900
FaB	Faceville loamy sand, 2 to 5 percent slopes	50	75	300	600	650	1, 600
FaB2	Faceville loamy sand, 2 to 5 percent slopes, eroded	45	75	285	600	585	1, 600
FaC2	Faceville loamy sand, 5 to 8 percent slopes, eroded	40	70	270	570	550	1, 520
GdA	Goldsboro loamy coarse sand, 0 to 2 percent slopes	35	65	150	450	800	1, 400
GdB	Goldsboro loamy coarse sand, 2 to 5 percent slopes	35	60	150	450	800	1, 400
GdC	Goldsboro loamy coarse sand, 5 to 8 percent slopes	30	50	120	360	640	1, 120
GcA	Goldsboro coarse sand, thick surface, 0 to 2 percent slopes	30	60	135	405	720	1, 260
GcB	Goldsboro coarse sand, thick surface, 2 to 5 percent slopes	30	60	135	405	720	1, 260
GcC	Goldsboro coarse sand, thick surface, 5 to 8 percent slopes	25	45	105	325	575	1, 000
Gr	Grady loam						
Gu	Gullied land						
KaB	Klej fine sand, 0 to 5 percent slopes						

See footnote at end of table.

To obtain yields in columns B, a higher level of management is needed than that required for the yields in columns A. The farmer can obtain the yields in columns B if he (1) chooses carefully the kind of crop to be grown and the cropping system to be used, (2) adds liberal amounts of lime and fertilizer where required, (3) maintains a high content of organic matter, (4) plants high-yielding varieties and hybrids, (5) seeds at recommended rates and at proper times, (6) controls weeds, insects, and plant diseases, (7) controls excess water through drainage, and (8) conserves the soil, plant nutrients, and moisture.

The level of management needed to get the yields in columns B is about the same as that described in the capability units in the subsection "Capability Groups of Soils."

carrying capacity of pasture under two levels of management

under the highest level of management feasible. Dashed lines indicate that the crop is not generally grown on the soil]

Watermelons		Oats		Coastal bermudagrass (pasture)		Pensacola bahiagrass (pasture)		Small grain (pasture)	
A	B	A	B	A	B	A	B	A	B
No.	*No.*	*Bu.*	*Bu.*	*Cow-acre-days* [1]	*Cow-acre-days* [1]	*Cow-acre-days* [1]	*Cow-acre-days* [1]	*Cow-acre-days* [1]	*Cow-acre-days* [1]
175	300	15	35	150	450	150	325	60	145
175	300	15	35	150	450	150	325	60	145
155	270	10	30	135	405	135	290	55	130
				160	525	150	325		
				150	500	175	350		
200	300			150	500	175	350	60	155
200	300			150	500	175	350	60	155
140	260			110	360	155	325	40	110
250	350	30	45	150	465	150	320	85	170
250	350	30	45	150	465	150	320	85	170
225	350	25	45	150	465	150	320	85	170
225	315	25	40	135	420	135	290	75	150
200	315	20	40	135	420	135	290	75	150
250	350	20	30	150	425	150	300	75	160
225	315	15	25	135	380	135	270	65	140
250	350	30	50	150	475	150	370	90	175
225	350	25	50	150	475	150	370	90	175
200	315	20	45	135	425	135	315	80	160
				150	450	150	320		
				135	410	135	290		
				120	360	120	255		
				110	320	110	225		
250	350	20	50	150	475	140	310	55	160
175	200	10	20	150	450	150	320	40	110
250	360	20	40	150	470	150	320	80	160
250	360	20	40	150	470	150	320	80	160
225	325	15	35	135	420	135	290	70	145
225	325	15	35	135	420	135	290	70	145
250	355	15	25	100	250	150	275	60	150
225	320	10	20	90	225	135	245	55	135
						50	150		
						50	135		
						40	120		
250	355	15	25	100	250	150	275	60	150
225	320	10	20	90	225	135	245	55	135
250	350	30	50	150	475	150	350	90	175
225	350	25	50	150	475	150	350	90	175
200	330	20	45	145	450	145	335	85	170
250	360	20	40	150	470	150	320	80	160
250	360	20	40	150	470	150	320	80	160
200	285	15	30	120	375	120	255	65	130
225	325	15	35	135	420	135	290	70	145
225	325	15	35	135	420	135	290	70	145
180	255	10	25	110	340	110	235	60	115
150	275	10	20	125	400	175	360	45	120

TABLE 2.—*Estimated acre yields of principal crops and carrying*

Map symbol	Soil	Corn		Cotton		Peanuts	
		A	B	A	B	A	B
		Bu.	*Bu.*	*Lb.*	*Lb.*	*Lb.*	*Lb.*
KgB	Klej sand, 0 to 5 percent slopes	20	45			600	1, 600
KgC	Klej sand, 5 to 8 percent slopes	15	40			540	1, 440
KsB	Klej sand, shallow, 0 to 5 percent slopes	20	45			600	1, 600
KsC	Klej sand, shallow, 5 to 8 percent slopes	15	40			540	1, 440
LdB	Lakeland sand, 0 to 5 percent slopes	15	30	100	250	500	1, 000
LdC	Lakeland sand, 5 to 8 percent slopes	10	25	90	225	450	900
LaB	Lakeland coarse sand, 0 to 5 percent slopes						
LaC	Lakeland coarse sand, 5 to 8 percent slopes						
LaD	Lakeland coarse sand, 8 to 12 percent slopes						
LaF	Lakeland coarse sand, 12 to 45 percent slopes						
LkB	Lakeland sand, shallow, 0 to 5 percent slopes	15	30	100	250	500	1, 000
LkC	Lakeland sand, shallow, 5 to 8 percent slopes	10	25	90	225	450	900
LnD	Lakeland, Cuthbert, and Shubuta soils, 5 to 12 percent slopes						
LnF	Lakeland, Cuthbert, and Shubuta soils, 12 to 45 percent slopes						
Lo	Leon coarse sand						
Lu	Local alluvial land						
LyA	Lynchburg loamy fine sand, 0 to 2 percent slopes	30	70				
LyB	Lynchburg loamy fine sand, 2 to 5 percent slopes	30	70				
LzA	Lynchburg loamy fine sand, thick surface, 0 to 2 persent slopes	25	65				
LzB	Lynchburg loamy fine sand, thick surface, 2 to 5 percent slopes	25	65				
MaB	Marlboro loamy sand, 2 to 5 percent slopes	50	75	300	600	650	1, 600
MaB2	Marlboro loamy sand, 2 to 5 percent slopes, eroded	45	75	275	600	600	1, 600
NoA	Norfolk loamy sand, 0 to 2 percent slopes	45	70	250	520	600	1, 500
NoB	Norfolk loamy sand, 2 to 5 percent slopes	45	70	250	520	600	1, 500
NoB2	Norfolk loamy sand, 2 to 5 percent slopes, eroded	40	70	225	520	540	1, 500
NoC	Norfolk loamy sand, 5 to 8 percent slopes	40	65	225	470	540	1, 350
NoC2	Norfolk loamy sand, 5 to 8 percent slopes, eroded	35	65	200	470	510	1, 350
NrA	Norfolk sand, thick surface, 0 to 2 percent slopes	35	55	230	475	550	1, 425
NrB	Norfolk sand, thick surface, 2 to 5 percent slopes	35	55	230	475	550	1, 425
NrC	Norfolk sand, thick surface, 5 to 8 percent slopes	30	50	210	425	495	1, 280
OkB	Oktibbeha soils, 2 to 5 percent slopes						
OkC	Oktibbeha soils, 5 to 8 percent slopes						
Pm	Plummer soils						
Pr	Pocomoke and Rains soils	15	40				
Pt	Pocomoke and Rains soils, thick surface	15	40				
Ra	Rains loamy sand	10	25				
RsB	Ruston loamy sand, 2 to 5 percent slopes	45	70	250	520	600	1, 500
RsB2	Ruston loamy sand, 2 to 5 percent slopes, eroded	40	70	225	520	540	1, 500
RsC	Ruston loamy sand, 5 to 8 percent slopes	40	65	225	470	540	1, 350
RsC2	Ruston loamy sand, 5 to 8 percent slopes, eroded	35	65	200	470	500	1, 350
RcB	Ruston coarse sand, 2 to 5 percent slopes	40	65	225	470	540	1, 350
RdB	Ruston coarse sand, thick surface, 2 to 5 percent slopes	35	55	230	475	550	1, 425
RdC	Ruston coarse sand, thick surface, 5 to 8 percent slopes	30	50	210	425	495	1, 280
Ru	Rutlege loamy fine sand						
Sc	Scranton fine sand	25	70				
Sf	Scranton fine sand, shallow	25	70				
ShB	Shubuta loamy sand, 2 to 5 percent slopes	25	55	200	450	600	1, 425
ShB2	Shubuta loamy sand, 2 to 5 percent slopes, eroded	20	55	180	450	540	1, 425
ShC	Shubuta loamy sand, 5 to 8 percent slopes	20	50	180	405	540	1, 280
ShC2	Shubuta loamy sand, 5 to 8 percent slopes, eroded	15	50	160	405	500	1, 280
Sw	Swamp						
TfB	Tifton loamy sand, 2 to 5 percent slopes	50	75	300	600	650	1, 600
TfB2	Tifton loamy sand, 2 to 5 percent slopes, eroded	45	75	270	600	585	1, 600
TfC2	Tifton loamy sand, 5 to 8 percent slopes, eroded	40	65	240	540	535	1, 400

[1] Number of days a year that 1 acre of pasture will graze a cow without injury to the pasture.

capacity of pasture under two levels of management—Continued

Watermelons		Oats		Coastal bermudagrass (pasture)		Pensacola bahiagrass (pasture)		Small grain (pasture)	
A	B	A	B	A	B	A	B	A	B
No.	*No.*	*Bu.*	*Bu.*	*Cow-acre-days* [1]	*Cow-acre-days* [1]	*Cow-acre-days* [1]	*Cow-acre-days* [1]	*Cow-acre-days* [1]	*Cow-acre-days* [1]
200	300	15	35	150	500	175	350	60	155
180	270	10	30	135	450	155	315	55	140
200	300	15	35	150	500	175	350	60	155
180	270	10	30	135	450	155	315	55	140
250	355	15	25	100	250	150	275	60	150
225	320	10	20	225	225	135	245	55	135
						50	150		
						50	150		
						50	120		
250	355	15	25	100	250	150	275	60	150
225	320	10	20	225	225	135	245	55	135
250	350	20	50	150	475	140	310	55	160
250	350	20	50	150	475	140	310	55	160
225	315	15	45	135	425	125	280	50	145
225	315	15	45	135	425	125	280	50	145
250	350	30	50	150	475	150	350	90	175
225	350	25	50	150	475	150	350	90	175
250	350	30	45	150	465	150	320	85	170
250	350	30	45	150	465	150	320	85	170
225	350	25	45	150	465	150	320	85	170
225	315	25	40	135	420	135	290	80	155
200	315	20	40	135	420	135	290	80	155
250	350	20	30	150	425	150	300	75	160
250	350	20	30	150	425	150	300	75	160
225	315	15	25	135	380	135	270	65	145
				130	425	100	225		
				160	525	150	325		
				160	525	150	325		
				125	350	115	230		
250	350	30	40	150	465	150	320	85	170
225	350	25	40	150	465	150	320	85	170
225	315	25	35	135	420	135	290	80	155
205	315	20	35	135	420	135	290	80	155
225	315	25	35	135	420	135	290	80	155
250	350	20	30	130	380	135	270	65	145
225	315	15	25	150	425	150	300	75	160
				150	450	125	275		
		20	40	150	500	175	350	60	165
		20	40	150	500	175	350	60	165
225	330	20	40	150	450	150	335	75	155
200	330	15	40	150	450	150	335	75	155
200	295	15	35	135	405	135	300	65	140
175	295	10	35	135	405	135	300	65	140
250	350	30	50	150	475	150	350	90	175
225	350	25	50	150	475	150	350	90	175
200	315	20	45	135	425	135	315	80	155

Use of Soils as Woodland [4]

Forests originally covered most of Washington County, but they have been clear cut to supply timber for the large sawmills that operated in and around the county before 1930. Some areas were cleared for farming. Later part of the farmland reverted to woodland, and trees now cover more than 80 percent of the county. Of this area, 306,360 acres was classified as commercial forest in 1959 in the Conservation Needs Inventory. From these forests are obtained sawtimber, pulpwood, crossties, poles, piling, veneer, and many other products. These products are used locally or are shipped to manufacturing plants in surrounding areas.

Except for a small part, all of the woodland in the county is privately owned. Although large wood-using industries own a large acreage, small owners own a considerable part.

Oaks are the dominant trees in the county. They vary in quality from poor scrub trees in the sandhills area to large, well-formed trees on river bottoms and in swamps. Also in swamps are large areas of cypress. Longleaf pine is the most common pine, especially in the sandhills area. Slash pine and loblolly pine also occur, but most of the planted areas are in slash pine.

The scrub oak in the sandhills is in large areas that have a scattering of longleaf pine (fig. 13). These areas could be planted to pines if sites are prepared carefully.

General woodland management

Protecting the soil is one of the main benefits gained from a good stand of trees. A tree cover slows the fall of raindrops so that they hit the ground gently and are absorbed better by the surface layer. Also, litter from trees helps hold the soil in place and cushions the falling raindrops. Tree roots help stabilize the soil by holding it in place to resist the erosive effects of surface runoff. A well-managed stand of trees helps to prevent soil deterioration and helps to conserve soil and water.

***Figure 13.*—Scrub oak covers large areas in woodland suitability group 1.**

[4] E. D. HOLCOMBE, woodland conservationist, Soil Conservation Service, assisted in preparing this subsection.

Proper management of woodland is a part of good soil management. Proper management includes (1) protection from fire, (2) tree planting, and (3) proper cutting.

Protection from fire.—When wildfires destroy trees and ground cover, the hazard of erosion is increased and the ability of the soil to absorb moisture is lessened. Fires also slow the growth of trees, and by injuring them, make them more susceptible to damage by insects or disease.

Throughout the county the Florida Forest Service protects woodland from fire. The individual landowner can increase this protection by observing the rules of fire prevention and by constructing adequate firebreaks around and through his woodland (fig. 14). These firebreaks

***Figure 14.*—This firebreak will prevent wildfire from spreading. The young pines are growing on an old field of Norfolk sand, thick surface, 2 to 5 percent slopes. Woodland suitability group 4.**

slow or stop a wildfire under normal conditions. Care should be taken to construct firebreaks so that erosion is prevented.

Tree planting.—Because trees grow well under many conditions, many areas in the county that are not suitable for cultivation can be planted to them. These areas include eroded areas, gully banks, and slopes too steep for cultivation. Idle land can also be planted to trees, which provide an income and protect the soil (fig. 15).

Proper cutting practices.—To profit most from his woodland and to protect the soil, a forest owner should use proper cutting practices. These practices vary as the conditions of the woodland varies. Foresters will gladly help landowners plan the cutting of trees and other woodland management so that a profit is obtained and the soil is protected.

Soil properties affecting tree production

The soils of Washington County differ greatly in their suitability for trees. The combinations of species, or forest types, that grow on a particular soil are determined largely by the nature of the site. The site is determined by the position on the slope, the steepness of slope, and the kind of soil.

Among the most important factors that affect the productivity of a soil in trees is its ability to maintain opti-

Figure 15.—Slash pine planted 6 years ago in bahiagrass pasture on Bowie loamy sand, 2 to 5 percent slopes. Woodland suitability group 4.

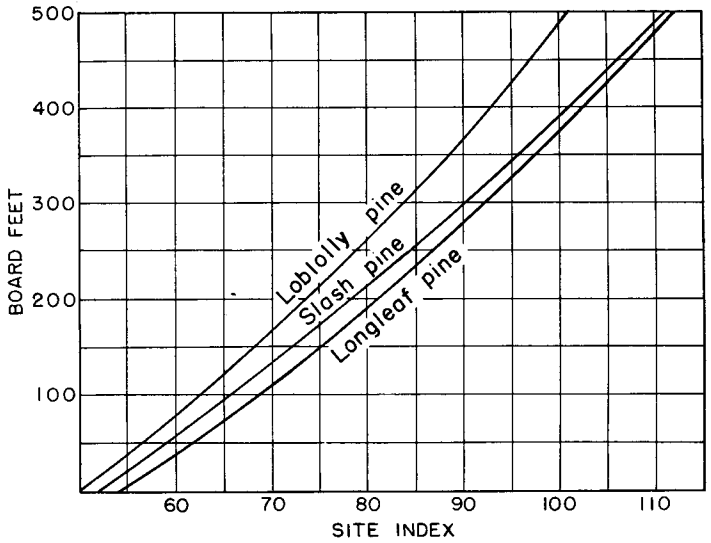

Figure 16.—Average yearly growth per acre (Doyle Rule) at 60 years of age in well-stocked, second-growth stands without intensive management.

mum moisture and to permit the development of an adequate root system. Other soil characteristics that affect the site are thickness of the surface layer, natural supply of plant nutrients, texture and consistence of the layers, aeration, depth of fine-textured material, and depth to the water table.

Woodland suitability groups

To assist owners of woodland in planning the use of their soils, the soils of Washington County have been placed in woodland suitability groups. Each group consists of soils that have about the same suitability for wood crops, require about the same management, and have about the same potential productivity.

Listed in table 3, and later described in the text, are the 12 woodland suitability groups in the county. Average site indexes of slash, loblolly, and longleaf pines are listed for each suitability group. Also shown are ratings of the hazards and limitations that affect management. The ratings in table 3 are based largely on the experience and judgment of local soil scientists, foresters, and landowners. The terms used in the table require explanation.

The potential productivity of a soil for a specified kind of tree is expressed as a *site index*. The site index for a given soil is the 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. A site index in table 3 is an average for all the soils in the suitability group. The site index for any one soil in the group may be slightly more or less than average.

The curves in figure 16 show, according to site index, the average yearly growth per acre of loblolly, slash, and longleaf pines at 60 years of age in well-stocked, second-growth stands that are not intensively managed. Growth is measured in board feet according to the Doyle Rule and includes trees 9 inches in diameter or larger.

Each woodland suitability group has, in varying degree, limitations that affect its management. In the descriptions of the suitability groups, some of these limitations are expressed in relative terms, *slight*, *moderate*, or *severe*. The relative term expresses the degree of limitation, as explained in the following paragraphs.

PLANT COMPETITION: When a woodland is disturbed by fire, cutting, grazing, or some other means, undesirable brush, trees, and plants may invade. The invading growth competes with the desirable trees and hinders their establishment and growth.

Competition is *slight* if unwanted plants present no special problem. It is *moderate* if the invaders delay but do not prevent the establishment of a normal, fully stocked stand. Where plant competition is moderate, seedbed preparation 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, carefully prepare the site and use management that includes controlled burning, spraying with chemicals, and girdling.

SEEDLING MORTALITY: Even when healthy seedlings of a suitable tree are correctly planted or occur naturally in adequate numbers, some of them will not survive if characteristics of the soil are unfavorable.

Mortality is *slight* if not more than 25 percent of the planted seedlings die, or if trees ordinarily regenerate naturally in places where there are enough seeds. Mortality 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 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, plant seedlings where the seeds do not grow, prepare special seedbeds, and use good methods of planting to insure a full stand of trees.

EQUIPMENT LIMITATION: Drainage, slope, stoniness, soil texture, or other soil characteristics may restrict or prohibit the use of ordinary equipment in pruning, thinning, harvesting, or other woodland management. Different soils may require different kinds of equipment,

TABLE 3.—*Site indexes and hazards*

Woodland suitability group	Map symbols	Site index		
		Longleaf	Slash	Loblolly
Group 1: Very deep, excessively drained coarse sands that are highly leached and have coarse texture to a depth of more than 60 inches.	EsB, EsC, EsD, EsE; LaB, LaC, LaD, LaF	60	70	(1)
Group 2: Deep, somewhat excessively drained to well-drained highly leached soils that have a sandy surface layer and are finer textured at a depth of 42 to 85 inches.	EtB, EtC; LdB, LdC	65	75	(1)
Group 3: Deep, somewhat excessively drained soils that have a sandy surface layer and are finer textured at a depth of 30 to 42 inches.	EuB, EuC; LkB, LkC	70	80	(1)
Group 4: Deep, well-drained soils that have a coarse sand to loamy fine sand surface layer that is underlain by sandy loam to sandy clay at a depth of less than 30 inches.	BoA, BoB, BoB2, BoC, BoC2; BwB, BwC; CaB, CaB2, CaC2; FaB, FaB2, FaC2; MaB, MaB2; NoA, NoB, NoB2, NoC, NoC2; NrA, NrB, NrC; RcB, RdB, RdC; RsB, RsB2, RsC, RsC2; TfB, TfB2, TfC2.	70	90	90
Group 5: Well-drained to somewhat poorly drained soils that have a sand to sandy clay loam surface layer and, except for the Lakeland soils, clayey or sandy clay material at a depth of less than 18 inches.	AnA, AnB, AnC; CtB3, CtC3; CuB, CuB2, CuC, CuC2; CwD3; EaB; LnD, LnF; OkB, OkC; ShB, ShB2, ShC, ShC2.	70	90	85
Group 6: Deep, moderately well drained to somewhat poorly drained soils that have a coarse sand to loamy fine sand surface layer and mostly sandy clay loam at a depth of less than 30 inches.	DuB, EfA, EfB; EnA, EnB; GcA, GcB, GcC; GdA, GdB, GdC; LyA, LyB; LzA, LzB.	65	90	90
Group 7: Deep, moderately well drained to somewhat poorly drained soils that have sand to loamy sand to a depth of more than 42 inches, and moderately well drained to somewhat poorly drained soils that have fine-textured materials at 30 to 42 inches.	BfB; BnB, BnC; KaB; KgB, KgC; KsB, KsC; Sc, Sf.	70	80	80
Group 8: Somewhat poorly drained soil that has a sand to coarse sand surface layer and a compact organic pan at a depth of 12 to 42 inches.	Lo	65	85	80
Group 9: Poorly drained or very poorly drained soils that have a loamy sand to clay loam surface layer and sandy clay loam to clay at a depth of less than 30 inches.	Ba; Bd; Gr; Pr; Pt; Ra	[2] 70	[2] 90	95
Group 10: Deep, poorly drained or very poorly drained soils in which loamy fine sand or sand extends from the surface to a depth of more than 42 inches.	Pm; Ru	[2] 60	[2] 90	[2] 100
Group 11: Slightly wet, generally coarse-textured soil that is along streams or in depressions and consists of material from adjacent areas.	Lu	70	100	100
Group 12: Miscellaneous land types that vary greatly in characteristics and generally are not suitable for pine trees.	Al; Bp; Gu; Sw	(3)	(3)	(3)

[1] Loblolly pine generally does not grow naturally on these soils.

[2] Site index is for drained areas.

of woodland suitability groups

Plant competition	Seedling mortality	Equipment limitation	Erosion hazard	Windthrow hazard
Severe	Severe	Moderate or severe	Moderate or severe	Slight.
Severe	Severe	Moderate	Moderate	Slight.
Severe	Moderate or severe	Moderate	Moderate	Slight.
Slight	Slight or moderate	Slight or moderate	Moderate	Slight.
Moderate or severe	Slight or moderate	Moderate	Moderate or severe	Slight or moderate.
Slight or moderate	Slight	Moderate	Slight	Slight.
Slight or moderate	Slight	Slight or moderate	Slight	Slight.
Moderate	Slight	Moderate	Slight	Moderate.
Severe	Moderate or severe	Severe	Slight	Moderate.
Severe	Moderate	Severe	Slight	Moderate.
Severe	Slight	Moderate or severe	Slight	Slight.

[3] Generally not suited to pines.

methods of operation, or seasons when equipment may be used.

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 slopes are moderately steep, if heavy equipment is restricted by wetness during the wettest seasons, or if the use of equipment damages the tree roots to some extent. Equipment limitation is *severe* if many types of equipment cannot be used, if the time 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 soil. Limitation is severe on moderately steep and steep soils. It is also severe on wet bottom lands.

EROSION HAZARD: 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 only a small loss of soil is expected. Generally, erosion is slight if slopes range from 0 to 2 percent and runoff is slow or very slow. The erosion hazard is *moderate* where a moderate loss of soil is expected if runoff is not controlled and the vegetative cover 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.

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.

WINDTHROW HAZARD: Soil characteristics affect the development of tree roots and how firmly the roots anchor the tree and enable it to resist the force of the wind. Root development may be prevented by a high water table or by an impermeable layer. The protection by surrounding trees also affects windthrow hazard. Knowing the degree of this hazard is important when choosing trees for planting and when planning release cuttings or harvest cuttings.

The windthrow hazard 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 wind velocity is very high. It is *severe* if rooting is not deep enough to give adequate stability. Individual trees are then likely to be blown over if they are released on all sides.

In the following pages the 12 woodland suitability groups are described, and the soils in each group are listed.

WOODLAND SUITABILITY GROUP 1

In this group are very deep, excessively drained coarse sands that are highly leached and extend to a depth of more than 60 inches. They are well above ground water and have a very low available moisture capacity. Permeability is rapid to very rapid. These soils are on ridges and broad, gently sloping uplands. They are—

EsB	Eustis coarse sand, 0 to 5 percent slopes.
EsC	Eustis coarse sand, 5 to 8 percent slopes.
EsD	Eustis coarse sand, 8 to 12 percent slopes.
EsE	Eustis coarse sand, 12 to 35 percent slopes.
LaB	Lakeland coarse sand, 0 to 5 percent slopes.
LaC	Lakeland coarse sand, 5 to 8 percent slopes.
LaD	Lakeland coarse sand, 8 to 12 percent slopes.
LaF	Lakeland coarse sand, 12 to 45 percent slopes.

Plant competition is severe, and if trees are to regenerate successfully, the site should be specially prepared (figs. 17 and 18). Natural regeneration cannot be

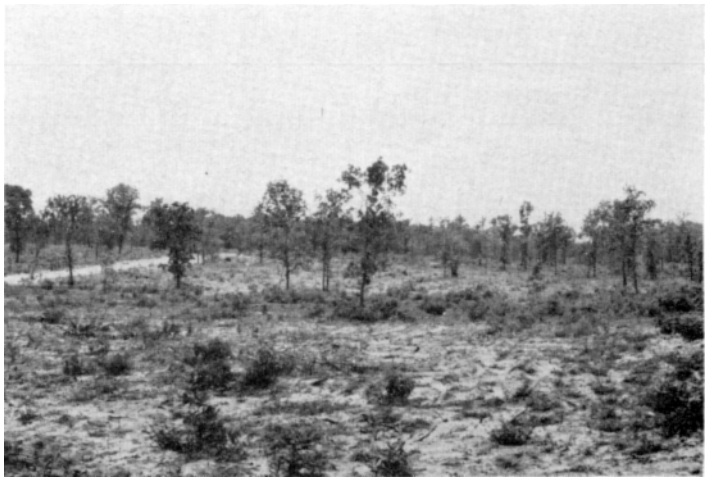

***Figure 17.*—In preparation for planting trees on Lakeland coarse sand, 0 to 5 percent slopes, scrub oaks and wiregrass have been destroyed by machinery and chemicals.**

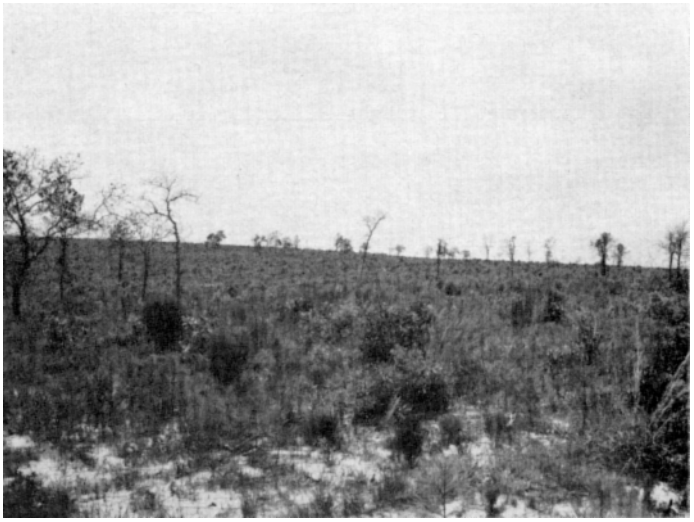

***Figure 18.*—Two-year-old planted slash pine on Lakeland coarse sand, 0 to 5 percent slopes. The native vegetation has been controlled by machinery and chemicals.**

depended on, for more than 50 percent of the planted seedlings often die. Wiregrass must be controlled.

The use of equipment on the steeper slopes may be restricted in dry weather by the looseness of the coarse sand. Wind erosion is severe on some exposed sites. Windthrow normally is not a hazard.

WOODLAND SUITABILITY GROUP 2

In this group are deep, somewhat excessively drained to well-drained, highly leached soils that have a sand surface layer and finer textured material at a depth of 42 to 85 inches. These soils have a low available moisture capacity and rapid to very rapid permeability. Ground water is well below the surface.

The soils are—

EtB Eustis sand, 0 to 5 percent slopes.
EtC Eustis sand, 5 to 8 percent slopes.
LdB Lakeland sand, 0 to 5 percent slopes.
LdC Lakeland sand, 5 to 8 percent slopes.

Because of competition from undesirable plants, special preparation of the site is essential if trees are to regenerate satisfactorily. The trees cannot be relied on to reproduce naturally. Consequently, it is often necessary to replant them, even after the best preparation of the site.

The use of some kinds of equipment, especially on steeper slopes, may be restricted in extremely dry weather. Erosion may occur on the steeper slopes, and wind erosion is a hazard in exposed areas. Windthrow is not a problem.

WOODLAND SUITABILITY GROUP 3

In this group are deep, somewhat excessively drained soils that have a sandy surface layer and finer textured material at a depth of 30 to 42 inches. These soils have a low available moisture capacity and rapid to very rapid permeability. They are somewhat droughty during dry periods but are not so droughty as the soils in groups 1 and 2. The soils are—

EuB Eustis sand, shallow, 0 to 5 percent slopes.
EuC Eustis sand, shallow, 5 to 8 percent slopes.
LkB Lakeland sand, shallow, 0 to 5 percent slopes.
LkC Lakeland sand, shallow, 5 to 8 percent slopes.

Loblolly pine generally does not occur naturally on these soils, but scattered trees indicate that its site index is 70 to 75.

Plant competition is severe, and special preparation of the site is necessary for establishing a good stand of trees. Replanting may be needed, especially after extensive droughts. In most areas natural reproduction cannot be relied upon. Wiregrass is a serious problem and needs to be eliminated.

The use of equipment may be restricted on slopes during dry weather. Wind erosion is a hazard in exposed areas, but water erosion is likely only on the steeper slopes.

WOODLAND SUITABILITY GROUP 4

In this group are deep, well-drained soils that have a coarse sand to loamy fine sand surface layer that is underlain by sandy loam to sandy clay at a depth of less than 30 inches. Permeability is moderate to moderately slow, and the available moisture capacity is medium to high. These soils are strongly acid and have moderate natural fertility. They are—

BoA Bowie loamy sand, 0 to 2 percent slopes.
BoB Bowie loamy sand, 2 to 5 percent slopes.
BoB2 Bowie loamy sand, 2 to 5 percent slopes, eroded.
BoC Bowie loamy sand, 5 to 8 percent slopes.
BoC2 Bowie loamy sand, 5 to 8 percent slopes, eroded.
BwB Bowie loamy sand, thick surface, 2 to 5 percent slopes.
BwC Bowie loamy sand, thick surface, 5 to 8 percent slopes.
CaB Carnegie loamy sand, 2 to 5 percent slopes.
CaB2 Carnegie loamy sand, 2 to 5 percent slopes, eroded.
CaC2 Carnegie loamy sand, 5 to 8 percent slopes, eroded.
FaB Faceville loamy sand, 2 to 5 percent slopes.
FaB2 Faceville loamy sand, 2 to 5 percent slopes, eroded.
FaC2 Faceville loamy sand, 5 to 8 percent slopes, eroded.
MaB Marlboro loamy sand, 2 to 5 percent slopes.
MaB2 Marlboro loamy sand, 2 to 5 percent slopes, eroded.
NoA Norfolk loamy sand, 0 to 2 percent slopes.
NoB Norfolk loamy sand, 2 to 5 percent slopes.
NoB2 Norfolk loamy sand, 2 to 5 percent slopes, eroded.
NoC Norfolk loamy sand, 5 to 8 percent slopes.
NoC2 Norfolk loamy sand, 5 to 8 percent slopes, eroded.
NrA Norfolk sand, thick surface, 0 to 2 percent slopes.
NrB Norfolk sand, thick surface, 2 to 5 percent slopes.
NrC Norfolk sand, thick surface, 5 to 8 percent slopes.
RsB Ruston loamy sand, 2 to 5 percent slopes.
RsB2 Ruston loamy sand, 2 to 5 percent slopes, eroded.
RsC Ruston loamy sand, 5 to 8 percent slopes.
RsC2 Ruston loamy sand, 5 to 8 percent slopes, eroded.
RcB Ruston coarse sand, 2 to 5 percent slopes.
RdB Ruston coarse sand, thick surface, 2 to 5 percent slopes.
RdC Ruston coarse sand, thick surface, 5 to 8 percent slopes.
TfB Tifton loamy sand, 2 to 5 percent slopes.
TfB2 Tifton loamy sand, 2 to 5 percent slopes, eroded.
TfC2 Tifton loamy sand, 5 to 8 percent slopes, eroded.

On the more eroded soils, the site index may be lower than those given in table 3. Slash pine grows well in natural stands (fig. 19).

Figure 19.—**A good natural stand of slash pine on soils in woodland suitability group 4.**

Plant competition is generally slight, but low-quality trees and shrubs in stands of desirable trees that are planted or naturally seeded should be deadened or removed. During periods of extremely dry weather, seedling mortality may be a problem in areas that have a thick surface soil.

The use of equipment is limited on the steeper slopes. Erosion is severe on some of the exposed steep slopes. Windthrow generally is not a hazard.

WOODLAND SUITABILITY GROUP 5

The soils of this group are well drained to somewhat poorly drained and have a sand to sandy clay loam surface

726-719—65——5

layer. In most of them clay or sandy clay is at a depth of less than 18 inches. The soils are—

AnA Angie loamy sand, 0 to 2 percent slopes.
AnB Angie loamy sand, 2 to 5 percent slopes.
AnC Angie loamy sand, 5 to 8 percent slopes.
CtB3 Cuthbert sandy clay loam, 2 to 5 percent slopes, severely eroded.
CtC3 Cuthbert sandy clay loam, 5 to 8 percent slopes, severely eroded.
CuB Cuthbert soils, 2 to 5 percent slopes.
CuB2 Cuthbert soils, 2 to 5 percent slopes, eroded.
CuC Cuthbert soils, 5 to 8 percent slopes.
CuC2 Cuthbert soils, 5 to 8 percent slopes, eroded.
CwD3 Cuthbert, Shubuta, and Lakeland soils, 5 to 12 percent slopes, severely eroded.
EaB Esto loamy sand, 0 to 5 percent slopes.
LnD Lakeland, Cuthbert, and Shubuta soils, 5 to 12 percent slopes.
LnF Lakeland, Cuthbert, and Shubuta soils, 12 to 45 percent slopes.
OkB Oktibbeha soils, 2 to 5 percent slopes.
OkC Oktibbeha soils, 5 to 8 percent slopes.
ShB Shubuta loamy sand, 2 to 5 percent slopes.
ShB2 Shubuta loamy sand, 2 to 5 percent slopes, eroded.
ShC Shubuta loamy sand, 5 to 8 percent slopes.
ShC2 Shubuta loamy sand, 5 to 8 percent slopes, eroded.

The soils in this group are slow to very slow in permeability and are moderate in available moisture capacity. In spots of Lakeland sand and coarse sand, the sandy surface soil is more than 18 inches thick.

Site indexes on the Lakeland soils are about 10 less than those listed in table 3.

Plant competition varies, but the sites require some preparation, and low-quality trees should be deadened or removed. Because the seedling mortality is a problem on the steeper slopes and on the coarse-textured soils, some replanting may be necessary. The use of equipment is restricted on the steeper slopes, and special equipment may be needed for planting and harvesting.

Erosion hazard is severe on the steeper slopes and in exposed areas of the finer textured soils. Special care should be taken in harvesting and in locating firebreaks and roads. Windthrow is moderate on some of the steeper slopes and in severely eroded areas.

WOODLAND SUITABILITY GROUP 6

In this group are deep, moderately well drained to somewhat poorly drained soils that have a coarse sand to loamy fine sand surface layer. At a depth of less than 30 inches, the surface layer is underlain mainly by sandy clay loam or fine sandy clay loam. Permeability is rapid to moderately rapid in the surface soil and generally moderate in the subsoil. Available moisture capacity is moderate. The soils are—

DuB Dunbar loamy sand, 2 to 5 percent slopes.
EfA Eulonia loamy fine sand, 0 to 2 percent slopes.
EfB Eulonia loamy fine sand, 2 to 5 percent slopes.
EnA Eulonia loamy fine sand, thick surface, 0 to 2 percent slopes.
EnB Eulonia loamy fine sand, thick surface, 2 to 5 percent slopes.
GdA Goldsboro loamy coarse sand, 0 to 2 percent slopes.
GdB Goldsboro loamy coarse sand, 2 to 5 percent slopes.
GdC Goldsboro loamy coarse sand, 5 to 8 percent slopes.
GcA Goldsboro coarse sand, thick surface, 0 to 2 percent slopes.
GcB Goldsboro coarse sand, thick surface, 2 to 5 percent slopes.
GcC Goldsboro coarse sand, thick surface, 5 to 8 percent slopes.
LyA Lynchburg loamy fine sand, 0 to 2 percent slopes.
LyB Lynchburg loamy fine sand, 2 to 5 percent slopes.
LzA Lynchburg loamy fine sand, thick surface, 0 to 2 percent slopes.
LzB Lynchburg loamy fine sand, thick surface, 2 to 5 percent slopes.

In somewhat poorly drained areas, site indexes are slighter higher than those listed in table 3.

Planting or seeding is generally successful, but after the seedlings are established, it may be necessary to remove some competing trees and shrubs. Because these soils are wet most of the time, their structure may be damaged by compaction. For the best growth of pines, some areas should be drained. Erosion is not a problem in most areas (fig. 20).

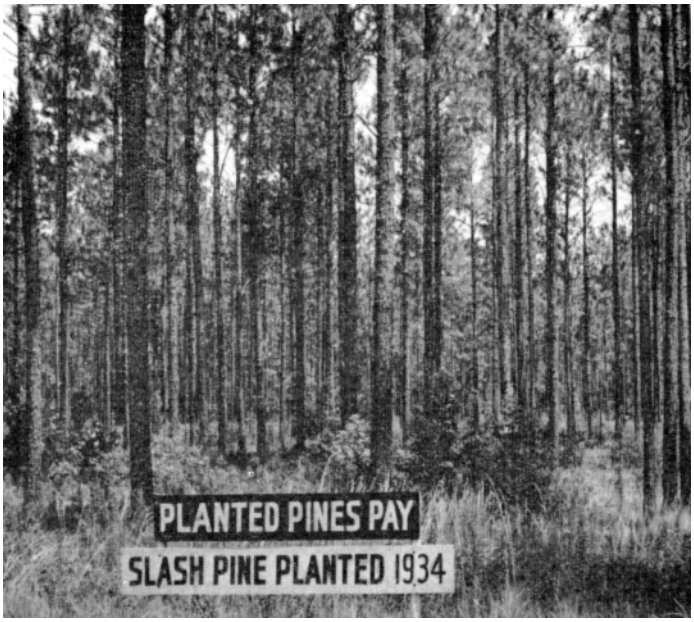

Figure 20.—**This 28-year-old plantation of slash pine shows excellent growth on soils of woodland suitability group 6.**

WOODLAND SUITABILITY GROUP 7

In this group are deep, moderately well drained to somewhat poorly drained soils that have sand to loamy sand extending from the surface to a depth of more than 42 inches. In some areas finer textured material occurs at a depth of 30 to 42 inches. Available moisture capacity is low, and permeability is rapid to very rapid. The water table is generally 36 inches or more below the surface. The soils are—

BfB Blanton fine sand, 0 to 5 percent slopes.
BnB Blanton sand, 0 to 5 percent slopes.
BnC Blanton sand, 5 to 8 percent slopes.
KaB Klej fine sand, 0 to 5 percent slopes.
KgB Klej sand, 0 to 5 percent slopes.
KgC Klej sand, 5 to 8 percent slopes.
KsB Klej sand, shallow, 0 to 5 percent slopes.
KsC Klej sand, shallow, 5 to 8 percent slopes.
Sc Scranton fine sand.
Sf Scranton fine sand, shallow.

Under the best moisture conditions of these soils, the site index for slash pine is higher than that given in table 3.

Removing unwanted trees and shrubs may be necessary to release pine seedlings so that they grow and produce a

good stand. Seedling mortality is not a problem under normal conditions. The use of equipment is limited during extremely dry weather.

WOODLAND SUITABILITY GROUP 8

Leon coarse sand (Lo) is the only soil in this group. It is somewhat poorly drained and has a sand to coarse sand surface layer and a compact organic pan at a depth of 12 to 42 inches. The water table is generally 12 to 36 inches below the surface. Available moisture capacity is low, and permeability is very rapid.

The high water table restricts the root zone and may cause seedling mortality, even in dry periods. Some drainage may be necessary because, in wet periods, the water table causes excessive wetness that may limit the use of some kinds of equipment. Because the root zone is shallow, the hazard of windthrow may increase after thinning. Erosion is not a problem. Plant competition is moderate; unwanted trees and shrubs may require removal so that desirable trees are released.

WOODLAND SUITABILITY GROUP 9

The soils in this group are poorly drained or very poorly drained and have a loamy sand to clay loam surface layer that is underlain by sandy clay loam to clay at a depth of less than 30 inches. Permeability is slow to very slow, and the water table is generally high. Available moisture capacity is high. The soils are—

Ba Bayboro soils.
Bd Bladen soils.
Gr Grady loam.
Pr Pocomoke and Rains soils.
Pt Pocomoke and Rains soils, thick surface.
Ra Rains loamy sand.

Drainage or other practices to control water are necessary for best growth of pines. Because undesirable shrubs and trees compete, site preparation is needed. Seedling mortality may be severe unless surface water is drained. Unless well-drained roads are constructed and excess surface water is removed, the use of equipment is severely limited. The root zone is restricted by the high water table.

WOODLAND SUITABILITY GROUP 10

The soils in this group are deep and poorly drained or very poorly drained. They consist of sand or loamy fine sand that extends to a depth of more than 42 inches. The water table is high, available moisture capacity is low, and permeability is rapid. The soils are—

Pm Plummer soils.
Ru Rutlege loamy fine sand.

Surface drainage or other practices to control water are necessary for best growth of pines. Competition from undesirable shrubs and trees is severe. To insure that a good stand develops, site preparation is necessary. Because these soils are wet, the use of equipment may be restricted most of the time. The high water table restricts the root zone.

WOODLAND SUITABILITY GROUP 11

Local alluvial land (Lu), the only soil in this woodland group, consists of material along streams that is slightly wet and has been washed from adjacent areas. It is generally coarse textured and moderately well drained. Permeability is moderate to rapid, and available moisture capacity is moderate to high. Normally, the texture and color of this land varies greatly from place to place.

This land is likely to be flooded frequently for short periods, and during these periods the use of equipment is restricted. Because plant competition is severe, undesirable trees, shrubs, and vines must be removed to allow normal growth of pines. Seedlings can be established if competing plants are controlled. After a stand is established, some control of competing plants is still needed. Damage caused by windthrow generally is low, and erosion normally is not a problem.

WOODLAND SUITABILITY GROUP 12

This group consists of the following miscellaneous land types—

Al Alluvial land.
Bp Borrow pits.
Gu Gullied land.
Sw Swamp.

Except for Gullied land, these land types generally are not suited to pines.

Use of Soils for Wildlife [5]

The kinds of wildlife and their abundance within an area are influenced by the soils of the area. Basically, the capability of the soils to produce plants desirable for food and cover determines the suitability of an area for different kinds of wildlife. Each soil has specific capability for producing desirable plants. In a large area, however, the suitability of the soils for different kinds of plants and, consequently, for different kinds of wildlife is determined by the pattern of soils within the area and the capability of the soils in the pattern. In addition to the patterns of soils, topography, agricultural development, extent of wooded areas, and presence of open water are also important in determining the wildlife population.

An interpretation of the soil survey for wildlife suitability can be made conveniently by using the generalized map that shows soil associations, or patterns of soils. After naming plants suitable for food and cover for the main game species in Washington County, this subsection discusses the wildlife potential of the seven soil associations, which are shown on the general soil map at the back of this report. Because soil associations 2 and 3 are similar in their suitability for wildlife, they are discussed together in this subsection. The seven soil associations are described generally in the section "General Soil Map."

Food and cover suitable for wildlife

In Washington County the main kinds of wildlife that live on land are white-tailed deer, wild turkey, wood duck, bobwhite (quail), mourning dove, gray and fox squirrels, and rabbit. Opossum, raccoon, skunk, and nongame birds are common throughout the county.

Deer.—Choice foods for deer are acorns, greenbrier, saw-palmetto, gallberry, bracken, moss, mushrooms, pineland three-awn, yellow-eyed grass, clovers, goldenaster, goldenrod, alder, pipewort, youpon, and other native

[5] By DAVID P. POWELL, soil specialist, and HOWARD R. BISSLAND, biologist, Soil Conservation Service.

shrubs and herbs for browse. For habitats deer require extensive wooded areas and areas where there is not much farming.

Turkey.—Choice foods for turkey are insects, acorns, pawpaws, yellow-eyed grass, blackberries, browntop millet, clover leaves, corn, cowpeas, peanuts, dogwood seed, seed from Pensacola bahiagrass and carpetgrass, oats, pine seed, and soybeans. For habitats wild turkey require extensive wooded areas that are not intensively managed. They need surface water for daily drinking and swampy areas for roosting.

Bobwhite (quail).—Choice foods for bobwhite are acorns, blackberries, wild black cherries, dogwood seed, seeds of annual and bicolor lespedezas, beggarweed, tick-clovers, and ragweed. Soybeans, cowpeas, corn, peanuts, and many other cultivated crops are also choice foods. Bobwhite eat many insects. They have a limited range and require food and shelter within a short distance. These birds thrive in general farming areas where fence rows and small woodlots are common. They also are found in wild, open areas that have not been cultivated.

Dove.—Choice foods for dove are browntop millet, corn, peanuts, cowpeas, and soybeans, as well as seed from ragweed and other wild plants. These birds do not eat insects. They range widely and do not need water near the feeding ground, but they do need water daily. They thrive in open farmland and feed in large, open fields and in woodland.

Squirrel.—Gray and fox squirrels are found in Washington County. Their choice foods are acorns, hickory nuts, pine nuts, chinkapins, pecans, small fruits, and mushrooms. They also eat larvae and insects. The gray squirrel raid cornfields, and they eat the seeds of pears. Both kinds of squirrel live in wooded areas, but the gray squirrel like protection and are common in the town of Chipley and other towns and in public parks throughout the county. Fox squirrel do not like populated places and frequent areas of live oaks, ponded areas of cypress, and areas of pine and oak.

Wood duck.—The wood duck, called summer duck locally, nest principally in small ponds in wooded areas along the Choctawhatchee River and Holmes Creek and in the area of lakes in the south-central part of the county. Their foods are acorns, dogwood fruits, seeds and tubers of pond weeds, and water insects and their larvae.

Rabbit.—Rabbits are common in Washington County. Their choice foods are young corn, oats, crimson clover, cowpeas, browntop millet, peanuts, kudzu, carpetgrass, and the young tender shoots and leaves of most native grasses and shrubs. Rabbits have a limited range and require food and shelter within a short distance. They thrive in general farming areas where fence rows and small woodlots provide shelter. They are also found in wild, open areas that have not been cultivated.

Wildlife suitability of the soil associations

The principal soils of soil association 1 are deep, droughty sands that have been used little for farming. Extensive areas have a cover consisting principally of scrub oak, wiregrass, and scattered longleaf pine. Swampy areas are common along small stream bottoms or in depressions, and there are many small lakes or intermittent ponds. The uncleared areas provide good range for deer, turkey, quail, and other wildlife, but natural foods are limited because the soils are poor and management for wildlife is inadequate. The ponds and lakes provide good habitats for wood duck. The wildlife can be increased appreciably by planting suitable food plants and by using other good management practices.

Many of the lakes in association 1 provide good fishing. Other lakes can be improved for fishing by managing them to increase fish production. Some sites suitable for construction of ponds are in the northwestern part of the county where stream patterns are well established.

Areas of soil associations 2 and 3 are dominant in the northern part of the county. The soils in these associations are among the most fertile in the county and are on gently sloping to steep hillsides. Natural drains are numerous and well established. Many areas have been cleared for cultivation and now have a pattern of cultivated fields, pastures, and woodlots. Along many fence rows are trees, native shrubs, and grasses. Some large areas are in mixed stands of pine, oak, and hickory.

Bobwhite and dove are the principal game birds in the more intensively farmed areas of soil associations 2 and 3. They thrive on farms where good wildlife management is practiced, because the soils are well suited for growing choice food crops for these birds (figs. 21 and 22). Squirrel and many nongame animals and birds live in larger wooded areas. Bobwhite are found in the wooded areas where there is some open land or poor stands of trees, but the number of bobwhite is usually small because food is scarce.

***Figure 21.*—Browntop millet on the right and chufa on the left provide excellent food for dove.**

Figure 22.—**A field border of shrub lespedeza provides good food and shelter for dove and quail.**

Supplemental plantings of choice food plants, along with other practices of wildlife management, can increase wildlife in these associations.

Although there are not many natural lakes or large streams in associations 2 and 3, there are many natural drainageways that make good sites for medium-sized and small ponds. Such ponds can be constructed and managed to provide excellent fishing.

Soil association 4 is made up of sloping to steep, erodible soils that have been farmed in only a few places. Most areas support stands of pine and hardwoods and a thick undergrowth of shrubs and bushes. A few scattered, small fields on the more gentle slopes are cultivated. Many kinds of wildlife find excellent cover on this soil association. Food for wildlife can be increased by plantings in open areas of woodland and along field borders. The number of squirrel, bobwhite, and songbirds varies from few to many.

A well-established pattern of small streams and draws provides numerous good sites for small ponds. Such ponds can be constructed and managed to provide excellent fishing.

Areas of soil association 5 are nearly level and wooded, and they occur predominantly in the southern part of the county next to large areas of soil association 1. The soils of association 5 are deep, moderately well drained to poorly drained sands, on which there has been little farming. Small swamps, shallow ponds, and lakes are numerous. The vegetation is mainly pine and an undergrowth of wiregrass, palmetto, and gallberry.

Wooded areas of soil association 5, together with wooded areas of soil association 1, are large enough to be the home of deer and turkey. Bobwhite, squirrel, and other wildlife are common, but their number is limited because food is scarce. The ponds and lakes in this association provide good habitats for wood duck. The association is well suited to wildlife if plantings are made for food and if other wildlife management is practiced.

Natural lakes are numerous in soil association 5 and are well stocked with fish. Some of these lakes can be improved by deepening, by clearing the water weeds, and by restocking desirable kinds of fish.

Soil association 6 is extensive in the northern part of the county. Many large areas, particularly the one west of Vernon, have been farmed little and are mainly wooded. In other areas farming has been more intensive, and open fields and pastures are numerous. The pattern of comparatively flat, moderately well drained soils, interspersed with numerous wet depressions and draws, provides good habitats for many kinds of wildlife. The numbers of wildlife, however, are limited by inadequate wildlife management. The extensive wooded areas are well suited to deer and turkey. Squirrel, bobwhite, dove, songbirds, and other wildlife also live in these wooded areas and in the more intensively farmed areas. They can be increased by good wildlife management.

Soil association 6 has a few lakes that provide good fishing. Although there are many streams and draws, the topography is too nearly level for construction of fish ponds.

The principal areas of soil association 7 are the swamps along the Choctawhatchee River, Holmes Creek, and Pine Log Creek. Smaller swamps in this association are in the south-central part of the county. Most of these swamps are covered with a dense growth of hardwoods, cypress, and vines and shrubs. The swamps provide excellent cover for most kinds of wildlife that live in the county and are especially well suited to woodland species such as deer, turkey, and squirrel. Wood duck find suitable feeding and nesting places along the streams. Most kinds of wildlife can be increased by applying good management.

The major streams in soil association 7 are well stocked with fish and provide good fishing. The lakes in the south-central part of the county are excellent for fishing.

Use of Soils for Engineering Works [6]

Soil engineering is well established today. It is, in a broad sense, a subdivision of structural engineering because it deals with soil as the foundation material upon which structures rest or with soil as a structural material. To the engineer, soils are natural materials that occur in great variety over the earth. Their engineering properties vary widely from place to place, even within the boundaries of a single project (fig. 23).

Generally, soil is used in the locality and in the condition in which it is found. A large part of soil engineering deals with locating the various soils, determining their engineering properties, correlating those properties with the requirements of the job, and selecting the best possible material for each job.

This soil survey report contains information about the soils of Washington County that will help engineers. Special emphasis has been placed on properties related to

[6] L. E. Strickland, agricultural engineer, and David P. Powell, soil specialist for interpretations, Soil Conservation Service; and William Gartner, Jr., engineer of research, Florida State Road Dept., assisted in preparing this subsection.

TABLE 4.—*Engineering test data* [1] *for*

Soil name and location	Parent material	Bureau of Public Roads report No.	Depth	Horizon	Mechanical analyses [2]	
					Percentage passing sieve—	
					¾ in.	No. 4 (4.7 mm.)
			Inches			
Bowie loamy sand:						
SE¼SW¼ sec. 23, T. 3 N., R. 13 W. (ortho profile).	Thick beds of sandy clay.	S37592	0–5	Ap		
		S37593	15–27	B2		
		S37594	41–52+	C2		
SE¼SE¼ sec. 34, T. 3 N., R. 14 W. (coarser textured).	Thick beds of sandy clay.	S37598	4–11	A2		
		S37599	19–28	B2	100	99
		S37600	43–57+	C2	100	99
Bowie loamy sand, thick surface:						
NE¼SW¼ sec. 5, T. 3 N., R. 14 W. (thick A horizon).	Thick beds of sandy clay.	S37595	5–12	A2		
		S37596	22–43	B3		
		S37597	43–70+	C1		
Cuthbert soils:						
NE¼NE¼ sec. 18, T. 3 N., R. 12 W. (ortho profile).	Thick beds of sandy clay and clay.	S37601	0–5	A1	100	99
		S37602	9–15	B2		
		S37603	15–30	B3		
		S37604	38–51+	C2		
SW¼NE¼ sec. 28, T. 4 N., R. 13 W. (AC profile).	Thick beds of sandy clay and clay.	S37605	0–5	A1	100	99
		S37606	7–13	C1		
		S37607	22–36+	C3		
SE¼SW¼ sec. 27, T. 3 N., R. 14 W. (coarse-textured A and C horizons).	Thick beds of sandy clay and clay.	S37608	3–9	A2	100	98
		S37609	14–22	B3		
		S37610	22–42	C1	100	99
Goldsboro loamy coarse sand:						
NE¼SE¼ sec. 36, T. 5 N., R. 14 W. (ortho profile).	Sandy clay loam.	S37611	4–8	A2		
		S37612	14–26	B2		
		S37613	34–64+	C1		
SE¼SW¼ sec. 25, T. 5 N., R. 13 W. (coarser textured B horizon).	Sandy clay loam.	S37617	0–4	A1		
		S37618	17–28	B22		
		S37619	38–52+	C1		
Goldsboro coarse sand, thick surface:						
SW¼SW¼ sec. 36, T. 4 N., R. 16 W. (thick A horizon).	Sandy clay loam.	S37614	7–13	A2		
		S37615	24–32	B2		
		S37616	42–55+	C2		
Klej sand:						
NW¼NW¼ sec. 17, T. 1 N., R. 14 W. (ortho profile).	Thick beds of sand underlain by sandy clay loam.	S37620	3–6	A2		
		S37621	16–32	C2		
		S37622	55–77	C4		
NE¼NE¼ sec. 29, R. 16 W., T. 1 N. (fine-textured D horizon).	Thick beds of sand underlain by sandy clay loam.	S37623	5–25	A2		
		S37624	25–52	C1		
		S37625	76–98+	D1		
Klej sand, shallow:	Thick beds of sand underlain by sandy clay loam.	S37626	0–5	A1		
SW¼NW¼ sec. 15, T. 3 N., R. 14 W. (shallow).		S27627	23–33	C3	100	99
		S27628	37–53+	D2	100	97
Lynchburg loamy fine sand:						
NE¼SE¼ sec. 21, T. 5 N., R. 13 W. (ortho profile).	Thick beds of clay loam.	S37629	0–5	A1		
		S27630	17–30	B2g		
		S37631	56–72+	C2g		
NW¼SW¼ sec. 4, T. 3 N., R. 12 W. (shallow to C horizon).	Thick beds of clay loam.	S37632	0–7	A1		
		S37633	19–25	B3g	100	99
		S37634	31–50+	C2		
Lynchburg loamy fine sand, thick surface:	Thick beds of clay loam.	S37635	3–12	A12		
NE¼NE¼ sec. 16, T. 3 N., R. 15 W. (thick A horizon).		S37636	27–39	B2g		
		S37637	45–55+	C2g		

See footnotes at end of table.

soil samples taken from 24 soil profiles

Mechanical analyses [2]—Continued							Liquid limit	Plasticity index	Classification	
Percentage passing sieve—Continued			Percentage smaller than—						AASHO [3]	Unified [4]
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	84	16	12	6	4	2	[5]NP	[5]NP	A-2-4(0)	SM.
100	86	38	35	31	26	24	37	16	A-6(2)	SC.
100	93	67	65	62	56	53	68	33	A-7-5(18)	MH.
100	61	12	11	9	7	5	NP	NP	A-2-4(0)	SP-SM.
97	65	24	23	21	19	16	25	10	A-2-4(0)	SC.
96	45	22	21	20	19	18	34	15	A-2-6(0)	SC.
100	60	12	10	8	6	2	NP	NP	A-2-4(0)	SW-SM.
100	73	35	33	31	27	25	36	16	A-2-6(1)	SC.
100	73	35	33	31	27	25	37	16	A-2-6(1)	SC.
97	75	19	15	11	6	4	NP	NP	A-2-4(0)	SM.
100	92	57	54	53	50	47	58	29	A-7-6(14)	MH-CH.
100	96	59	55	51	47	45	59	26	A-7-5(14)	MH.
100	98	59	52	46	42	39	55	23	A-7-5(12)	MH.
98	85	23	18	12	8	6	NP	NP	A-2-4(0)	SM.
100	92	52	50	48	45	42	42	19	A-7-6(7)	CL.
100	90	56	51	46	41	39	47	26	A-7-6(11)	CL.
95	71	11	10	9	6	3	NP	NP	A-2-4(0)	SP-SM.
100	85	33	32	31	31	29	42	17	A-2-7(1)	SM-SC.
97	68	26	25	23	22	21	43	21	A-2-7(1)	SC.
100	72	23	18	14	10	7	NP	NP	A-2-4(0)	SM.
100	72	30	26	22	16	13	22	8	A-2-4(0)	SC.
100	75	39	37	33	28	25	40	19	A-6(3)	SC.
100	68	23	20	15	10	7	NP	NP	A-2-4(0)	SM.
100	75	26	23	19	14	12	NP	NP	A-2-4(0)	SM.
100	74	39	37	34	31	30	44	20	A-7-6(3)	SC.
100	73	20	16	9	5	4	NP	NP	A-2-4(0)	SM.
100	73	26	23	19	15	12	22	8	A-2-4(0)	SC.
100	86	62	60	56	52	50	63	33	A-7-5(16)	MH-CH.
100	79	11	10	8	5	2	NP	NP	A-2-4(0)	SP-SM.
100	72	9	8	6	5	4	NP	NP	A-3(0)	SP-SM.
100	75	6	5	4	2	1	NP	NP	A-3(0)	SP-SM.
100	80	13	10	7	4	3	NP	NP	A-2-4(0)	SM.
100	85	16	12	8	4	3	NP	NP	A-2-4(0)	SM.
100	87	28	24	21	18	17	24	8	A-2-4(0)	SC.
100	81	14	12	9	5	3	NP	NP	A-2-4(0)	SM.
98	80	16	14	12	8	6	NP	NP	A-2-4(0)	SM.
95	80	21	20	17	13	12	NP	NP	A-2-4(0)	SM.
100	88	28	23	16	8	5	NP	NP	A-2-4(0)	SM.
100	89	35	30	24	17	14	21	6	A-2-4(0)	SM-SC.
100	90	44	40	36	33	31	39	21	A-6(5)	SC.
100	82	33	29	22	14	11	18	3	A-2-4(0)	SM.
98	82	32	29	24	19	17	23	9	A-2-4(0)	SC.
100	85	36	32	28	25	24	35	16	A-6(2)	SC.
100	87	19	16	11	8	6	NP	NP	A-2-4(0)	SM.
100	85	28	26	22	17	15	22	8	A-2-4(0)	SC.
100	85	36	34	31	28	21	35	16	A-6(2)	SC.

TABLE 4.—*Engineering test data*[1] *for soil*

Soil name and location	Parent material	Bureau of Public Roads report No.	Depth	Horizon	Mechanical analyses[2]	
					Percentage passing sieve—	
					¾ in.	No. 4 (4.7 mm.)
Plummer soils:			*Inches*			
NW¼NW¼ sec. 10, T. 1 N., R. 16 W. (ortho profile).	Thick beds of sand underlain by sandy clay.	S37638	5–14	A2		
		S37639	28–46	C3g		
		S37640	46–60+	C4g		
SW¼SW¼ sec. 17, T. 1 N., R. 14 W. (compact C2 horizon).	Thick beds of sand underlain by sandy clay.	S37641	0–5	A1		
		S37642	13–32	C1		
		S37643	32–72+	C2		
SE¼NE¼ sec. 9, T. 2 N., R. 14 W. (shallow).	Thick beds of sand underlain by sandy clay.	S37644	0–14	A1		
		S37645	19–32	C2g		
		S37646	46–51+	D2g		
Shubuta loamy sand:						
SW¼SW¼ sec. 30, T. 3 N., R. 13 W. (ortho profile).	Thick beds of sandy clay and clay.	S37647	0–6	A1		
		S37648	11–21	B21		
		S37649	52–74+	C2		
SE¼NW¼ sec. 28, T. 4 N., R. 15 W. (thicker and coarser textured B horizon).	Thick beds of sandy clay and clay.	S37650	0–9	Ap	100	97
		S37651	18–35	B2		
		S37652	39–57	C1		
SE¼NW¼ sec. 19, T. 3 N., R. 15 W. (coarse-textured A horizon).	Thick beds of sandy clay and clay.	S37653	3–8	A2	100	98
		S37654	9–23	B2		
		S37655	35–50+	C2		
Vaucluse coarse sand:[6]						
NE¼SE¼ sec. 23, T. 3 N., R. 16 W. (ortho profile).	Unconsolidated sandy clays.	S37656	2–7	A12	100	93
		S37657	16–24	B2	100	94
		S37658	32–41+	C1		
SW¼NW¼ sec. 15, T. 3 N., R. 16 W. (thick B horizon).	Unconsolidated sandy clays.	S37659	6–16	A2		99
		S37660	16–32	B2	100	86
		S37661	45–57+	C1		
NW¼NW¼ sec. 21, T. 3 N., R. 16 W. (thick A horizon).	Unconsolidated sandy clays.	S37662	3–11	A12	100	96
		S37663	19–33	B2		98
		S37664	45–64+	C1		

[1] Tests performed by Bureau of Public Roads in accordance with standard procedures of the American Association of State Highway Officials (AASHO).

[2] 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 calculated on the basis of all the material, including that coarser than 2 millimeters in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method and the material coarser than 2 millimeters in diameter is excluded from calculations of grain-size fractions. The mechanical

samples taken from 24 soil profiles—Continued

Mechanical analyses [2]—Continued							Liquid limit	Plasticity index	Classification	
Percentage passing sieve—Continued			Percentage smaller than—							
No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.			AASHO [3]	Unified [4]
100	60	9	8	6	5	3	NP	NP	A-3(0)	SP-SM.
100	59	8	7	6	6	5	NP	NP	A-3(0)	SP-SM.
100	62	10	9	7	4	3	NP	NP	A-3(0)	SP-SM.
100	84	41	38	27	12	8	41	8	A-5(1)	SM.
100	66	4	4	4	3	1	NP	NP	A-3(0)	SP.
100	74	26	26	20	9	4	NP	NP	A-2-4(0)	SM.
100	86	14	12	9	6	4	NP	NP	A-2-4(0)	SM.
100	84	14	11	9	7	5	NP	NP	A-2-4(0)	SM.
100	84	29	27	24	20	17	23	7	A-2-4(0)	SM-SC.
100	87	26	20	13	8	6	NP	NP	A-2-4(0)	SM.
100	94	62	60	56	51	47	61	31	A-7-5(16)	MH-CH.
100	89	37	35	31	29	26	38	17	A-6(2)	SC.
95	72	17	14	11	8	6	NP	NP	A-2-4(0)	SM.
100	84	49	46	44	41	38	38	18	A-6(6)	SC.
100	82	39	37	36	35	33	40	17	A-6(2)	SC.
96	80	12	11	10	7	5	NP	NP	A-2-4(0)	SP-SM.
100	92	44	43	42	41	38	54	28	A-7-6(8)	SC.
100	91	35	34	33	32	31	49	25	A-2-7(3)	SC.
86	40	6	5	3	3	3	NP	NP	A-1-b(0)	SW-SM.
86	42	23	22	21	20	20	56	28	A-2-7(1)	SM-SC.
100	66	33	33	32	32	32	63	30	A-2-7(4)	SM-SC.
96	50	11	9	7	3	3	NP	NP	A-1-b(0)	SW-SM.
70	34	16	16	15	15	15	56	29	A-2-7(0)	SC.
100	73	27	27	25	25	25	52	26	A-2-7(2)	SC.
90	49	7	6	4	3	3	NP	NP	A-1-b(0)	SP-SM.
84	31	20	20	19	18	18	68	38	A-2-7(1)	SC.
100	39	26	26	24	24	23	66	34	A-2-7(2)	SM-SC.

analyses used in this table are not suitable for use in naming textural classes for soils.

[3] 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.

[4] Based on the Unified Soil Classification System, Tech. Memo. No. 3–357, v. 1, Waterways Experiment Station, Corps of Engineers, March 1953.

[5] NP=Nonplastic.

[6] In the final correlation Vaucluse sand was combined with other soils in two mapping units—Cuthbert soils, 2 to 5 percent slopes, and Lakeland Cuthbert, and Shubuta soils, 5 to 12 percent slopes.

Figure 23.—**This highway passes through several different soils. The engineering properties were determined for each soil before construction began.**

agriculture, especially those that affect irrigation structures, farm ponds, and other structures designed to control and conserve soil and water.

The information in the report will be helpful in:

1. Selecting and developing sites for industry, business, homes, and recreation.
2. Selecting locations for highways, pipelines, and airports.
3. Locating sand that can be used in construction.
4. Correlating pavement performance with kinds of soils and thus developing information that is useful in designing and maintaining pavements.
5. Determining the suitability of soils for cross-country movement of vehicles and construction equipment.
6. Supplementing information obtained from published maps and reports and aerial photographs for the purpose of presenting information that can be used readily by engineers.
7. Making preliminary estimates of the engineering properties of soils in planning agricultural drainage systems, farm ponds, irrigation systems, and diversion terraces.

Engineers of the Florida State Road Department, the United States Bureau of Public Roads, and the Soil Conservation Service collaborated with soil scientists of the Soil Conservation Service in preparing this part of the report. These engineers used their knowledge of soils to interpret laboratory tests and field experiences and to determine how the properties of soils in this county affect engineering.

The engineering interpretations in this report are necessarily generalized. At many construction sites, the soil material varies greatly within the depth of proposed excavations. Also, several different soils may be found within short distances. *Without further tests and sampling, the information in this report, therefore, is not adequate for design and construction of specific engineering works.*

The maps, soil descriptions, and other data in this report are valuable in planning detailed engineering surveys. By using information in this report, the engineer can select and then concentrate on the soil units most suitable for the kind of construction planned. Thus, a minimum number of soil samples will be needed for laboratory testing.

Much of the soil terminology in this report is that used by agriculturists. Many of the terms have a special meaning to soil scientists and should, therefore, be defined for the engineer. Some of the more common terms are defined in the Glossary at the back of the report. The engineer should refer to the sections "Descriptions of the Soils" and "Formation and Classification of Soils." In these sections there is much information that will be of value in planning engineering work.

Soil test data

Samples of the principal soil types in eight extensive soil series were tested in accordance with standard procedures to help evaluate the soils for engineering purposes. The test data are given in table 4, beginning on p.68. Each soil series was sampled in three localities, and the test data from different locations show some variation in physical characteristics. The data, however, do not show the maximum variations of the B and C horizons of each of the soil series. Because all samples were obtained at a depth of less than 9 feet, the data are not adequate for estimating the characteristics of soil materials in deep cuts that may be made in rolling or hilly areas.

The engineering soil classifications in table 4 are based on data obtained by the mechanical analyses and by tests made to determine liquid limits and plastic limits. Mechanical analyses were made by combined sieve and hydrometer methods. In the procedure of the American Association of State Highway Officials (AASHO), the fine material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the basis of all the materials in the soil sample, including that coarser than 2 millimeters in diameter. The Soil Conservation Service uses the pipette method and excludes material coarser than 2 millimeters in diameter from the calculations. Percentages of clay obtained by the hydrometer method are not used in naming soil textural classes.

The liquid-limit and plastic-limit tests measure 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 semisolid to a plastic state. As the moisture content is further increased, the material changes from the plastic to a liquid state. The plastic limit is the moisture content at which the soil material passes from a semisolid 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 a soil material is in a plastic condition.

Engineering classification systems

The engineering classifications of the soil materials in the soil samples tested are given in table 4 for the system approved by the American Association of State Highway Officials (AASHO) and the Unified system. Most highway engineers classify soil materials according to the AASHO system. 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 the parentheses following the soil group symbol.

Some engineers prefer to use the Unified system. In this system soil materials are identified as coarse grained (eight classes), fine grained (six classes), or highly organic (Pt).

Soil properties significant to engineering

Table 5 briefly describes the profile of each soil in the county and lists physical properties that are significant in engineering. These physical properties are estimated on basis of field observations and, for some soils, on basis of laboratory tests. They apply only to the soils in Washington County. Terms, such as shrink-swell potential, which may be unfamiliar to some readers, are defined in footnotes at the end of table 5.

Suitability of soils for engineering uses

In table 6 the soils of Washington County are evaluated from the standpoint of their suitability for engineering uses, and some of the soil features that affect these uses are given. As a rule, the soil series are named and, after the series name, there are symbols for the soils belonging to that series. Groups of undifferentiated soils are not given in table 6. Their properties vary according to the component soils. For an interpretation of the properties of the soils in an undifferentiated unit, see the soil series that make up the undifferentiated unit.

The suitability of soils as a source of topsoil is evaluated on the basis of quality and quantity.

The suitability of soil material for road fill depends largely on texture of soil material and its natural water content. Highly plastic soil materials with high natural water content are rated poor. Silts and fine sands are highly erodible and are difficult to compact. Moderately gentle slopes and fast revegetation are required. Silts and fine sands, therefore, are rated poor to fair.

Deep sands and other soils that are rapidly permeable and have a low water table are rated fair to good for septic tank filter fields. Rated not suitable are soils that have high content of clay and slow permeability or a high water table.

Among the soil properties that affect compaction are water content, structure, consistency, and position of the water table. Granular soils with little or no fines generally are easily compacted.

Formation and Classification of Soils

This section has two main parts. The first part describes the factors of soil formation and their effect on the soils in Washington County. In the second part, the soil series are placed in great soil groups and the morphology of the soils is discussed.

Factors of Soil Formation

Soil is produced by forces of weathering and soil formation acting on the parent material that has been deposited or accumulated by geologic agencies. The characteristics of the soil depend on five major factors: (1) the climate under which the soil material has accumulated and has existed since accumulation; (2) the physical and mineralogical composition of the parent material; (3) the relief, or lay of the land; (4) the plant and animal life in and on the soil; and (5) the length of time these forces have acted on the material. The influences of climate on soil and plants depend not only on temperature, rainfall, and humidity, but also on the physical characteristics of the soil or soil material and on the relief. Relief, in turn, strongly influences drainage, aeration, runoff, and exposure to sun and wind.

The five soil-forming factors are interdependent; each modifies the effect of the others. Any one of the five factors may have more influence than the others on the development of a soil and may account for most of its properties. For example, if the parent material is quartz sand, the soil generally has only weakly developed horizons. This strong effect of parent material, however, is modified greatly in some places by the effects of the climate, relief, and plants and animals in and on the soil. When a soil develops, more than one of the five factors influence the development, but in some places all but one factor may have little effect.

Climate

Climate is important in soil formation. Temperature and rainfall are major factors that influence the rate at which rocks weather and minerals decompose. They also influence leaching, eluviation, and illuviation. Climate also affects the kinds of plants and animals that live in a region. These organisms, in turn, are important in soil development.

The climate of Washington County is humid and temperate. Summers are long and warm, and winters are mild. Rainfall is abundant and generally is well distributed throughout the year, but it may be excessive early in spring and in fall. Weathering and soil formation are only slightly affected by freezing and thawing, which seldom occur. The mild climate induces biological activity throughout the year. Because the abundant rainfall continuously leaches and translocates soluble materials, soils contain only small amounts of organic matter and soluble plant nutrients. Climate is relatively uniform throughout the county and is not a major factor in producing differences among the soils.

Parent material

The parent materials of the soils in Washington County consist of (1) interbedded sands and clays, (2) beds of clays derived from and underlain by limestone, and (3) material washed from soils from those parent materials. Approximately 73 percent of Washington County is covered by deposits on first bottoms and in marine terraces. The surface of these deposits ranges from about 40 to 320 feet above sea level. Because fossils are absent, it is difficult to classify these deposits and determine their origin. They are of the Pliocene and Pleistocene epochs. The interbedded sands and clays of the uplands are in the Choctawhatchee and Alum Bluff groups. The beds of clays derived from and underlain

TABLE 5.—*Estimated physical*

[Dashed lines indicate that soil has variable

Map symbol	Soil series	Description of soil	Depth to seasonally high water table [2]	Depth from surface [3]	Classification
					USDA texture
			Feet	*Inches*	
Al	Alluvial land.	Alluvial material with variable characteristics.	0	----	----
AnA	Angie loamy sand, 0 to 2 percent slopes.	Loamy sand ½ foot to 1½ feet thick over slowly permeable sandy clay to clay; substratum is thinly bedded clay, sandy clay loam, and sandy loam. Occur on uplands.	2	0–15	Loamy sand
AnB	Angie loamy sand, 2 to 5 percent slopes.			15–32	Sandy clay to clay
AnC	Angie loamy sand, 5 to 8 percent slopes.			32–60+	Clay stratified with sandy loam.
Ba	Bayboro soils.	Loamy sand to clay loam ½ foot to 1½ feet thick over sandy clay loam to clay. Occur in low, wet areas on uplands.	0	0–15	Sandy clay loam [10]
				15–20	Sandy clay loam
				20–54+	Sandy clay to clay
Bd	Bladen soils.	Loamy sand to clay loam ½ to 1 foot thick over clay. Occur on wet flats of uplands.	0	0–6	Sandy clay loam [10]
				6–52+	Clay
BfB	Blanton fine sand, 0 to 5 percent slopes.	Fine sand or sand 3½ to more than 6 feet thick over finer material of variable texture. Occur on uplands.	2	0–76+	Sand
BnB	Blanton sand, 0 to 5 percent slopes.				
BnC	Blanton sand, 5 to 8 percent slopes.				
Bp	Borrow pits.	Open excavations made for removal of sand or road materials.	----	----	----
BoA	Bowie loamy sand, 0 to 2 percent slopes.	Loamy sand ½ foot to 1½ feet thick over sandy loam to sandy clay loam and that, in turn, over heavy sandy clay loam to sandy clay; sandy clay substratum. Occur on uplands.	6+	0–14	Loamy sand
BoB	Bowie loamy sand, 2 to 5 percent slopes.			14–27	Sandy loam to sandy clay loam.
BoB2	Bowie loamy sand, 2 to 5 percent slopes, eroded.			27–36	Sandy clay to clay
BoC	Bowie loamy sand, 5 to 8 percent slopes.			36–52+	Clay to sandy clay
BoC2	Bowie loamy sand, 5 to 8 percent slopes, eroded.				
BwB	Bowie loamy sand, thick surface, 2 to 5 percent slopes.	Loamy sand 1½ to 2½ feet thick over heavy sandy clay loam to clay; sandy clay substratum. Occur on uplands.	6+	0–21	Loamy sand
BwC	Bowie loamy sand, thick surface, 5 to 8 percent slopes.			21–70+	Sandy clay loam
CaB	Carnegie loamy sand, 2 to 5 percent slopes.	Loamy sand ½ foot to 1½ feet thick over sandy clay loam or sandy clay; small iron concretions throughout soil. Occur on uplands.	6+	0–14	Loamy sand to sandy loam.
CaB2	Carnegie loamy sand, 2 to 5 percent slopes, eroded.			14–80+	Sandy clay loam
CaC2	Carnegie loamy sand, 5 to 8 percent slopes, eroded.				
CtB3	Cuthbert sandy clay loam, 2 to 5 percent slopes, severely eroded.	Sandy clay loam 0 to 1 foot thick over dense, compact, slowly permeable, stratified clay and sandy clay; depth to slowly permeable material varies within short distances; a few seepage areas on hillsides. Occur on uplands.	6+	0–9	Sandy clay loam
CtC3	Cuthbert sandy clay loam, 5 to 8 percent slopes, severely eroded.			9–21	Sandy clay to clay
				21–42+	Sandy clay loam to sandy clay.
CuB	Cuthbert soils, 2 to 5 percent slopes.	Soils of variable surface texture that have a few seepage areas on hillsides. (For properties of soils see Cuthbert sandy clay loams, severely eroded, in this table.)	----	----	----
CuB2	Cuthbert soils, 2 to 5 percent slopes, eroded.				
CuC	Cuthbert soils, 5 to 8 percent slopes.				
CuC2	Cuthbert soils, 5 to 8 percent slopes, eroded.				

See footnotes at end of table.

properties significant to engineering[1]

characteristics and that property is not estimated]

Classification—Continued		Percentage passing sieve—		Permeability[4]	Structure[5]	Available moisture capacity[6]	Reaction[7]	Shrink-swell potential[8]
Unified	AASHO	No. 10	No. 200					
				Inches per hour		*Inches per inch of aepth*	*pH*	
SM	A-2	95-100	15-30	2. 5-5. 0	Crumb	0. 083-0. 092	5. 1-5. 5	Low.
CL, CH or MH	A-6 or A-7	100	50-65	<0. 05-0. 20	Subangular blocky	0. 108-0. 120	5. 1-5. 5	Moderate to high.
CH to MH	A-4 to A-7	100	[9]75-90	<0. 05-2. 5	Massive	0. 100-0. 120	5. 1-5. 5	Moderate to high.
OL, SC or CL	A-6 or A-7	100	40-60	0. 05-0. 8	Subangular blocky	0. 083-0. 133	4. 5-5. 5	Moderate.
SC or CL	A-6 or A-7	100	35-50	0. 8-2. 5	Subangular blocky	0. 117-0. 147	4. 5-5. 5	Moderate.
CH or MH	A-7	100	50-80	<0. 05-0. 20	Massive	0. 133-0. 200	4. 5-5. 5	High.
SC or CL	A-6 or A-7	100	35-50	0. 05-0. 8	Crumb	0. 083-0. 133	5. 1-5. 5	Low to moderate.
CH or MH	A-7	100	65-80	<0. 05-0. 20	Massive	0. 130-0. 200	5. 1-5. 5	High.
SP, SP-SM	A-2 or A-3	100	1-15	10+	Single grain	0. 033-0. 083	5. 1-5. 5	Low.
SM	A-2	100	15-30	5. 0-10. 0	Crumb	0. 092	5. 1-5. 5	Low.
SM-SC or SC	A-2 or A-6	100	30-40	2. 5-10. 0	Subangular blocky	0. 083-0. 108	5. 1-5. 5	Low.
SC, CL or CH	A-7	100	40-55	0. 2-0. 8	Angular blocky	0. 117-0. 200	5. 1-5. 5	Moderate to high.
SC, CH or MH	A-7 or A-6	100	45-70	0. 05-2. 5	Angular blocky	0. 083-0. 200	5. 1-5. 5	Moderate to high.
SM	A-2	100	15-25	5. 0-10. 0	Crumb	0. 067-0. 092	5. 1-5. 5	Low.
SC, CH	A-2, A-6	100	30-55	0. 2-2. 5	Subangular blocky	0. 108-0. 117	5. 1-5. 5	Low to moderate.
SM or SM-SC	A-2	85	20-30	2. 5-5. 0	Crumb	0. 067-0. 108	5. 1-5. 5	Low.
CL, CH	A-6	90	45-55	0. 2-2. 5	Subangular blocky	0. 117-0. 133	5. 1-5. 5	Low to moderate.
SC	A-2, A-6	97	30-45	0. 8-5. 0	Crumb	0. 033-0. 092	5. 1-5. 5	Low.
CH or MH	A-7	100	50-65	0. 05-0. 2	Angular and subangular blocky.	0. 117-0. 200	5. 1-5. 5	High.
SC, CL or CH	A-6 or A-7	100	[9]45-60	0. 8-0. 2	Angular and subangular blocky.	0. 108	5. 1-5. 5	Moderate to high.

TABLE 5.—*Estimated physical*

Map symbol	Soil series	Description of soil	Depth to seasonally high water table [2]	Depth from surface [3]	Classification
					USDA texture
			Feet	*Inches*	
CwD3	Cuthbert, Shubuta, and Lakeland soils, 5 to 12 percent slopes, severely eroded.	Soils of variable texture, generally on steep slopes in uplands; a few seepage areas. (For properties of individual soils in this mapping unit, see soils of same series described elsewhere in this table.)	6+		
DuB	Dunbar loamy sand, 2 to 5 percent slopes.	Loamy sand ½ foot to 1½ feet thick over dense, slowly permeable sandy clay loam to clay; substratum is stratified sandy clay to clay. Occurs on uplands.	2	0–13 13–20 20–52+	Loamy sand Sandy clay loam Clay
EaB	Esto loamy sand, 0 to 5 percent slopes.	Loamy sand to sand 5 to 15 inches thick over sandy loam to sandy clay loam and that, in turn, is 5 to 15 inches thick over clay to sandy clay. Occurs on uplands.	6+	0–15 15–26 26–52+	Loamy sand to sand Sandy loam to sandy clay loam. Sandy clay to clay
EfA	Eulonia loamy fine sand, 0 to 2 percent slopes.	Loamy fine sand ½ foot to 2½ feet thick over sandy loam to sandy clay loam 10 to 20 inches thick; underlain by compact sandy clay to clay. Occur on uplands.	2	0–15 15–33 33–65+	Loamy sand Sandy clay loam to silt loam. Sandy clay to clay
EfB	Eulonia loamy fine sand, 2 to 5 percent slopes.				
EnA	Eulonia loamy fine sand, thick surface, 0 to 2 percent slopes.				
EnB	Eulonia loamy fine sand, thick surface, 2 to 5 percent slopes.				
EtB	Eustis sand, 0 to 5 percent slopes.	Sand or coarse sand 3½ to 6 feet thick over finer material of variable texture; fine-textured material in the coarse sands at a depth greater than 10 feet. Occur on uplands.	6+	0–96+	Sand
EtC	Eustis sand, 5 to 8 percent slopes.				
EsB	Eustis coarse sand, 0 to 5 percent slopes.				
EsC	Eustis coarse sand, 5 to 8 percent slopes.				
EsD	Eustis coarse sand, 8 to 12 percent slopes.				
EsE	Eustis coarse sand, 12 to 35 percent slopes.				
EuB	Eustis sand, shallow, 0 to 5 percent slopes.	Fine sand to sand 2½ to 3½ feet thick over sandy loam to sandy clay. Occur on uplands.	6+	0–30 30–65+	Sand Sandy loam to sandy clay
EuC	Eustis sand, shallow, 5 to 8 percent slopes.				
FaB	Faceville loamy sand, 2 to 5 percent slopes.	Loamy sand ½ foot to 1½ feet thick over sandy clay loam to sandy clay. Occur on uplands.	6+	0–8 8–16 16–63+	Loamy sand Sandy loam to sandy clay loam. Sandy clay loam to sandy clay.
FaB2	Faceville loamy sand, 2 to 5 percent slopes, eroded.				
FaC2	Faceville loamy sand, 5 to 8 percent slopes, eroded.				
GdA	Goldsboro loamy coarse sand, 0 to 2 percent slopes.	Loamy coarse sand 1 foot to 1½ feet thick over sandy loam to fine sandy clay loam; sandy loam and sandy clay loam substratum. Occur in low positions on uplands.	2	0–11 11–64+	Loamy sand Sandy loam to sandy clay loam.
GdB	Goldsboro loamy coarse sand, 2 to 5 percent slopes.				
GdC	Goldsboro loamy coarse sand, 5 to 8 percent slopes.				
GcA	Goldsboro coarse sand, thick surface, 0 to 2 percent slopes.	Coarse sand 1½ to 2½ feet thick over sandy loam to sandy clay loam; sandy loam and sandy clay loam substratum. Occur in low positions on uplands.	2	0–20 20–36 36–55+	Sand Sandy loam to sandy clay loam. Sandy clay loam to sandy loam.
GcB	Goldsboro coarse sand, thick surface, 2 to 5 percent slopes.				
GcC	Goldsboro coarse sand, thick surface, 5 to 8 percent slopes.				
Gr	Grady loam.	Fine sandy loam to loam ½ to 1 foot thick over fine sandy clay to clay. Occurs in wet depressions on uplands.	0	0–6 6–55+	Sandy loam to loam Sandy clay to clay

See footnotes at end of table.

properties significant to engineering[1]—Continued

Classification—Continued		Percentage passing sieve—		Permeability[4]	Structure[5]	Available moisture capacity[6]	Reaction[7]	Shrink-swell potential[8]
Unified	AASHO	No. 10	No. 200					
				Inches per hour		*Inches per inch of depth*	*pH*	
SM	A-2	100	15–30	5.0–10.0	Crumb	0.067–0.092	5.1–5.5	Low.
SC	A-2 or A-4	100	30–45	2.5–5.0	Crumb	0.100–0.170	5.1–5.5	Low.
CH or MH	A-7	100	55–65	0.05–0.2	Subangular blocky to massive.	0.117–0.170	5.1–5.5	High.
SP–SM or SP	A-2, A-3	100	1–15	5.0–10.0	Single grain	0.042–0.092	5.1–5.5	Low.
SC or CL	A-2, A-6	100	30–45	0.8–2.5	Subangular blocky	0.083–0.117	5.1–5.5	Moderate.
CL or CH	A-7	100	35–80	0.05–0.2	Subangular blocky	0.117–0.200	5.1–5.5	High.
SM	A-2	100	15–30	5.0–10.0	Crumb	0.067–0.092	5.1–5.5	Low.
SC	A-2 to A-6	100	30–45	2.5–5.0	Subangular blocky	0.100–0.170	5.1–5.5	Moderate.
CL or CH or MH.	A-7	100	55–90	0.05–0.2	Subangular blocky to massive.	0.117–0.170	5.1–5.5	Moderate to high.
SP–SM	A-3	100	0–10	10+	Single grain	0.015–0.033	5.1–5.5	Low.
SP–SM or SP	A-2 or A-3	100	1–15	10+	Single grain	0.042	5.1–5.5	Low.
SM or SM–SC or SC.	A-2 to A-4	100	30–50	0.2–5.0	Subangular blocky	0.083–0.117	5.1–5.5	Low.
SM	A-2	100	15–30	2.5–5.0	Crumb	0.067–0.092	5.1–5.5	Low.
SC	A-2 to A-6	100	25–40	0.2–5.0	Subangular blocky	0.083–0.108	5.1–5.5	Moderate.
SC	A-6 or A-7	100	35–50	0.2–2.5	Subangular blocky	0.117–0.133	5.1–5.5	Moderate.
SM	A-2	100	15–25	5.0–10.0	Crumb	0.067–0.092	5.1–5.5	Low.
SM, SC or SM–SC.	A-2 or A-4	100	30–45	2.5–5.0	Crumb	0.083–0.108	5.1–5.5	Low.
SP, SP–SM	A-2	100	1–15	5.0–10.0	Single grain	0.033–0.042	5.1–5.5	Low.
SM, SC or SM–SC.	A-2 or A-4	100	20–40	2.5–5.0	Crumb	0.067–0.092	5.1–5.5	Low.
SC, SM	A-6 or A-7	100	35–50	0.8–2.5	Subangular blocky	0.083–0.108	5.1–5.5	Moderate.
SC, OL, CL or ML–CL.	A-4 or A-6	100	40–55	0.8–0.05	Crumb	0.083–0.113	5.1–5.5	Low to moderate.
CL or CH	A-7	100	40–65	0.05–0.2	Massive	0.130–0.200	5.1–5.5	High.

TABLE 5.—*Estimated physical*

Map symbol	Soil series	Description of soil	Depth to seasonally high water table [2]	Depth from surface [3]	Classification: USDA texture
			Feet	*Inches*	
KaB	Klej fine sand, 0 to 5 percent slopes.	Fine sand or sand 3½ to 6 feet thick over finer material of variable texture and thickness. Occur on uplands.	2	0–90+	Sand
KgB	Klej sand, 0 to 5 percent slopes.				
KgC	Klej sand, 5 to 8 percent slopes.				
KsB	Klej sand, shallow, 0 to 5 percent slopes.	Sand 2½ to 3½ feet thick over finer material of variable texture. Occur on uplands.	2	0–35	Sand
KsC	Klej sand, shallow, 5 to 8 percent slopes.			35–53+	Sandy loam to sandy clay
LdB	Lakeland sand, 0 to 5 percent slopes.	Sand or coarse sand 3½ to 6 feet thick over finer material of variable texture; finer textured material in the coarse sands at a depth greater than 10 feet. Occur on uplands.	6+	0–100+	Sand
LdC	Lakeland sand, 5 to 8 percent slopes.				
LaB	Lakeland coarse sand, 0 to 5 percent slopes.				
LaC	Lakeland coarse sand, 5 to 8 percent slopes.				
LaD	Lakeland coarse sand, 8 to 12 percent slopes.				
LaF	Lakeland coarse sand, 12 to 45 percent slopes.				
LkB	Lakeland sand, shallow, 0 to 5 percent slopes.	Fine sand to sand 2½ to 3½ feet thick over sandy loam to sandy clay. Occur on uplands.	6+	0–36	Sand
LkC	Lakeland sand, shallow, 5 to 8 percent slopes.			36–50+	Sandy loam to sandy clay
LnD	Lakeland, Cuthbert, and Shubuta soils, 5 to 12 percent slopes.	Soils of variable texture, generally on steep slopes on uplands; a few seepage areas. (For properties of individual soils in these mapping units, see the soils of the same series described elsewhere in this table.)	6+		
LnF	Lakeland, Cuthbert, and Shubuta soils, 12 to 45 percent slopes.				
Lo	Leon coarse sand.	Thick beds of coarse sand that have an organic pan at a depth of 1 foot to 2½ feet.	1	0–53+	Sand
Lu	Local alluvial land.	Alluvial material in depressions on uplands; thickness and texture are variable.	1		
LyA	Lynchburg loamy fine sand, 0 to 2 percent slopes.	Loamy fine sand ½ foot to 1½ feet thick over sandy loam to sandy clay loam; substratum is stratified sandy clay loam to sandy clay. Occur in low positions on uplands.	1	0–10	Loamy sand
LyB	Lynchburg loamy fine sand, 2 to 5 percent slopes.			10–56	Sandy loam to sandy clay loam.
				56–72+	Clay to sandy clay
LzA	Lynchburg loamy fine sand, thick surface, 0 to 2 percent slopes.	Loamy fine sand 1½ to 2½ feet thick over fine sandy loam to fine sandy clay loam; substratum is stratified sandy clay loam to sandy clay. Occur in low positions on uplands.	1	0–24	Loamy sand
LzB	Lynchburg loamy fine sand, thick surface, 2 to 5 percent slopes.			24–45	Sandy loam to sandy clay loam.
				45–55+	Sandy clay loam to sandy clay.
MaB	Marlboro loamy sand, 2 to 5 percent slopes.	Loamy sand ½ foot to 1½ feet thick over sandy clay; sandy clay loam and sandy clay substratum.	6+	0–7	Loamy sand
MaB2	Marlboro loamy sand, 2 to 5 percent slopes, eroded.			7–14	Sandy loam to sandy clay loam.
				14–63	Sandy clay loam to sandy clay.
				63–73+	Sandy clay loam to sandy clay.

See footnotes at end of table.

properties significant to engineering[1]—Continued

Classification—Continued		Percentage passing sieve—		Permeability[4]	Structure[5]	Available moisture capacity[6]	Reaction[7]	Shrink-swell potential[8]
Unified	AASHO	No. 10	No. 200					
				Inches per hour		*Inches per inch of depth*	*pH*	
SP or SP–SM	A–2	100	1–15	10+	Single grain	0. 033–0. 083	5. 1–5. 5	Low.
SP or SP–SM	A–2	100	1–15	10+	Single grain	0. 042	5. 1–5. 5	Low.
SM, SC or SM–SC.	A–2 to A–4	98	30–50	5. 0–10. 0	Subangular blocky	0. 083–0. 117	5. 1–5. 5	Low.
SP, SP–SM	A–2 or A–3	100	1–15	10+	Single grain	0. 015–0. 033	5. 1–5. 5	Low.
SP–SM or SP	A–2	100	1–15	10+	Single grain	0. 042	5. 1–5. 5	Low.
SC	A–4 or A–6	100	35–50	0. 2–5. 0	Angular blocky	0. 083–0. 117	5. 1–5. 5	Low to moderate.
SP, SP–SM	A–2 or A–3	100	0–10	10+	Single grain	0. 035	4. 5–5. 5	Low.
SM	A–2	100	15–30	5. 0–10. 0	Crumb	0. 067–0. 092	5. 1–5. 5	Low.
SM, SC or SM–SC.	A–2 to A–4	100	25–40	2. 5–5. 0	Subangular blocky	0. 083–0. 108	5. 1–5. 5	Low to moderate.
SC, CL	A–6, A–7	100	50–70	0. 05–2. 5	Massive	0. 083–0. 133	5. 1–5. 5	Moderate to high.
SM	A–2	100	15–25	5. 0–10. 0	Crumb	0. 067–0. 092	5. 1–5. 5	Low.
SM–SC or SC	A–2 to A–4	100	25–40	2. 5–5. 0	Subangular blocky	0. 083–0. 108	5. 1–5. 5	Low to moderate.
SC, CL	A–2 to A–6	100	30–45	0. 05–0. 2	Massive	0. 042–0. 133	5. 1–5. 5	Moderate.
SM	A–2	100	10–25	5. 0–10. 0	Crumb	0. 067–0. 092	5. 1–5. 5	Low.
SC, SM	A–2 or A–4	100	30–45	0. 2–5. 0	Subangular blocky	0. 083–0. 108	5. 1–5. 1	Low to moderate.
CL or CH	A–7	100	50–65	0. 2–2. 5	Subangular blocky	0. 117–0. 133	5. 1–5. 5	Moderate to high.
SC or CL	A–6 or A–7	100	35–50	0. 2–2. 5	Subangular blocky	0. 117–0. 133	5. 1–5. 5	Moderate.

TABLE 5.—*Estimated physical*

Map symbol	Soil series	Description of soil	Depth to seasonally high water table [2]	Depth from surface [3]	Classification: USDA texture
			Feet	*Inches*	
NoA	Norfolk loamy sand, 0 to 2 percent slopes.	Loamy sand ½ foot to 1½ feet thick over sandy loam to sandy clay loam; sandy clay substratum. Occur on uplands.	6+	0–17	Loamy sand
NoB	Norfolk loamy sand, 2 to 5 percent slopes.			17–53	Sandy loam to sandy clay loam.
NoB2	Norfolk loamy sand, 2 to 5 percent slopes, eroded.			53–65+	Sandy clay loam to sandy clay.
NoC	Norfolk loamy sand, 5 to 8 percent slopes.				
NoC2	Norfolk loamy sand, 5 to 8 percent slopes, eroded.				
NrA	Norfolk sand, thick surface, 0 to 2 percent slopes.	Sand 1½ to 2½ feet thick over sandy loam to sandy clay loam; sandy clay substratum. Occur on uplands.	6+	0–24	Sand
NrB	Norfolk sand, thick surface, 2 to 5 percent slopes.			24–65+	Sandy loam to sandy clay loam.
NrC	Norfolk sand, thick surface, 5 to 8 percent slopes.				
OkB	Oktibbeha soils, 2 to 5 percent slopes.	Clay loam to loamy sand 4 to 10 inches thick over slowly permeable clay loam to clay 22 to 32 inches thick; soft limestone substratum. Occur on uplands.	6+	0–10	Clay loam to loamy sand.[10]
OkC	Oktibbeha soils, 5 to 8 percent slopes.			10–44	Clay loam to clay
				44–50+	(Soft limestone)
Pm	Plummer soils.	Sand or fine sand 3½ or more feet thick; low areas flooded in wet seasons. Occur in low areas on uplands and on seepage slopes.	0	0–60	Sand
Pr	Pocomoke and Rains soils [11].	Loamy fine sand high in organic material and 1½ to 2½ feet thick over sandy loam to fine sandy clay loam. Occur in low areas and along drainageways on uplands.	0	0–16	Loamy sand
				16–55+	Sandy loam to sandy clay loam.
Pt	Pocomoke and Rains soils, thick surface [11].	Loamy fine sand high in organic material and 1½ to 2½ feet thick over sandy loam to fine sandy clay loam. Occur in low areas and along drainageways on uplands.	0	0–11	Loamy sand
				11–23	Sand to loamy sand
				23–64+	Sandy loam to sandy clay loam.
Ra	Rains loamy sand.	Loamy sand ½ foot to 1½ feet thick on sandy loam to fine sandy clay loam. Occurs in depressions and narrow drainageways.	0	0–18	Loamy sand
				18–51+	Sandy loam to sandy clay loam.
RsB	Ruston loamy sand, 2 to 5 percent slopes.	Loamy sand to coarse sand ½ foot to 1½ feet thick on sandy loam to sandy clay loam; sandy clay substratum. Occur on uplands.	6+	0–10	Loamy sand
RsB2	Ruston loamy sand, 2 to 5 percent slopes, eroded.			10–65+	Sandy loam to sandy clay loam.
RsC	Ruston loamy sand, 5 to 8 percent slopes.				
RsC2	Ruston loamy sand, 5 to 8 percent slopes, eroded.				
RcB	Ruston coarse sand, 2 to 5 percent slopes.				
RdB	Ruston coarse sand, thick surface, 2 to 5 percent slopes.	Coarse sand 1½ to 2½ feet thick on sandy loam to sandy clay loam; sandy clay substratum. Occur on uplands.	6+	0–25	Sand
RdC	Ruston coarse sand, thick surface, 5 to 8 percent slopes.			25–56+	Sandy loam to sandy clay loam.
Ru	Rutlege loamy fine sand.	Loamy fine sand or fine sand more than 3½ feet thick; high content of organic matter to a depth of about 1 foot. Occurs in low depressions and on broad flats; saturated with water for long periods.	0	0–9	Loamy sand to sand
				9–54+	Sand

See footnotes at end of table.

properties significant to engineering[1]—Continued

Classification—Continued		Percentage passing sieve—		Permeability[4]	Structure[5]	Available moisture capacity[6]	Reaction[7]	Shrink-swell potential[8]
Unified	AASHO	No. 10	No. 200					
				Inches per hour		*Inches per inch of depth*	*pH*	
SM	A-2	100	5–25	5. 0–10. 0	Crumb	0. 067–0. 092	5. 1–5. 5	Low.
SM or SM-SC	A-4	100	35–50	2. 5–5. 0	Subangular blocky	0. 083–0. 108	5. 1–5. 5	Low.
SC or CL	A-6 or A-7	100	40–55	0. 2–2. 5	Subangular blocky	0. 117–0. 133	5. 1–5. 5	Moderate.
SP-SM	A-2	100	5–15	5. 0–10. 0	Single grain	0. 067	5. 1–5. 5	Low.
SM-SC	A-2 or A-4	100	25–40	2. 5–5. 0	Subangular blocky	0. 083–0. 108	5. 1–5. 5	Low.
SC, SM-SC	A-2 to A-6	100	30–45	5. 0–10. 0	Crumb	0. 083–0. 200	5. 6–6. 0	Low to moderate.
CL or CH	A-6 or A-7	100	60–80	0. 05–0. 2	Subangular blocky	0. 109–0. 200	5. 6–6. 0	Moderate to high.
SP, SP-SM	A-2 or A-3	100	0–15	10+	Single grain	0. 033–0. 083	5. 1–5. 5	Low.
SM or OL	A-2	100	15–25	2. 5–5. 0	Crumb	0. 092–0. 150	4. 5–5. 5	Low.
SM, SC	A-2 to A-6	100	25–40	2. 5–5. 0	Subangular blocky	0. 083–0. 108	4. 5–5. 5	Low to moderate.
SM or OL	A-2	100	15–25	5. 0–10. 0	Crumb	0. 067–0. 092	4. 5–5. 5	Low.
SP-SM	A-2	100	5–20	10+	Single grain	0. 042–0. 083	4. 5–5. 5	Low.
SC, SM	A-2 to A-6	100	25–40	2. 5–5. 0	Subangular blocky	0. 083–0. 108	4. 5–5. 5	Moderate.
SM	A-2	100	15–25	5. 0–10. 0	Crumb	0. 067–0. 092	5. 1–5. 5	Low.
SM-SC or SC	A-2, A-4 or A-6.	100	25–50	2. 5–5. 0	Subangular blocky	0. 083–0. 108	5. 1–5. 5	Low to moderate.
SM or SP-SM	A-2	100	5–20	5. 0–10. 0	Crumb	0. 015–0. 092	5. 1–5. 5	Low.
SC, CL	A-6	100	35–55	2. 5–5. 0	Subangular blocky	0. 083–0. 108	5. 1–5. 5	Moderate.
SP, SP-SM	A-2 or A-3	100	5–15	10+	Single grain	0. 015–0. 042	5. 1–5. 5	Low.
SM, SC	A-2 to A-6	100	25–50	2. 5–5. 0	Subangular blocky	0. 083–0. 108	5. 1–5. 5	Low to moderate.
SP, SM or OL	A-2, A-3	100	1–20	2. 5–5. 0	Crumb	0. 033–0. 092	4. 5–5. 5	Low.
SP-SM or SP	A-2, A-3	100	1–15	5. 0–10. 0	Single grain	0. 015–0. 042	4. 5–5. 5	Low.

TABLE 5.—*Estimated physical*

Map symbol	Soil series	Description of soil	Depth to seasonally high water table [2]	Depth from surface [3]	Classification
					USDA texture
			Feet	*Inches*	
Sc	Scranton fine sand.	Fine sand more than 3½ feet thick over variable fine-textured material. Occurs in low areas on uplands.	1	0–52+	Sand
Sf	Scranton fine sand, shallow.	Fine sand 2½ to 3½ feet thick over sandy loam to fine sandy clay loam; high content of organic matter in top 8 inches. Occurs in low areas on uplands.	1	0–32 32–53+	Sand Sandy clay loam to sandy loam.
ShB	Shubuta loamy sand, 2 to 5 percent slopes.	Loamy sand to loamy fine sand ½ foot to 1½ feet thick over compact sandy clay to clay; sandy clay and clay substratum. Occur on uplands.	6+	0–11	Loamy sand to sandy loam.
ShB2	Shubuta loamy sand, 2 to 5 percent slopes, eroded.			11–75+	Sandy clay to clay
ShC	Shubuta loamy sand, 5 to 8 percent slopes.				
ShC2	Shubuta loamy sand, 5 to 8 percent slopes, eroded.				
Sw	Swamp.	Soils of variable characteristics in swamps; surface layer high in organic material.	0	0–11	
TfB	Tifton loamy sand, 2 to 5 percent slopes.	Loamy sand to loamy fine sand ½ foot to 1½ feet thick over heavy sandy clay loam to sandy clay; pebbles of iron throughout the solum. Occur on uplands.	6+	0–6 6–14 14–61+	Loamy sand Sandy loam to loamy sand Sandy clay loam to sandy clay.
TfB2	Tifton loamy sand, 2 to 5 percent slopes, eroded.				
TfC2	Tifton loamy sand, 5 to 8 percent slopes, eroded.				

[1] The physical properties are estimated on basis of field observations and other experience. They apply only to the soils in Washington County.

[2] Level expected during the normal wet seasons.

[3] Depth from surface of a typical soil profile.

[4] Permeability as determined through saturated, undisturbed sample core 3 inches in diameter and 3 inches high with 1-inch head of water and tension of 60 centimeters water column.

[5] Structure is arrangement of individual soil particles and groups of particles in the natural state.

[6] Available moisture capacity is the amount of capillary water available to plants in the soil when the flow downward by gravity

properties significant to engineering[1]—Continued

Classification—Continued		Percentage passing sieve—		Permeability[4]	Structure[5]	Available moisture capacity[6]	Reaction[7]	Shrink-swell potential[8]
Unified	AASHO	No. 10	No. 200					
				Inches per hour		*Inches per inch of depth*	*pH*	
SP-SM or SP	A-2, A-3	100	1-15	5. 0-10. 0	Single grain	0. 033-0. 092	5. 1-5. 5	Low.
SP-SM	A-2	100	5-15	5. 0-10. 0	Single grain	0. 033-0. 125	5. 1-5. 5	Low.
SC or SM-SC	A-4 or A-6	100	20-50	2. 5-5. 0	Subangular blocky	0. 083-0. 108	5. 1-5. 5	Moderate.
SM	A-2	100	15-30	2. 5-5. 0	Crumb	0. 067-0. 092	5. 1-5. 5	Low.
CL or CH or SC	A-6 or A-7	100	45-65	0. 05-0. 2	Angular and subangular blocky.	0. 108-0. 120	5. 1-5. 5	Moderate to high.
SM	A-2	85	10-20	2. 5-5. 0	Crumb	0. 067-0. 092	5. 1-5. 5	Low.
SM or SM-SC	A-2	85	20-35	0. 2-5. 0	Crumb	0. 083-0. 108	5. 1-5. 5	Low.
SM-SC or SC or CL.	A-4 or A-6	90	35-55	0. 2-2. 5	Subangular blocky	0. 117-0. 133	5. 1-5. 5	Low to moderate.

has practically stopped. In sands it is approximately the total amount of water held. In clays it may be considerably less than the total amount.

[7] The pH value indicates the degree of soil acidity (less than 7.0) or alkalinity (more than 7.0).

[8] Shrink-swell potential refers to the change in volume of the soil with change in moisture content.

[9] Ratings are for the clay strata. A smaller percentage of the sandier strata passes the 200 sieve.

[10] The surface soil of this undifferentiated unit varies from clay loam to loamy sand. Data are for sandy clay loam, which is dominant.

[11] Data are for Pocomoke soils.

TABLE 6.—*Engineering*

Soil and map symbols	Suitability as source of—			Suitability for—		Compaction characteristics at or near optimum moisture	Soil features adversely affecting—
	Topsoil	Sand	Road fill	Use as foundations	Septic tank filter fields		Highway location
Alluvial land (Al)	Variable	Variable	Variable	Variable; generally not suited.	Not suitable.	Variable	Variable material; high water table; frequent flooding.
Angie (AnA, AnB, AnC).	Poor	Poor	Poor to fair.	Poor to fair.	Poor to fair.	Narrow range of optimum moisture; soil in place has near optimum moisture; sheepsfoot roller compacts soil to maximum density.	Erodibility; slow internal drainage; plastic clay in subsoil.
Bayboro (Ba)	Good	Not suitable.	Poor	Poor to very poor.	Not suitable.	Narrow range of optimum moisture; soil in place is very wet; optimum moisture difficult to obtain; spike roller compacts soil to maximum density.	Slowly permeable subsoil; high water table; low position; occasional flooding; plastic clay material in top 15 inches.
Bladen (Bd)	Poor	Not suitable.	Poor	Poor to very poor.	Not suitable.	Narrow range of optimum moisture; soil in place is wet; optimum moisture difficult to obtain; spike roller compacts soil to maximum density.	Slowly permeable subsoil; high water table; plastic clay.
Blanton (BfB, BnB, BnC).	Fair	Good	Good	Good	Fair to good; low-lying areas hazardous in wet seasons.	Wide range of optimum moisture; vibrator or steel roller compacts soil easily.	Moderately high water table.
Borrow pits (Bp)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Bowie (BoA, BoB, BoB2, BoC, BoC2, BwB, BwC).	Good	Poor	Fair to good.	Good to excellent.	Good	Medium range of optimum moisture; soil in place has near optimum moisture; pneumatic roller compacts soil to maximum density.	Erodibility; moderately slow internal movement of water; plastic clay in subsoil.
Carnegie (CaB, CaB2, CaC2).	Very good.	Poor	Fair	Fair to good.	Good	Medium range of optimum moisture; soil in place has near optimum moisture; pneumatic roller compacts soil to maximum density.	Erodibility; moderately slow internal movement of water.
Cuthbert (CtB3, CtC3, CuB, CuB2, CuC, CuC2).	Poor to fair.	Poor	Poor to fair.	Poor to fair.	Poor	Narrow range of optimum moisture; soil in place has near optimum moisture; sheepsfoot roller compacts soil to maximum density.	Erodibility; slow internal drainage; variable substratum; seepage zone present.
Cuthbert, Shubuta, and Lakeland soils (CwD3).	(2)	(2)	(2)	(2)	(2)	(2)	(2)

See footnotes at end of table.

interpretations of the soils

Soil features adversely affecting—Continued						
Dikes or levees	Farm ponds		Agriculture drainage	Irrigation	Terraces and diversions	Waterways
	Reservoir area	Embankment				
Variable soil texture; organic pockets.	Position along natural drains; variable material.	Variable material; organic pockets.	High water table; frequent flooding; variable material.	Frequent flooding.	Not applicable	Frequent flooding.
Moderate to high shrink-swell potential.	Slowly permeable subsoil; variable substratum.	Moderate to high shrink-swell potential.	Slow permeability.	Low intake rate; shallow root zone.	High erodibility; shallow soils.	Erodibility; sod difficult to establish.
Ponded areas; high shrink-swell potential.	Slowly permeable; low position.	Plastic sandy clay and clay; high shrink-swell potential.	High water table; slowly permeable subsoil; low position.	Slow infiltration rate; high water table; slow permeability.	Not applicable	Ponded areas; not applicable.
Plastic clay; high shrink-swell potential.	Slowly permeable; nearly level position.	Plastic clay subsoil; high shrink-swell potential.	High water table; slowly permeable subsoil.	Slow infiltration rate; slow permeability; high water table.	Not applicable	Low, nearly level position.
Loose, permeable material.	Very porous to a considerable depth.	Loose, permeable material.	None	Low available moisture capacity.	Not applicable	Low, nearly level position; sand texture.
(1)	(1)	(1)	(1)	(1)	(1)	
Moderate to high shrink-swell potential.	Sandy clay loam to sandy clay subsoil; moderately slow permeability.	Medium to high shrink-swell potential.	Moderately slow permeability.	None	Moderate erodibility.	Moderate erodibility.
None	Sandy clay subsoil with moderately slow permeability.	Moderate shrink-swell potential.	Moderately slow permeability.	None	Moderate erodibility.	Moderate erodibility.
Moderate to high shrink-swell potential.	Slowly permeable subsoil; variable substratum.	Sand lenses in substratum; moderate to high shrink-swell potential.	Slow permeability.	Low intake rate restricts root zone.	High erodibility; shallow soils.	High erodibility; sod difficult to establish.
(2)	(2)	(2)	(2)	(2)	(2)	(2).

TABLE 6.—*Engineering*

Soil and map symbols	Suitability as source of—			Suitability for—		Compaction characteristics at or near optimum moisture	Soil features adversely affecting—
	Topsoil	Sand	Road fill	Use as foundations	Septic tank filter fields		Highway location
Dunbar (DuB)	Fair	Poor	Poor	Poor to fair.	Poor; lowest areas not suited.	Narrow range of optimum moisture; soil in place wet; optimum moisture difficult to obtain; sheepsfoot roller compacts soil to maximum density.	Slow internal movement of water; plastic sandy clay to clay subsoil.
Esto (EaB)	Poor	Poor	Poor to fair.	Poor to fair.	Poor	Narrow range of optimum moisture; soil in place has near optimum moisture; sheepsfoot roller compacts soil to maximum density.	Slow internal movement of water; sandy clay loam to plastic clay subsoil; variable substratum.
Eulonia (EfA, EfB, EnA, EnB).	Fair	Poor	Poor to fair.	Poor to fair.	Poor	Narrow range of optimum moisture; soil in place slightly wet; moderate treatment needed to obtain maximum moisture.	Moderately high water table; moderately slow internal movement of water; wet plastic clay substratum.
Eustis coarse sand (EsB, EsC, EsD, EsE).	Poor	Very good.	Good	Good	Good	Wide range of optimum moisture; vibrator or steel roller compacts soil easily.	Erodibility
Eustis sand and Eustis sand, shallow (EtB, EtC, EuB, EuC).	Fair to poor.	Good	Good	Good	Good	Wide range of optimum moisture in upper 3 feet; vibrator or steel roller compacts soil easily. Lower part has medium range of optimum moisture, is near optimum moisture in place, and is compacted to maximum density with pneumatic roller.	Erodibility
Faceville (FaB, FaB2, FaC2).	Good	Poor	Fair to good.	Fair to good.	Good	Moderate range of optimum moisture; soil in place has near optimum moisture; pneumatic roller compacts soil to maximum density.	Erodibility; moderately slow internal drainage.
Goldsboro (GcA, GcB, GcC, GdA, GdB, GdC).	Good	Poor	Fair to good.	Fair	Fair to poor; lowest areas not suited.	Medium range of optimum moisture; soil in place is slightly wet; dries to optimum moisture readily; pneumatic roller compacts soil to maximum density.	Moderately low position; moderately high water table.

See footnotes at end of table.

interpretations of the soils—Continued

Soil features adversely affecting—Continued						
Dikes or levees	Farm ponds		Agriculture drainage	Irrigation	Terraces and diversions	Waterways
	Reservoir area	Embankment				
Moderate to high shrink-swell potential.	Moderately high water table; slowly permeable sandy clay to clay subsoil.	Moderate to high shrink-swell potential.	Moderately high water table; slow permeability.	High water table restricts root zone.	Not applicable	Somewhat poorly drained, nearly level soil.
Moderate to high shrink-swell potential.	Slowly permeable sandy clay loam to clay subsoil; variable substratum.	Moderate to high shrink-swell potential.	Slow permeability.	Low to medium available moisture capacity.	High erodibility; shallow soil; small areas.	High erodibility; sod difficult to establish.
Moderate to high shrink-swell potential.	Sandy clay loam to sandy clay subsoil; moderately slow permeability.	Moderate to high shrink-swell potential.	Moderately high water table; moderately slow permeability.	Medium available moisture capacity.	Not applicable	Moderate erodibility.
Deep, porous, loose sands.	Deep, porous, loose sands.	Deep, porous, loose sands.	None	Low available moisture capacity.	Deep sands; rapid permeability; terraces not needed.	High erodibility; sod difficult to establish.
Very porous in top 2½ to 6 feet.	Very porous in top 2½ to 6 feet; sandy clay loam to clay substratum.	Rapid permeability.	None	Low available moisture capacity.	Deep sands; rapid permeability; terraces not needed.	High erodibility; sod difficult to establish.
None	Sandy clay loam to sandy clay subsoil; moderately slow permeability.	Moderate to high shrink-swell potential.	Well-drained soils.	None	Moderate erodibility.	Moderate erodibility.
None	Moderately low position; moderately high water table; slowly permeable subsoil.	Moderate shrink-swell potential.	Moderately high water table; moderately rapid permeability.	Medium available moisture capacity.	Wetness; moderate erodibility.	High erodibility.

TABLE 6.—*Engineering*

Soil and map symbols	Suitability as source of—			Suitability for—		Compaction characteristics at or near optimum moisture	Soil features adversely affecting—
	Topsoil	Sand	Road fill	Use as foundations	Septic tank filter fields		Highway location
Grady (Gr)	Good	Poor	Poor	Poor to very poor.	Not suited	Narrow range of optimum moisture; soil in place very wet; optimum moisture easy to obtain; sheepsfoot roller compacts soil to maximum density.	Low position; high water table; very slowly permeable subsoil; wet plastic clay substratum.
Klej (KaB, KgB, KgC, KsB, KsC).	Fair	Fair	Good	Fair to good.	Fair to good; low-lying areas hazardous in wet seasons.	Wide range of optimum mositure; vibrator or steel roller compacts soil easily.	Moderately high water table.
Lakeland coarse sand (LaB, LaC, LaD, LaF).	Poor	Very good.	Good	Good	Good	Wide range of optimum moisture; vibrator or steel roller compacts soil easily.	Erodibility
Lakeland sand and Lakeland sand, shallow (LdB, LdC, LkB, LkC).	Fair to poor.	Good	Good	Good	Good	Wide range of optimum moisture in upper 3 feet; vibrator compacts this part easily. Lower part has medium range of optimum moisture, is near optimum moisture in place, and is compacted to maximum density by pneumatic roller.	Erodibility
Lakeland, Cuthbert and Shubuta soils (LnD, LnF).	(2)	(2)	(2)	(2)	(2)	(2)	(2)
Leon (Lo)	Poor	Fair	Fair to good.	Fair	Poor	Wide range of optimum moisture; soil in place is wet; vibrator or steel roller compacts soil easily.	High water table
Local alluvial land (Lu).	Poor	Fair to good.	Variable	Poor	Poor	Wide range of optimum moisture; vibrator or steel roller compacts soil easily.	Low position; high water table; variable material.
Lynchburg (LyA, LyB, LzA, LzB).	Good	Poor	Fair	Poor to fair.	Poor; lowest areas not suited.	Medium range of optimum moisture; soil in place near optimum moisture; pneumatic roller compacts soil to maximum density.	Low position; high water table; hillside seepage; wet plastic clay substratum.
Marlboro (MaB, MaB2).	Good	Poor	Fair	Fair to good.	Good	Narrow range of optimum moisture; soil in place near optimum moisture; sheepsfoot roller compacts soil to maximum density.	Erodibility

See footnotes at end of table.

interpretations of the soils—Continued

Soil features adversely affecting—Continued						
Dikes or levees	Farm ponds		Agriculture drainage	Irrigation	Terraces and diversions	Waterways
	Reservoir area	Embankment				
High shrink-swell potential.	Low position; high water table; very slowly permeable subsoil; wet plastic clay substratum.	Plastic subsoil; high shrink-swell potential.	Depressed position; high water table; slowly permeable subsoil; no natural outlets.	Poor drainage; irrigation not needed.	Not applicable	Natural outlets not available.
Loose, permeable material.	Very permeable sandy surface soil; sandy loam to sandy clay at 2½ to 6 feet.	Loose, permeable material.	Moderately high water table; rapid permeability.	Low available moisture capacity.	Not applicable	Sand texture.
Loose, permeable material.	Deep, very porous sands.	Loose, permeable material.	None	Low available moisture capacity.	Deep sands; rapid permeability; terraces not needed.	High erodibility; sod difficult to establish.
Loose, permeable material.	Permeable sand over moderately permeable substratum.	Loose, permeable material over substratum with medium shrink-swell potential.	None	Low available moisture capacity.	Deep sands; high erodibility; terraces not needed.	High erodibility; sod difficult to establish.
(2)	(2)	(2)	(2)	(2)	(2)	(2).
Loose, permeable material.	Permeable sand; periodically high water table; nearly level low slopes.	Loose, permeable material.	High water table; rapid permeability.	Low available moisture capacity; high water table.	Not applicable	Nearly level soil.
Variable	Low position; variable permeability and variable material.	Variable	Low position; variable stratified material.	Low available moisture capacity high water table.	Not applicable	No drainage outlets.
None	Low position; high water table; slowly permeable subsoil.	Moderate shrink-swell potential.	Low position; high water table; seepage areas.	High water table	Low position; not applicable.	Low position; moderate erodibility.
None	Heavy sandy clay loam to sandy clay subsoil; moderately slow permeability.	Erodibility	None	None	Moderate erodibility.	Moderate erodibility.

TABLE 6.—*Engineering*

Soil and map symbols	Suitability as source of—			Suitability for—		Compaction characteristics at or near optimum moisture	Soil features adversely affecting—
	Topsoil	Sand	Road fill	Use as foundations	Septic tank filter fields		Highway location
Norfolk (NoA, NoB, NoB2, NoC, NoC2, NrA, NrB, NrC).	Good	Poor	Fair to good.	Good	Good	Medium range of optimum moisture; soil in place wet; pneumatic roller compacts soil to maximum density.	Erodibility; moderately slow internal movement of water.
Oktibbeha (OkB, OkC)	Fair	Very poor.	Poor	Poor	Poor	Narrow range of optimum moisture in top 42 inches; soil in place near optimum moisture; spike roller compacts soil to maximum density. Underlying limestone variable.	Erodibility; slow internal movement of water; plastic sandy clay to clay subsoil; soft limestone substratum.
Plummer (Pm)	Poor	Good	Good	Poor	Not suited	Wide range of optimum moisture; soil in place is wet; vibrator or steel roller compacts soil easily.	Low position; high water table; seepage zone present.
Pocomoke and Rains soils (Pr, Pt).	Good	Poor	Poor	Poor	Not suited	Medium range of optimum moisture; soil in place is wet; soil drains to optimum moisture readily; pneumatic roller compacts soil to maximum density.	Low position; high water table; moderately slow permeability; high content of organic matter.
Rains (Ra)	Fair	Poor	Poor	Poor	Not suited	Medium range of optimum moisture; soil in place is very wet; drains moderately easily to optimum moisture; pneumatic roller compacts soil to maximum density.	Low position; high water table; moderately slow permeability.
Ruston (RcB, RdB, RdC, RsB, RsB2, RsC, RsC2).	Good to fair.	Poor to fair.	Fair to good.	Good	Good	Medium range of optimum moisture; soil in place near optimum moisture; pneumatic roller compacts soil to maximum density.	Erodibility
Rutlege (Ru)	Good	Fair	Poor	Poor	Not suited	Wide range of optimum moisture; soil in place very wet; vibrator or steel roller compacts soil to maximum density.	Low position; high organic-matter content.
Scranton (Sc, Sf)	Good	Fair	Fair	Fair	Poor	Wide range of optimum moisture; soil in place near optimum moisture; pneumatic roller compacts soil to maximum density.	Moderately low position; high water table.

See footnotes at end of table.

interpretations of the soils—Continued

Soil features adversely affecting—Continued						
Dikes or levees	Farm ponds		Agriculture drainage	Irrigation	Terraces and diversions	Waterways
	Reservoir area	Embankment				
None	Sandy loam to sandy clay loam subsoil; moderately slow permeability.	Erodibility; moderate shrink-swell potential.	None	None	Moderate erodibility.	Moderate erodibility.
Plastic sandy clay to clay; high shrink-swell potential.	Slow permeability; underlain by soft limestone.	Plastic sandy clay to clay; high shrink-swell potential.	Slow permeability.	Slow intake rate; restricted root zone.	Moderate erodibility; shallow soils.	High erodibility.
Loose, permeable material.	Deep sands; rapid permeability; high water table; low position.	Loose sands; rapidly permeable.	High water table; rapid permeability.	Low available moisture capacity; high water table.	Not applicable	Ponded areas with poor outlets.
High organic-matter content.	Low position; high water table; clayey subsoil.	Moderate shrink-swell potential.	Low position; high water table; moderately slow permeability.	High water table	Not applicable	Low, nearly level position.
None	Low position; high water table; clayey subsoil.	Moderate shrink-swell potential.	Low position; high water table; moderately slow permeability.	High water table	Not applicable	Low, nearly level position.
None	Sandy loam to sandy clay loam subsoil; moderately slow permeability.	Erodibility; moderate shrink-swell potential.	None	None	Moderate erodibility.	Moderate erodibility.
Loose, permeable material; high organic-matter content.	Low position; high water table; moderate permeability; deep sand.	Loose, permeable material.	High water table	High water table	Not applicable	Low, nearly level position.
Loose, permeable material.	Very permeable sandy surface soil; sandy loam to sandy clay at 2½ to 6 feet.	Loose, permeable material.	High water table; rapid permeability.	High water table	Not applicable	Low, nearly level position.

TABLE 6.—*Engineering*

Soil and map symbols	Suitability as source of—			Suitability for—		Compaction characteristics at or near optimum moisture	Soil features adversely affecting—
	Topsoil	Sand	Road fill	Use as foundations	Septic tank filter fields		Highway location
Shubuta (ShB, ShB2, ShC, ShC2).	Fair	Poor	Fair	Fair to good.	Poor to fair.	Narrow range of optimum moisture; soil in place near optimum moisture; sheepsfoot roller compacts soil to maximum roller.	Erodibility; slow internal drainage.
Swamp (Sw)	Fair to good.	Unsuitable.	Variable	Not suited.	Not suited	Variable materials	Low position; high water table; frequently inundated; variable material; organic pockets.
Tifton (TfB, TfB2, TfC2).	Good	Poor	Fair	Good	Good	Medium range of optimum moisture; soil in place near optimum moisture; pneumatic roller compacts soil to maximum density.	Erodibility; moderately slow internal movement of water.

[1] Variable; characteristics are related to those of adjacent soils.

by consolidated limestone are of the Suwannee formations. The materials washed from soils of these formations were transported by water and deposited in the valleys. Most of these formations are overlain by a mantle of Pliocene and Pleistocene deposits. Except for the alluvial deposits in the valleys, these materials are of marine or deltaic origin.

The parent materials in the county differ widely in mineral and chemical composition and in their physical constitution. Most of the main differences, such as those between sand, silt, and clay, can be observed in the field. Differences in mineralogical and chemical composition are important to soil formation and to present physical and chemical characteristics. Most of these differences can be determined only by careful laboratory examination. The chemical and mineralogical nature of the sediments has not been studied enough to determine how it relates to differences among the soils. Many differences among soils of the county appear to reflect original differences in the geological materials. Thus, parent material seems to have been important in causing differences among the soils in the county.

Relief

Relief of the soils is largely determined by the geologic history of the region, including the underlying parent material formations and the effects of dissection by rivers and streams. Relief influences soil formation through its effects on drainage, erosion, temperature, and plant cover. Its influence is modified by the other four factors of soil formation.

The topography of Washington County ranges from broad, nearly level areas to highly dissected areas with narrow ridgetops and moderately steep to steep side slopes. The most highly dissected area in the county is the generally north-facing escarpment that extends east and west across the central part of the county. This escarpment varies considerably in width and is very irregular in slope and shape. It roughly divides the county into two topographically different parts.

The part of the county south of this escarpment consists almost entirely of deep sandy soils that generally occur in broad, nearly level and gently sloping areas. In some places the southeastern and southwestern parts of the county are dissected by narrow drainageways that have moderately steep side slopes. In the south-central part of the county numerous lakes and intermittent ponds occur, but surface drainageways are few. Potholes and sinks range from few to many in the southeastern and south-central parts of the county. The potholes vary considerably in size and shape but are circular in most places.

In the northern half of the county the soils generally have a fine-textured subsoil in the nearly level to sloping areas. These areas are dissected by many poorly to moderately well defined drainageways of low gradient. Most of these drainageways are tributaries of Holmes Creek and the Choctawhatchee River, but streams in the extreme east-central part of the county flow into the Chipola River. Many small and medium-sized shallow swamps occur throughout the east-central part of the county. The northern half of the county is dominantly gently sloping, but several prominent, highly dissected hills occur south and southeast of Chipley. They are Falling Water Hill, Rock Hill, High Hill, Oak Hill, and Orange Hill.

interpretations of the soils—Continued

Soil features adversely affecting—Continued						
Dikes or levees	Farm ponds		Agriculture drainage	Irrigation	Terraces and diversions	Waterways
	Reservoir area	Embankment				
Moderate to high shrink-swell material.	Variable clayey substratum; slow permeability.	High shrink-swell potential.	Slow permeability.	Slow intake restricts root zone.	Moderate erodibility; thin surface soil; clayey subsoil.	Moderately erodible; moderately difficult to establish sod.
Variable material; high organic-matter content.	Low position; high water table; frequent flooding.	Variable material[2]	Low position; frequent flooding; variable substratum.	Not applicable	Not applicable	Low wet positions; variable soils.
None	Heavy sandy clay loam to sandy clay subsoil; moderately slow permeability.	Erodibility	None	None	Moderate erodibility.	Moderate erodibility.

[2] Variable; engineering interpretations of individual soils are similar to those given for soils of the same series elsewhere in this table.

Elevations in Washington County range from about 20 feet where the Choctawhatchee River leaves the county to 331 feet on Oak Hill. Generally, the northern half of the county is lower than the southern half.

Living organisms

Trees, grasses, earthworms, burrowing animals, and the many micro-organisms that live on and in the soil are active in the soil-forming process. The changes that these organisms bring about depend, among other things, on the kinds of life and the life processes peculiar to each. The kinds of plants and animals that live on and in the soil are determined by the environment, including climate, parent material, relief, and age of the soil, and also by the effect the organisms themselves have on the environment. Living organisms are important chiefly in forming horizons; in mixing horizons and retarding their development; in reversing the leaching processes; and in furnishing organic matter to the soil.

The original vegetation on the better drained soils of the county consisted dominantly of longleaf pine, native grasses, low shrubs, vines, and some hardwoods. The native vegetation now consists principally of longleaf pine, loblolly pine, slash pine, oak, hickory, dogwood, magnolia, gum, low shrubs, and grasses. In the swampy areas are cypress, scattered slash pine, blackgum, bay, magnolia, and other water-tolerant hardwoods.

Organic matter from the various plants decomposes rather rapidly because temperature, moisture content, micropopulation of the soil, and the organic material itself are favorable for decomposition. Most of the soils contain a fairly small amount of organic matter, and this is mainly in the upper part of the A horizon. Vegetation is fairly uniform throughout the county and, therefore, is not a major factor in producing the differences among the soils.

Time

Time is required for soil to form. Generally, much more time is needed for parent material to accumulate than for different horizons to form in the profile. The length of time needed for soil to develop depends on the other factors of soil formation.

The age of soils varies considerably. Mature soils have well-developed, clearly defined horizons. Except for Regosols and Alluvial soils, soils on the less sloping areas are generally more developed than soils on stronger slopes. On the stronger slopes the surface material has been less stable. Geologic erosion has been so rapid that there has been little soil development. Alluvial soils on the first bottoms have little horizon development, primarily because new soil material is deposited each time a stream overflows.

Classification of Soils

Classification of soils is an orderly grouping of defined kinds of soil into classes in a system designed to make it easier to learn about soils, their characteristics, and their interrelationships. Knowledge gained through experience and research is easier to organize and apply if soils are classified.

A category in classification is a group of classes at one level in the classification system. A comprehensive system, one that will be useful in dealing with soils over small and large areas, must have a number of categories,

the higher ones consisting of fewer and broader classes than the lower ones.

In the soil classification now used in the United States, soils are placed in six categories, one above the other. Beginning at the top, the six categories are the order, suborder, great soil group, family, series, and type. The suborder and family have been little used and have not been fully developed.

In soil classification and mapping, attention has been largely given to soil types and series and to the subsequent grouping of the series into great soil groups and orders. The two lowest categories, series and type, have been used primarily for study of soils of small geographic areas, whereas the order and great soil group generally have been used for the study of soils of large geographic areas.

The category of the soil order consists of three classes, zonal, intrazonal, and azonal, each made up of many great soil groups. In a great soil group are soils that have fundamental characteristics in common.

The zonal soil order consists of those great soil groups that have soils with well-developed characteristics that reflect the influence of the active factors of soil genesis. The active factors are climate and living organisms, chiefly vegetation. The great soil group in the zonal order in Washington County is the Red-Yellow Podzolic.

The intrazonal order consists of those great soil groups with distinct, genetically related horizons that reflect the dominating influence of some local factor of topography or parent material over the effects of climate and living organisms. The intrazonal soils of this county are members of the Ground-Water Podzol, Humic Gley, and Low-Humic Gley great soil groups.

The azonal order consists of soils lacking well-developed profile characteristics that reflect the influence of age. Parent material has not been in place long enough for horizons to form or, because of topography and resistant parent material, the soil has washed away almost as fast as the horizons have formed. Azonal soils in Washington County belong to the Regosol great soil group.

Five great soil groups are represented in Washington County, which lies entirely within the Gulf Coastal Plain. The Red-Yellow Podzolic soils occupy about 25 percent of the county; the Ground-Water Podzols, less than 1 percent; the Humic Gley soils, about 2 percent; the Low-Humic Gley soils, about 4 percent; and the Regosols, about 50 percent. Alluvial first bottom lands, swamps, and other miscellaneous land that have not been classified into higher categories occupy about 18 percent of the county.

In table 7, the soil series are classified by great soil groups, drainage, and parent material. Many of the

TABLE 7.—*Soil series classified by great soil group, drainage, and parent material*

Great soil groups	Red-Yellow Podzolic soils (central concept)	Red-Yellow Podzolic soils (intergrading toward Regosols)	Red-Yellow Podzolic soils (intergrading toward Low-Humic Gley soils)	Red-Yellow Podzolic soils (intergrading toward Ground-Water Laterite soils)	Ground-Water Podzols	Humic Gley soils	Low-Humic Gley soils	Regosols	Regosols (intergrading toward Humic Gley soils)
Drainage class	Well drained or moderately well drained	Well drained or moderately well drained	Somewhat poorly drained	Well drained	Somewhat poorly drained	Very poorly drained	Poorly drained	Well drained or moderately well drained	Somewhat poorly drained
Parent or underlying material—									
Deep sands and loamy sands of Pleistocene Age.	----------	----------	----------	----------	Leon	Rutlege	Plummer	Blanton Eustis Klej Lakeland	Scranton.
Sandy loams, sandy clay loams, and clays of Pleistocene Age.	Bowie Eulonia Goldsboro Faceville Marlboro Norfolk Ruston	----------	Angie Dunbar Esto Lynchburg	Carnegie Tifton	----------	Bayboro Pocomoke	Bladen Grady Rains.		
Stratified sands, silts, and clays of Miocene Age.	Shubuta	Cuthbert.							
Fine-textured, red, calcareous deposits of consolidated and unconsolidated limestone of Oligocene Age.	Oktibbeha.								

soil series in the county do not fall within the central concept of any great soil group but intergrade from one great soil group toward another.

In this subsection each great soil group in Washington County is discussed and a profile representative of each series in the great soil group is described. The terms "soil series" and "soil type" are defined in the section "How Soils Are Mapped and Classified."

In the profile descriptions, some terms are used that may not be familiar to the general reader. The top layer in a tilled soil is called the Ap horizon, or the plow layer. In an undisturbed soil the upper layer of mineral soil is the A1 horizon. Below this layer, some profiles may have A2, A3, or other horizons that are designated by the letter A and a suffix. The A horizon consists of all of these layers considered together.

The B horizon, or subsoil, in most soils contains clay and other minerals that were moved from the A horizon. In some places it is divided in B1, B2, and B3 layers. In most places the soil formed from material similar to that underlying the B horizon. This material is called the C horizon. Some soils have a lithologic discontinuity below the B or C horizon that is indicated by a significant change in particle-size distribution or mineralogy. The change in clay content in the textural B horizon does not indicate a difference in the parent material. A Roman number is prefixed to the horizon letter to indicate a lithologic discontinuity.

Red-Yellow Podzolic soils

Red-Yellow Podzolic soils are a group of well-developed, well-drained soils that formed under forest in a climate ranging from warm-temperate humid to tropical humid. These soils have a thin organic A0 horizon and a thin organic-mineral A1 horizon. The organic-mineral horizon is underlain by a light-colored, leached A2 horizon and that, in turn, by a red, yellowish-red, or yellow clayey B horizon. The parent material is more or less siliceous. Coarse reticulate streaks or mottles of red, brown, yellow, and light gray occur in the C horizon. The soils of this group were developed by the processes of latasolation and podzolization.

These soils generally have a low cation-exchange capacity. Kaolinite is the dominant clay mineral, and there are smaller amounts of feldspar, vermiculite, gibbsite, and montmorillonite. The B horizon has moderate to strong, subangular blocky structure and colors of medium to high chroma.

In Washington County Red-Yellow Podzolic soils have a dark-colored, thin A1 horizon and a well-defined A2 horizon that has weak, granular structure. The A horizon is strongly acid to medium acid. The structure of the B2 horizon is moderate and medium and ranges from angular to subangular blocky. More clay is in the strongly acid to medium acid B2 horizon than is in the A2 horizon. The C horizon is highly mottled and generally has a weaker structure than the B2 horizon.

RED-YELLOW PODZOLIC SOILS (RED MEMBERS)

The red members of the Red-Yellow Podzolic group in the county are in the Ruston, Faceville, Shubuta, and Oktibbeha series. They developed from marine sediments of the Coastal Plain in nearly level to sloping areas. They are well drained and have moderately well developed or well developed soil horizons.

The Ruston and Faceville soils are good examples of the red members of the Red-Yellow Podzolic soils. They have a thick, strong-brown to yellowish-red subsoil with a moderate, medium, subangular blocky structure. The C horizon is highly mottled. The Faceville soils are finer textured than the Ruston soils, particularly in the B1 and B2 horizons.

The Shubuta soils are similar to the Ruston soils in color of the A and B horizons, but the A horizon of the Shubuta soils is normally thinner than that in the Ruston soils, and the B horizon is thinner, much firmer, and finer textured. The depth to the C horizon is much less in the Shubuta soils than in the Faceville soils.

The A horizon of Oktibbeha soils is normally thinner than that in the Ruston soils and generally is finer textured. The B horizon is also thinner and is redder and much finer textured. Oktibbeha soils have formed from limestone or limestone residuum instead of from sandy loam and sandy clay loam as have the Ruston soils. The lower B horizon of the Oktibbeha soils is slightly acid to alkaline, and that of the Ruston soils is strongly acid.

FACEVILLE SERIES: The soils in this series are on nearly level to strongly sloping uplands and are deep, well drained, and strongly acid. They developed from thick beds of acid sandy clay loam and sandy clay. Faceville soils have a dark grayish-brown to brown loamy sand A horizon. The B horizon is within 14 inches of the surface and is generally strong brown to yellowish red but is red in a few areas. It consists of moderately friable to firm heavy fine sandy clay loam to fine sandy clay and grades to the underlying C horizon of clay loam to sandy clay. The C horizon is gray mottled with yellowish brown to red or is yellowish brown to red mottled with gray or white.

The Faceville soils have good surface drainage and internal drainage. Permeability is moderately rapid in the A horizon and is moderately slow in the B horizon. Air and water move well in these soils, and the available moisture capacity is moderate. Natural fertility is moderately high.

Profile of a Faceville soil in a moist pasture of bahiagrass (NE¼SE¼ sec. 28, T. 5 N., R. 13 W.):

Ap—0 to 8 inches, dark grayish-brown (10YR 4/2) loamy sand; weak, medium, crumb structure; very friable; abundant fine roots; few iron concretions on surface; strongly acid; boundary abrupt and wavy.

B1—8 to 16 inches, strong-brown (7.5YR 5/6) light sandy clay loam; weak, medium, subangular blocky structure; friable when moist, slightly sticky when wet, and slightly hard when dry; plentiful fine roots; plentiful fine and medium pores; strongly acid; boundary gradual and smooth.

B2t—16 to 38 inches, yellowish-red (5YR 5/8) heavy fine sandy clay loam; moderate, medium, subangular blocky structure; firm when moist, sticky when wet, and hard when dry; few fine roots; few fine pores; strongly acid; boundary gradual and wavy.

B3—38 to 46 inches, yellowish-red (5YR 5/8) heavy fine sandy clay loam with few, medium, distinct, dark-red (10R 3/6) mottles and common, medium, distinct, brownish-yellow (10YR 6/8) mottles; moderate, medium, subangular blocky structure; firm when moist, very sticky when wet, and hard when dry; few fine pores; strongly acid; boundary clear and smooth.

726-719—65——7

C—46 to 63 inches +, mottled yellowish-brown (10YR 5/8), brownish-yellow (10YR 6/8), dark-red (10R 3/6), and light-gray (10YR 7/1) heavy fine sandy clay loam; weak, coarse, subangular blocky structure; very firm when moist, sticky when wet, and very hard when dry; few pores; strongly acid.

OKTIBBEHA SERIES: Soils in this series are deep, moderately acid, and moderately well drained. They occur on uplands, on side slopes of limestone sinks, and on gentle slopes near these sinks. These soils developed from beds of medium acid clay that are underlain by limestone. They were influenced by the limestone and in some areas were derived from weathered residuum of limestone mixed with the overlying clay material. Oktibbeha soils have a very dark gray to dark-brown A horizon that ranges from 3 to 10 inches in thickness and from loamy sand to clay loam in texture. Within 10 inches of the surface, the A horizon is abruptly underlain by a B horizon of reddish-brown to red clay loam to clay. The B3 horizon is mottled with various shades of red, gray, and brown. At a depth of 32 to 36 inches, these soils are neutral to moderately alkaline. Below the B horizon is moderately soft, alkaline limestone mottled with very pale brown and white.

Oktibbeha soils have slow to rapid surface drainage and medium to slow internal drainage. Permeability is rapid to moderate in the A horizon and is slow in the B. The dense, poorly aerated lower part of the B horizon is not favorable for development of roots. The A horizon has moderately high fertility, and the B horizon has high available moisture capacity.

Profile of an Oktibbeha soil in a moist wooded area (SW¼NE¼ sec. 36, T. 4 N., R. 14 W.):

A1—0 to 6 inches, very dark gray (10YR 3/1) loamy sand; weak, fine and medium, granular structure; very friable; abundant small and medium roots and few large roots; low organic-matter content; moderately acid; boundary gradual and smooth.

A2—6 to 10 inches, dark grayish-brown (10YR 4/2) loamy sand; moderate, medium, granular structure; very friable; plentiful fine roots and few medium roots; moderately acid; boundary abrupt and smooth.

B1—10 to 12 inches, yellowish-red (5YR 4/6) sandy clay loam with few, medium, dark grayish-brown (10YR 4/2) streaks of loamy sand that have penetrated along the root channels from above; weak, coarse, subangular blocky structure that, with slight pressure, breaks to moderate, fine and medium, crumb structure; friable when moist and slightly hard when dry; plentiful very fine roots; few fine pores; moderately acid; boundary gradual and smooth.

B21t—12 to 20 inches, red (2.5YR 4/6) clay loam; moderate, medium, subangular blocky structure; firm when moist, sticky when wet, and hard when dry; few fine roots; few fine pores; moderately acid; boundary gradual and smooth.

IIB22t—20 to 34 inches, red (2.5YR 4/6) clay; weak to moderate, medium, subangular blocky structure; very firm when moist, plastic when wet, and extremely hard when dry; few very fine roots; few fine pores; slightly acid; boundary clear and irregular.

IIB3—34 to 44 inches, dark-red (2.5YR 3/6) clay containing very pale brown (10YR 7/3) fragments of soft limestone; massive; extremely firm when moist, very plastic when wet, and extremely hard when dry; neutral to moderately alkaline; boundary abrupt and irregular.

R—44 to 50 inches +, very pale brown and white, moderately soft limestone.

RUSTON SERIES: The soils in the Ruston series are deep, well drained, and strongly acid. They developed from thick beds of acid sandy clay loam material on nearly level to strongly sloping uplands. The A horizon is generally dark-gray to very dark grayish-brown loamy sand to coarse sand, but in some areas, mainly in the western and north-central parts of the county, it ranges from sand to very coarse sand. The B horizon is strong brown to red. It is underlain by a distinctly mottled sandy clay loam to coarse sandy loam C horizon.

Surface drainage and internal drainage are good. Permeability is moderately rapid in the A horizon and is moderate in the B horizon. The Ruston soils are well aerated throughout and generally are in good tilth. They have good available moisture capacity and moderate natural fertility, and they retain plant nutrients well and respond well to fertilizer.

Profile of a Ruston soil in a moist pasture of bahiagrass and scattered persimmon bushes (NE¼NW¼ sec. 7, T. 4 N., R. 12 W.):

Ap—0 to 5 inches, dark-gray (10YR 4/1) loamy sand; weak, fine, granular structure; very friable; abundant fine roots; medium organic-matter content; strongly acid; boundary clear and smooth.

A2—5 to 10 inches, brown (10YR 5/3) loamy sand; weak, fine, granular structure; very friable; plentiful fine roots; strongly acid; boundary clear and wavy.

A3—10 to 13 inches, yellowish-brown (10YR 5/4) sandy loam; moderate, medium and fine, granular structure; very friable; plentiful fine roots; few fine pores; strongly acid; boundary gradual and wavy.

B1—13 to 18 inches, yellowish-red (5YR 5/6) light sandy clay loam; weak, fine and medium, subangular blocky structure that breaks with slight pressure to moderate, medium, crumb structure; friable; plentiful fine roots; few fine and medium pores; strongly acid; boundary gradual and wavy.

B2t—18 to 38 inches, yellowish-red (5YR 4/8) sandy clay loam; moderate, medium, subangular blocky structure; friable when moist and hard when dry; few fine roots; few fine and medium pores; strongly acid; boundary gradual and wavy.

B3—38 to 57 inches, strong-brown (7.5YR 5/6) sandy clay loam with common, fine and medium, faint, yellowish-red (5YR 5/8) and brownish-yellow (10YR 6/8) mottles; moderate, medium, subangular blocky structure; friable when moist and hard when dry; few fine pores; strongly acid; boundary gradual and wavy.

C—57 to 65 inches +, strong-brown (7.5YR 5/8) sandy clay loam with common, medium, prominent, dark-red (2.5YR 3/6) mottles and many, medium, distinct, brownish-yellow (10YR 6/8) mottles; moderate, medium, subangular blocky structure; friable when moist and hard when dry; few fine and medium pores; strongly acid.

SHUBUTA SERIES: The soils in this series are deep, moderately well drained to well drained, and strongly acid. They developed from thick beds of acid sandy clay and clay on nearly level to steep uplands. In most places the A horizon is very dark grayish-brown to light yellowish-brown loamy sand, 8 to 14 inches thick, but in a few small areas it is sandy loam and sand. The A horizon grades rather abruptly to a yellowish-red to dark-red B horizon that is friable to firm sandy clay loam to fine sandy clay. The B horizon is mottled below a depth of 20 to 30 inches, and the amount of mottling increases with increasing depth. The B horizon is underlain by a C horizon of distinctly mottled, compact sandy clay loam to fine sandy clay.

Shubuta soils have good surface drainage and medium to slow internal drainage. Permeability is moderate to

moderately slow in the A horizon and is moderately slow in the B horizon. It is slow in the B2 and B3 horizons. Because the subsoil is somewhat dense, roots do not develop well. The available moisture capacity is moderate, but the natural fertility is low.

Profile of a Shubuta soil in a moist wooded area (SW¼SW¼ sec. 30, T. 3 N., R. 13 W.):

A1—0 to 6 inches, very dark grayish-brown (10YR 3/2) loamy sand; weak, fine, crumb structure; very friable; abundant small roots and few medium roots; few small pores; low organic-matter content; few medium and large root channels; strongly acid; boundary gradual and wavy.

A2—6 to 8 inches, dark-brown (10YR 4/3) loamy fine sand; weak, fine, granular structure; very friable; abundant small roots and few medium roots; few small pores; few medium root channels; strongly acid; boundary gradual and wavy.

A3—8 to 9 inches, dark yellowish-brown (10YR 4/4) fine sandy loam; weak, medium, subangular blocky structure that, with slight pressure, breaks to moderate, medium, granular structure; friable; plentiful small roots; few small pores; strongly acid; boundary clear and irregular.

B1—9 to 11 inches, yellowish-red (5YR 4/8) fine sandy clay loam; moderate, medium, subangular blocky structure; friable; plentiful small roots and few medium roots; plentiful small and medium pores; few large root channels; strongly acid; boundary clear and irregular.

B21t—11 to 21 inches, yellowish-red (5YR 4/8) fine sandy clay; moderate, medium, subangular blocky and moderate, fine, angular blocky structure; very firm when moist, sticky and plastic when wet, and hard when dry; few small roots; plentiful small and medium pores; strongly acid; boundary gradual and wavy.

B22t—21 to 25 inches, yellowish-red (5YR 4/8) fine sandy clay; few, fine, distinct, yellowish-brown (10YR 5/8) and red (2.5YR 4/8) mottles; moderate, medium, subangular blocky and moderate, fine, angular blocky structure; very firm when moist, sticky and plastic when wet, and hard when dry; very few small roots; plentiful small and medium pores; strongly acid; boundary gradual and wavy.

B3—25 to 35 inches, yellowish-red (5YR 5/8) fine sandy clay with common, medium, distinct mottles of dark red (10R 3/6), common, fine, distinct mottles of yellowish brown (10YR 5/8), and few, fine, distinct mottles of very pale brown (10YR 7/3); moderate, medium, angular and subangular blocky structure; very firm when moist, sticky and plastic when wet, and hard when dry; plentiful small and medium pores; strongly acid; boundary gradual and wavy.

C1—35 to 52 inches, mottled dark-red (10R 3/6), brownish-yellow (10YR 6/8), and light-gray (10YR 7/1) fine sandy clay; moderate, fine and medium, angular blocky structure; very firm when moist, sticky and plastic when wet, and hard when dry; plentiful small pores and medium pores; strongly acid; boundary clear and wavy.

IIC2—52 to 75 inches +, dark-red (10R 3/6) fine sandy clay loam with common, medium and coarse, prominent, light-gray (10YR 7/1) streaks of fine sandy clay, and common, medium and coarse, distinct, brownish-yellow (10YR 6/8) streaks of fine sandy clay loam; weak, coarse, angular blocky structure; firm when moist, sticky and plastic when wet, and hard when dry; strongly acid.

RED-YELLOW PODZOLIC SOILS (YELLOW MEMBERS)

The yellow members of the Red-Yellow Podzolic group are in the Norfolk, Bowie, Marlboro, Goldsboro, and Eulonia series. They are well drained to moderately well drained and developed under similar climate and vegetation. They vary somewhat in degree of horizonation, but all are at least moderately well developed. These soils range from nearly level on the broad interstream areas to sloping on marine terrace escarpments and stream breaks.

The Norfolk and Marlboro soils are good examples of the yellow members of the Red-Yellow Podzolic group. Their B horizon is thick, yellow to yellowish-brown sandy clay loam to clay loam with moderate, medium, subangular blocky structure. The C horizon is highly mottled. The Marlboro soils are finer textured than the Norfolk soils, particularly in the B1 and B2 horizons.

The Bowie soils have A1, B1, and B2t horizons similar to those of the Norfolk soils in color and texture but their B2t horizon is normally thinner. The IIB22t horizon is mottled or splotched with red and is finer textured and nearer the surface than that in Norfolk soils.

The Goldsboro soils are similar to the Norfolk soils in texture but are moderately well drained instead of well drained. The A1 horizon of the Goldsboro soils generally is darker and slightly higher in organic-matter content. The B3 horizon is mottled with yellow, brown, red, and gray.

The Eulonia soils are moderately well drained, but the Norfolk soils are well drained. They generally have a finer textured A horizon than the Norfolk soils and a much thinner B horizon. Their B horizon is underlain by a much finer textured, nonconforming, buried B horizon that is highly mottled.

BOWIE SERIES: The soils of this series are on nearly level to strongly sloping uplands and are deep, well drained, and strongly acid. They developed from thick beds of acid sandy clay loam and sandy clay. Bowie soils have a dark-gray to yellowish-brown loamy sand to sandy loam A horizon. The B horizon is within 30 inches of the surface and is yellow to yellowish brown. Mottles of strong brown to red occur in the IIB22t horizon at a depth that ranges from 20 to 30 inches but is generally about 28 inches. The friable, unmottled B21t horizon is sandy loam to fine sandy clay loam, and the slightly compact, mottled IIB22t horizon is heavy fine sandy clay loam to sandy clay. The B horizon is underlain by a IIC horizon of clay.

Bowie soils have good surface drainage and moderate internal drainage. Permeability is rapid to moderately rapid in the A horizon and is moderately slow in the B horizon. These soils are moderately well aerated throughout. They have moderate available moisture capacity and moderately low natural fertility.

Profile of a Bowie soil in a moist idle field (SE¼SW¼ sec. 23, T. 3 N., R. 13 W.):

Ap—0 to 6 inches, brown (10YR 5/3) loamy sand; weak, medium, crumb structure; very friable; abundant fine roots and few medium roots; few small quartz pebbles; low organic-matter content; moderately acid; boundary clear and smooth.

A21—6 to 9 inches, yellowish-brown (10YR 5/4) loamy sand with few fine and medium root channels filled with brown (10YR 5/3) soil material; weak, medium, granular structure; very friable; plentiful fine roots; few small quartz pebbles; moderately acid; boundary clear and smooth.

A22—9 to 14 inches, yellowish-brown (10YR 5/6) loamy fine sand; moderate, medium and coarse, granular structure; friable; few fine roots; plentiful fine pores; few small quartz pebbles; moderately acid; boundary gradual and smooth.

B1—14 to 16 inches, yellowish-brown (10YR 5/8) fine sandy loam; weak, coarse, subangular blocky structure; friable when moist and slightly hard when dry; few fine roots; strongly acid; boundary gradual and wavy.

B21t—16 to 27 inches, yellowish-brown (10YR 5/8) fine sandy clay loam; moderate, coarse, subangular blocky structure; friable when moist and hard when dry; few fine roots; abundant fine pores and many medium pores; few quartz pebbles; strongly acid; boundary gradual and irregular.

IIB22t—27 to 36 inches, yellowish-brown (10YR 5/8) fine sandy clay with common, medium, prominent, red (10R 4/8) mottles; moderate, medium and coarse, angular blocky structure; firm when moist, very hard when dry; few fine roots; plentiful fine pores; few small quartz pebbles; common distinct clay skins; strongly acid; boundary gradual and irregular.

IIB23t—36 to 41 inches, mottled yellowish-brown (10YR 5/8), red (10R 4/6), and yellowish-brown (10YR 5/4) to light yellowish-brown (10YR 6/4) clay; strong, medium, angular blocky structure; firm when moist and very hard when dry; very few fine roots; few fine pores; many prominent clay skins; strongly acid, boundary clear and irregular.

IIC—41 to 52 inches +, mottled light-gray (10YR 7/1), light brownish-gray (10YR 6/2), yellow (10YR 7/8), and red (10R 4/6) clay with few very thin lenses of fine sandy clay loam; strong, medium and coarse, angular blocky structure; very hard when dry; very few fine roots; few fine pores; abundant clay skins; strongly acid.

EULONIA SERIES: The soils in this series are on nearly level to gently sloping uplands and are deep, moderately well drained, and strongly acid. They developed from a thin deposit of sandy loam over clay to sandy clay. These soils have a black to dark grayish-brown loamy fine sand A1 horizon. The A2 horizon is grayish brown to light olive brown. Within 30 inches of the surface is a B horizon of light yellowish-brown to brownish-yellow, friable sandy loam to sandy clay loam. The IIB23t horizon is generally reticulately mottled yellowish-brown, gray, and red clay to sandy clay and is underlain by a mottled red, yellow, and gray IIC horizon of sandy clay loam to clay.

Eulonia soils have slow to moderate surface drainage and moderately slow internal drainage. Permeability is moderately rapid in the A horizon and moderately slow in the B horizon. During wet periods these soils are wet and poorly aerated. The root zone is restricted by a compact, buried IIB23t horizon. Organic-matter content and natural fertility are moderate.

Profile of a Eulonia soil in a moist wooded area (NW¼ SW¼ sec. 26, T. 4 N., R. 16 W.):

A11—0 to 4 inches, very dark gray (10YR 3/1) loamy fine sand; moderate to strong, medium, granular structure; very friable; abundant fine roots and few medium roots; medium organic-matter content; strongly acid; boundary gradual and wavy.

A12—4 to 7 inches, dark grayish-brown (10YR 4/2) loamy fine sand with many, medium, distinct root channels and insect burrows filled with very dark gray (10YR 3/1) loamy fine sand; moderate, medium, granular structure; very friable; abundant fine roots; strongly acid; boundary gradual and smooth.

A2—7 to 11 inches, light olive-brown (2.5Y 5/4) loamy fine sand with common, medium, distinct root channels and insect burrows filled with dark grayish-brown (10YR 4/2) loamy fine sand; moderate, medium, granular structure; very friable; plentiful fine roots; strongly acid; boundary gradual and wavy.

B1—11 to 15 inches, light yellowish-brown (10YR 6/4) fine sandy loam with few, medium, distinct insect burrows and root channels filled with dark grayish-brown (2.5Y 4/2) loamy fine sand; weak, medium, subangular blocky structure that, with slight pressure, breaks to moderate, medium, crumb structure; friable; abundant fine roots; strongly acid; boundary gradual and wavy.

B21t—15 to 25 inches, brownish-yellow (10YR 6/6) fine sandy clay loam; moderate, medium, subangular blocky structure; friable when moist, slightly sticky when wet, and hard when dry; few fine roots; plentiful fine and medium pores; strongly acid; boundary gradual and wavy.

B22t—25 to 33 inches, brownish-yellow (10YR 6/6) fine sandy clay loam with common, medium, faint, strong-brown (7.5YR 5/8) mottles, few, medium, faint, light yellowish-brown (10YR 6/4) and yellowish-brown (10YR 5/8) mottles, and few, fine, distinct, light-gray (10YR 7/1) and yellowish-red (5YR 5/8) mottles; moderate, medium, subangular blocky structure; friable when moist, slightly sticky when wet, and hard when dry; few fine roots; plentiful fine pores; strongly acid; boundary clear and wavy.

IIB23t—33 to 48 inches, silty clay mottled with light yellowish brown (10YR 6/4), strong brown (7.5YR 5/8), yellowish brown (10YR 5/8), pale brown (10YR 6/3), gray (N 6/0), and yellowish red (5YR 5/8); moderate, medium, angular and subangular blocky structure; very firm when moist, compact and sticky when wet, and very hard when dry; strongly acid; boundary gradual and wavy.

IIC—48 to 65 inches +, mottled gray (10YR 6/1), brownish-yellow (10YR 6/6), red (2.5YR 4/8), strong-brown (7.5YR 5/8), yellowish-brown (10YR 5/8), pale-brown (10YR 6/3), and light reddish-brown (5YR 6/3) very fine sandy clay loam with lenses of silty clay and fine sandy clay loam; massive; firm when moist and very hard when dry; strongly acid.

GOLDSBORO SERIES: The soils in this series are on nearly level to sloping uplands and are deep, moderately well drained, and strongly acid. They developed from thick beds of acid sandy loam and sandy clay loam. These soils have a very dark gray to dark grayish-brown loamy coarse sand to coarse sand A1 horizon. The B horizon is within 30 inches of the surface and is yellow to yellowish-brown fine sandy loam to fine sandy clay loam. Faint mottles of pale brown, pale yellow, and strong brown normally occur about 24 inches below the surface. Mottling increases at depths below 30 inches, and gray mottles occur in the lower depths. The B horizon is underlain by distinctly mottled fine sandy clay loam.

Goldsboro soils have slow to medium runoff and medium internal drainage. Permeability is rapid to moderately rapid in the A horizon and moderate in the B horizon. Natural fertility is moderate.

Profile of a Goldsboro soil in a moist wooded area (NE¼SE¼ sec. 36, T. 5 N., R. 14 W.):

A11—0 to 4 inches, very dark gray (10YR 3/1) loamy coarse sand; moderate, fine, granular structure; very friable when moist and soft when dry; plentiful small and medium roots; few small and medium pores; medium organic-matter content; strongly acid; boundary gradual and smooth.

A12—4 to 8 inches, dark grayish-brown (2.5Y 4/2) loamy coarse sand with few, medium, distinct insect burrows of very dark gray (10YR 3/1); moderate, fine, granular structure; very friable when moist and soft when dry; plentiful small roots and few medium roots; plentiful small pores and few medium pores; strongly acid; boundary gradual and smooth.

A3—8 to 11 inches, light olive-brown (2.5Y 5/4) loamy coarse sand with few, fine, distinct insect burrows of dark grayish brown (2.5Y 4/2) and very dark gray (10YR 3/1); moderate, fine, granular structure; very friable when moist and soft when dry; plentiful small roots; plentiful small pores and few medium pores; strongly acid; boundary gradual and smooth.

B1—11 to 14 inches, brownish-yellow (10YR 6/6) sandy loam with common fine and medium insect burrows of very dark gray (10YR 3/1) and dark grayish brown (2.5Y 4/2); weak, medium, subangular blocky structure that, with slight pressure, breaks to moderate, medium, crumb structure; friable when moist and slightly hard when dry; plentiful small roots; plentiful small and medium pores; strongly acid; boundary gradual and smooth.

B2t—14 to 26 inches, brownish-yellow (10YR 6/8) sandy clay loam; moderate, medium, subangular blocky structure; slightly sticky when wet, friable when moist, and hard when dry; plentiful small roots; plentiful small and medium pores; strongly acid; boundary gradual and smooth.

B3—26 to 34 inches, brownish-yellow (10YR 6/8) fine sandy clay loam with common, medium, distinct, yellowish-brown (10YR 5/8) mottles and few, fine, faint, very pale brown (10YR 7/4) mottles; moderate, coarse, subangular blocky structure; slightly sticky when wet, friable when moist, and hard when dry; few small roots; plentiful small and medium pores; plentiful soft concretions; strongly acid; boundary gradual and smooth.

Cg—34 to 64 inches +, mottled strong-brown (7.5YR 5/8), light-gray (10YR 7/2), red (2.5YR 4/8), yellowish-brown (10YR 5/8), and brownish-yellow (10YR 6/6) sandy clay loam; weak, coarse, subangular blocky structure; slightly sticky when wet, friable when moist, and hard when dry; few small and medium pores; plentiful soft concretions; strongly acid.

MARLBORO SERIES: The soils of this series are on nearly level to sloping uplands and are deep, well drained, and strongly acid. They developed in thick beds of sandy clay loam and sandy clay. They have a gray to very dark grayish-brown sandy loam to loamy sand A horizon. The B horizon is within 14 inches of the surface and is heavy fine sandy clay loam to fine sandy clay that is firm to slightly sticky and yellow to brownish yellow or yellowish brown. Below a depth of 30 inches, the B horizon is faintly splotched with yellow, strong brown, and red. The splotches increase with increasing depth. Below a depth of 42 inches, the B horizon is underlain by thick beds of highly mottled fine sandy clay or sandy clay loam.

Marlboro soils have moderate surface drainage and internal drainage. Permeability is moderately rapid in the A horizon and moderately slow in the B horizon. Internal movement of air and water is favorable, available moisture capacity is good, and fertility is moderate.

Profile of a Marlboro soil in a moist cultivated area (SE¼SE¼ sec. 20, T. 5 N., R. 13 W.):

Ap—0 to 7 inches, very dark grayish-brown (10YR 3/2) loamy sand; very few iron pebbles on surface; weak, medium, granular structure; very friable; plentiful fine roots; few small pores; strongly acid; boundary gradual and wavy.

A2—7 to 12 inches, dark yellowish-brown (10YR 4/4) sandy loam; moderate, medium, granular structure; friable; few fine roots; few small pores; strongly acid; boundary gradual and wavy.

B1—12 to 14 inches, yellowish-brown (10YR 5/6) light fine sandy clay loam; weak, medium, subangular blocky structure that, with slight pressure, breaks to moderate, medium, crumb structure; friable when moist and slightly hard when dry; few fine roots; few small and medium pores; very few iron pebbles; strongly acid; boundary gradual and smooth.

B21t—14 to 34 inches, brownish-yellow (10YR 6/8) heavy fine sandy clay loam; moderate, medium, subangular blocky structure; friable when moist, slightly sticky or sticky when wet, and slightly hard when dry; few small and medium pores; strongly acid; boundary gradual and smooth.

B22t—34 to 44 inches, brownish-yellow (10YR 6/8) heavy fine sandy clay loam; few, fine, distinct, strong-brown (7.5YR 5/6) mottles and few, medium, distinct, brownish-yellow (10YR 6/6) mottles; moderate, medium, subangular blocky structure; friable when moist, sticky when wet, and slightly hard when dry; strongly acid; boundary gradual and smooth.

B3—44 to 63 inches, brownish-yellow (10YR 6/8) heavy fine sandy clay loam with common, medium, distinct, strong-brown (7.5YR 5/6) mottles, few, fine, faint, pale-brown (10YR 6/3) mottles, and few, medium, distinct, brownish-yellow (10YR 6/6) and red (2.5YR 4/8) mottles; weak, medium, subangular blocky structure; friable when moist, sticky when wet, and slightly hard when dry; strongly acid; boundary gradual and smooth.

C—63 to 73 inches +, mottled brownish-yellow (10YR 6/8), strong-brown (7.5YR 5/6), brownish-yellow (10YR 6/6), pale-brown (10YR 6/3), and red (2.5YR 4/8) fine sandy clay loam; weak, coarse, subangular blocky structure; firm when moist, sticky when wet, and very hard when dry; abundant, red and strong-brown, soft concretions; strongly acid.

NORFOLK SERIES: The soils in this series are on nearly level to strongly sloping uplands and are deep, well drained, and strongly acid. They developed from thick beds of acid sandy clay loam. In undisturbed areas the A1 horizon is dark grayish-brown to light brownish-gray sand and loamy sand, but in some cultivated areas it is somewhat browner. The A2 horizon ranges from yellowish brown to light yellowish brown. Within 30 inches of the surface is a yellow to yellowish-brown B horizon that is dominantly sandy clay loam but ranges from sandy clay loam to sandy loam. The B horizon is underlain by distinctly mottled parent material of sandy clay loam.

Norfolk soils have good surface drainage and internal drainage. Permeability is rapid to moderately rapid in the A horizon and moderate in the B horizon. These soils are well aerated throughout. They have good available moisture capacity and moderate natural fertility.

Profile of a Norfolk soil in a moist pasture of bahiagrass (SE¼NE¼ sec. 32, T. 4 N., R. 15 W.):

A1p—0 to 5 inches, dark grayish-brown (10YR 4/2) loamy sand; weak, fine, granular structure; very friable; abundant fine roots; few small quartz pebbles; low to medium organic-matter content; strongly acid; boundary clear and smooth.

A12—5 to 7 inches, brown to dark-brown (10YR 4/3) loamy sand; weak, fine, granular structure; very friable; plentiful fine roots; few small and medium quartz pebbles; strongly acid; boundary clear and smooth.

A2—7 to 17 inches, yellowish-brown (10YR 5/6) loamy sand; weak, fine, granular structure; very friable; few fine roots; few small and medium quartz pebbles; strongly acid; boundary gradual and smooth.

B1—17 to 24 inches, yellowish-brown (10YR 5/8) sandy loam; medium, granular structure; friable; few fine roots; few small and medium quartz pebbles; strongly acid; boundary gradual and wavy.

B21t—24 to 32 inches, yellowish-brown (10YR 5/8) light sandy clay loam; weak, medium, subangular blocky structure; friable to firm; few fine roots; few fine pores; few small and medium quartz pebbles; strongly acid; boundary gradual and wavy.

B22t—32 to 44 inches, yellowish-brown (10YR 5/8) sandy clay loam; moderate, medium, granular structure; friable when moist, slightly sticky when wet, and hard when dry; very few fine roots; few fine pores; few small and medium quartz pebbles; strongly acid; boundary gradual and wavy.

B3—44 to 53 inches, yellowish-brown (10YR 5/8) sandy clay loam with few, fine, faint, strong-brown (7.5YR 5/8) mottles; moderate, medium, subangular blocky structure; friable to firm when moist, slightly sticky when wet, and hard when dry; few fine and medium pores; few small and medium quartz pebbles; strongly acid; boundary clear and wavy.

C1—53 to 65 inches +, brownish-yellow (10YR 6/6) heavy sandy clay loam with many, coarse, prominent, yellowish-red (5YR 5/8) mottles, few, fine, distinct, red (10YR 4/6) mottles, and common, medium, distinct, gray (10YR 6/1) mottles; moderate, medium, subangular blocky structure; friable to firm when moist, slightly sticky when wet, and very hard when dry; few small and medium quartz pebbles; strongly acid.

RED-YELLOW PODZOLIC SOILS (INTERGRADING TOWARD GROUND-WATER LATERITE SOILS)

Some Red-Yellow Podzolic soils in Washington County have slight lateritic development and some characteristics of Ground-Water Laterite soils. These soils, however, are more like typical Red-Yellow Podzolic soils than typical Ground-Water Laterite soils.

These soils developed from a reticulately mottled, lateritic parent material. Throughout the soils are concretions formed from compounds of iron and aluminum and in some places manganese. In some areas, deep in the profile, a thin layer of highly weathered clayey material that is rich in sesquioxides has hardened irreversibly.

These soils have a thin organic A0 horizon and a thin organic-mineral A1 horizon. The organic-mineral horizon is underlain by a light-colored, leached A2 horizon and that, in turn, by a red, yellowish-red, or yellow, more clayey B horizon. Small iron concretions and pebbles occur throughout the soils. The parent material is more or less siliceous. Coarse reticulate streaks or mottles of red, yellow, brown, and light gray occur in the lower horizons. Kaolinite is the dominant clay mineral, and there are smaller amounts of feldspar, vermiculite, gibbsite, and montmorillonite. The B horizon has moderate to strong, subangular blocky structure and colors of medium to high chroma.

In Washington County these intergrades have a dark-colored, thin A1 horizon and a well-defined A2 horizon that has a weak, crumb structure. The A horizon is strongly acid to medium acid. The structure of the B2 horizon is moderate and medium and ranges from angular to subangular blocky. More clay is in the strongly acid to medium acid B2 horizon than is in the A2 horizon. The C horizon is highly mottled and generally has a weaker structure than the B2 horizon.

In Washington County the Carnegie and Tifton soils are Red-Yellow Podzolic soils that intergrade toward Ground-Water Laterites. The B horizon of the Carnegie soils is strong brown to red, and that of the Tifton soils is yellow to yellowish brown.

CARNEGIE SERIES: The soils in this series are on nearly level to strongly sloping uplands and are deep, well drained, and strongly acid. They developed from stratified, acid sandy clay loam and sandy clay. These soils have a very dark-gray to dark-brown loamy sand to fine sandy loam A1 or Ap horizon. The moderately friable, porous B horizon is within 14 inches of the surface and is strong-brown to red sandy clay loam to fine sandy clay. It is underlain by distinctly mottled parent material of fine sandy clay loam to fine sandy clay. These soils have many iron concretions or pebbles throughout the profile.

Carnegie soils have good surface drainage and internal drainage. Permeability is moderately rapid in the A horizon and moderately slow in the B horizon. Soil aeration and the available water capacity are good, and natural fertility is moderately high.

Profile of a Carnegie soil in a moist pasture of bahiagrass (SE¼SW¼ sec. 32, T. 5 N., R. 13 W.):

Ap—0 to 8 inches, dark-brown (10YR 3/3) loamy sand; weak, medium, granular structure; very friable; abundant fine roots and few medium roots; few fine pores; many iron concretions on surface and throughout horizon; low organic-matter content; strongly acid; boundary gradual and smooth.

A2—8 to 11 inches, brown to dark-brown (7.5YR 4/4) sandy loam; moderate, medium, granular structure; friable; many fine roots; many iron concretions; strongly acid; boundary gradual and smooth.

B1—11 to 18 inches, yellowish-red (5YR 4/8) light fine sandy clay loam; weak, medium, subangular blocky structure; friable; many fine roots; few fine pores; many iron concretions; strongly acid; boundary gradual and smooth.

B21t—18 to 34 inches, yellowish-red (5YR 4/8) fine sandy clay loam; moderate, medium, subangular blocky structure; friable when moist, slightly sticky when wet, and slightly hard when dry; few fine roots; many fine and medium pores; many iron concretions; strongly acid; boundary gradual and smooth.

B22t—34 to 39 inches, yellowish-red (5YR 4/8) heavy fine sandy clay loam; moderate, medium, subangular blocky structure; friable when moist, sticky when wet, and hard when dry; few fine and medium pores; many iron concretions; strongly acid; boundary gradual and smooth.

B23t—39 to 50 inches, yellowish-red (5YR 5/8) fine sandy clay loam; moderate, medium, subangular blocky structure; friable when moist, slightly sticky when wet, and slightly hard when dry; few fine and medium pores; many iron concretions; boundary gradual and smooth.

B31—50 to 63 inches, strong-brown (7.5YR 5/8) fine sandy clay loam with few, medium, faint, yellowish-red (5YR 5/8) mottles; moderate, medium, subangular blocky structure; friable when moist, slightly plastic when wet, and slightly hard when dry; few fine pores; many iron concretions; strongly acid; boundary gradual and smooth.

B32—63 to 74 inches, strong-brown (7.5YR 5/8) fine sandy clay loam with common, medium, distinct, red (2.5YR 4/8) mottles, common, fine, faint, yellowish-brown (10YR 5/8) mottles, and few, coarse, faint, brownish-yellow (10YR 6/8) mottles; weak, medium, subangular blocky structure; friable when moist, slightly sticky when wet, and slightly hard when dry; many iron pebbles; strongly acid; boundary gradual and smooth.

C—74 to 80 inches +, mottled very pale brown (10YR 7/4), strong-brown (7.5YR 5/8), red (2.5YR 4/8), yellowish-brown (10YR 5/8), and brownish-yellow (10YR 6/8) fine sandy clay loam; weak, coarse, subangular blocky structure; firm when moist, sticky when wet, and hard when dry; many iron concretions; strongly acid.

TIFTON SERIES: The soils in this series are on nearly level to strongly sloping uplands and are deep, well

drained, and strongly acid. They developed from thick beds of reticulately mottled acid sandy clay and sandy clay loam. The A horizon is very dark-gray to dark grayish-brown loamy sand to fine sandy loam. Within 14 inches of the surface is a moderately friable B horizon of brownish-yellow to yellowish-brown fine sandy loam to fine sandy clay. Yellowish-brown to strong-brown mottles generally occur in the B3 horizon and increase with increasing depth. The B horizon is underlain by a C horizon that is distinctly mottled fine sandy clay and fine sandy clay loam. Throughout the profile of these soils are many iron concretions or pebbles.

Tifton soils have good surface drainage and internal drainage. Permeability is moderately rapid in the A horizon and moderately slow in the B horizon. Aeration and available moisture capacity are good, and natural fertility is moderately high.

Profile of a Tifton soil in a moist cultivated field (NE¼NE¼ sec. 34, T. 5 N., R. 13 W.):

Ap—0 to 6 inches, dark grayish-brown (10YR 4/2) loamy sand; weak, fine, granular structure; very friable; plentiful fine roots; low organic-matter content; many iron concretions on surface and throughout horizon; strongly acid; boundary abrupt and smooth.

A2—6 to 11 inches, yellowish-brown (10YR 5/4) loamy fine sand; weak, medium, granular structure; very friable; few fine roots; many iron concretions; strongly acid; boundary gradual and smooth.

B11—11 to 14 inches, yellowish-brown (10YR 5/8) fine sandy loam; weak, medium, subangular blocky structure that, with slight pressure, breaks to moderate, medium, crumb structure; friable when moist and slightly hard when dry; few fine roots; few fine and medium pores; many iron pebbles; strongly acid; boundary gradual and smooth.

B12—14 to 19 inches, yellowish-brown (10YR 5/8) light fine sandy clay loam; weak, medium, subangular blocky structure; friable when moist, slightly sticky when wet, and slightly hard when dry; few fine roots; plentiful fine and medium pores; many iron pebbles; strongly acid; boundary gradual and smooth.

B21t—19 to 33 inches, yellowish-brown (10YR 5/8) heavy fine sandy clay loam to clay loam; moderate, medium, subangular blocky structure; friable when moist, slightly sticky when wet, and hard when dry; plentiful fine pores and few medium pores; many iron pebbles; strongly acid; boundary gradual and smooth.

B22t—33 to 46 inches, brownish-yellow (10YR 6/8) heavy fine sandy clay loam to clay loam with few, fine, faint, strong-brown (7.5YR 5/8) mottles; moderate, medium, subangular blocky structure; friable when moist, slightly sticky when wet, and hard when dry; few fine and medium pores; many iron pebbles; abundant, medium, moderately soft, dark-red iron concretions; strongly acid; boundary gradual and wavy.

B3—46 to 53 inches, brownish-yellow (10YR 6/8) heavy fine sandy clay loam to clay loam with common, fine, faint, strong-brown (7.5YR 5/5) mottles, common, medium, distinct, red (2.5YR 4/8) mottles, and few, fine, faint, yellowish-brown (10YR 5/8) mottles; moderate, medium, subangular blocky structure; firm when moist, sticky when wet, and hard when dry; few fine pores; many iron pebbles; plentiful, soft, dark-red iron concretions that increase in size and number with depth; strongly acid; boundary gradual and wavy.

C—53 to 61 inches +, mottled brownish-yellow (10YR 6/8), strong-brown (7.5YR 5/8), and red (2.5YR 4/8) heavy fine sandy clay loam with common, medium, distinct, light-gray (10YR 7/1) mottles of fine sandy clay; weak, coarse, subangular blocky structure; firm when moist, sticky when wet, and hard when dry; many iron concretions; few, soft, red iron concretions; few fine pores; strongly acid.

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

Red-Yellow Podzolic soils that intergrade toward Low-Humic Gley soils are slightly less developed and less well drained than typical Red-Yellow Podzolic soils. The effect of the water in the lower part of these soils makes them intergrade toward the Low-Humic Gley soils, but they are more like typical Red-Yellow Podzolic soils. They developed from marine sediments under a deciduous and coniferous forest in a warm climate. Although they differ in texture and in thickness of the soil horizons, these soils have about the same drainage. They are extensive throughout the county. These soils are in the Angie, Dunbar, Esto, and Lynchburg series.

The Lynchburg and Dunbar soils are good examples of Red-Yellow Podzolic soils that intergrade toward Low-Humic Gley soils. The subsoil of the Lynchburg and Dunbar soils is thick and is yellowish brown highly mottled with various hues of yellow, brown, red, and gray. The soils are massive or have moderate, medium, subangular blocky structure. The C horizon is highly mottled. The Dunbar soils are finer textured than the Lynchburg soils, particularly in the B2 horizon.

The Angie and Esto soils formed from about the same kind of material as the Lynchburg soils, but they have a thinner solum and less horizonation than those soils. Angie soils have a thinner and much finer textured B2 horizon than the Lynchburg soils. The transition from the A horizon to the B is more abrupt in the Angie soils than in the Lynchburg. Esto soils generally have a paler and thinner B2 horizon than the Lynchburg soils and are generally underlain by finer textured material.

ANGIE SERIES: The soils in this series are deep, somewhat poorly drained, and strongly acid. They developed from thinly bedded clay and sandy clay in nearly level to sloping areas. These soils have a very dark gray to grayish-brown loamy sand A1 or Ap horizon that ranges from 2 to 6 inches in thickness. The A2 and A3 horizons are grayish brown to light yellowish brown and together are 4 to 12 inches thick. The A horizon grades abruptly to a B2t horizon of yellow to strong-brown, firm sandy clay to clay. The B2t horizon extends to a depth of 10 to 24 inches. Below this depth is a B3 horizon that is mottled with various hues of yellow, red, and gray. At a depth of 16 to 44 inches, the B horizon is underlain by distinctly mottled material that is stratified sandy clay and sandy clay loam in most places and is sandy loam to clay in others.

Angie soils have slow to moderate surface drainage and slow internal drainage. Permeability is moderate in the A horizon and slow in the B horizon. The B horizon is dense, is poorly aerated, and does not favor development of roots. The available moisture capacity is low in the A horizon and high in the B horizon. During periods of high rainfall, these soils may waterlog because of the dense, slowly permeable B horizon. Natural fertility is low.

Profile of an Angie soil in a moist wooded area (NE¼NW¼ sec. 26, T. 4 N., R. 15 W.):

A1—0 to 5 inches, very dark gray (10YR 3/1) loamy sand; weak, fine, granular structure; very friable; plentiful fine roots; few iron concretions and quartz pebbles on surface; strongly acid; boundary gradual and smooth.

A2—5 to 9 inches, grayish-brown (10YR 5/2) loamy sand with few very dark-gray (10YR 3/1) insect burrows and root channels; weak, fine, granular structure; very friable; plentiful fine roots; few fine pores; strongly acid; boundary gradual and smooth.

A3—9 to 15 inches, light yellowish-brown (10YR 6/4) to yellowish-brown (10YR 5/4) loamy sand; weak, fine and medium, granular structure; very friable; plentiful fine roots and few medium roots; plentiful fine pores and few medium pores; few iron concretions and quartz pebbles; strongly acid; boundary abrupt and wavy.

B2t—15 to 24 inches, yellow (10YR 7/6) sandy clay; weak to moderate, medium, subangular blocky structure; sticky when wet, very firm when moist, and very hard when dry; few fine roots; few fine pores; strongly acid; boundary gradual and wavy.

B3—24 to 32 inches, yellow (10YR 7/6) sandy clay with few, medium, faint, brownish-yellow (10YR 6/6) mottles, few, fine, faint, red mottles, and few, fine, distinct, light-gray (10YR 7/2) mottles; weak, medium, subangular blocky structure; sticky when wet, very firm when dry, and very hard when moist; strongly acid; boundary gradual and wavy.

C1—32 to 51 inches, mottled dark-red (10R 3/6), strong-brown (7.5YR 5/8), yellowish-brown (10YR 5/8), light-red (10R 6/8), and light-gray (10YR 7/2), stratified sandy clay and sandy clay loam; massive; sticky when wet, very firm when moist, and very hard when dry; strongly acid; boundary gradual and wavy.

C2—51 to 60 inches +, mottled yellow (10YR 7/6), yellowish-brown (10YR 5/8), strong-brown (7.5YR 5/8), light-gray (10YR 7/2), and dark-red (2.5YR 3/6), stratified sandy clay and sandy clay loam; sticky when wet, very firm when moist, and very hard when dry; strongly acid.

DUNBAR SERIES: The soils in this series are on nearly level to gently sloping uplands and are deep, somewhat poorly drained, and strongly acid. They developed from thick beds of acid sandy clay material. The A horizon is dark-gray to very dark grayish-brown loamy sand. The B horizon occurs within 18 inches of the surface. It is light yellowish brown to olive brown and, in the lower part, is mottled with various shades of yellow, brown, red, and gray. Mottling normally occurs at a depth of about 18 inches, but the range is 12 to 26 inches. The IIB2g horizon is firm to very firm sandy clay to clay. It is underlain by highly mottled sandy clay to clay that contains lenses of sandy clay loam in many places.

Dunbar soils have moderate surface drainage and slow internal drainage. Permeability is rapid to moderately rapid in the A horizon and is moderately slow in the IIB2g horizon. The available moisture capacity is moderately high. The A horizon is moderately well aerated. These soils are medium to low in organic-matter content and in natural fertility.

Profile of a Dunbar soil in a moist idle field covered with weeds (SE¼SE¼ sec. 21, T. 4 N., R. 12 W.):

Ap—0 to 6 inches, dark-gray (10YR 4/1) loamy sand; weak, medium and fine, granular structure; very friable; low organic-matter content; plentiful fine roots and few medium roots; strongly acid; boundary clear and smooth.

A2—6 to 13 inches, pale-brown (10YR 6/3) loamy sand; weak, medium and fine, granular structure; very friable; few fine roots; strongly acid; boundary gradual and smooth.

A3—13 to 15 inches, light yellowish-brown (10YR 6/4) sandy loam; moderate, medium, granular structure; few fine roots; strongly acid; boundary gradual and wavy.

B1—15 to 20 inches, light yellowish-brown (10YR 6/4) sandy clay loam; moderate, medium, subangular blocky structure; friable when moist and hard when dry; very few fine roots; strongly acid; boundary clear and wavy.

IIB2g—20 to 36 inches, clay mottled with gray to light gray (10YR 6/1), light brownish gray (10YR 6/2), light yellowish brown (10YR 6/4), pale brown (10YR 6/3), strong brown (7.5YR 5/8), yellowish red (5YR 5/8), weak red (10R 5/3), and yellowish brown (10YR 5/6); weak, coarse, subangular blocky structure; very firm when moist, extremely hard when dry, and plastic when wet; strongly acid; boundary gradual and wavy.

IICg—36 to 52 inches +, gray (N 5/0) clay with common, medium, prominent, strong-brown (7.5YR 5/8) mottles, common, fine, distinct, brownish-yellow (10YR 6/8) mottles, common, medium, faint, light yellowish-brown (10YR 6/4) mottles, and few, fine, distinct, red (2.5YR 4/8) mottles; gray color increases with depth; few thin lenses of sandy clay in lower part of horizon; massive; very firm when moist, extremely hard when dry, and plastic when wet; strongly acid.

ESTO SERIES: The soils in this series are deep, moderately well drained to somewhat poorly drained, and strongly acid. They developed from clay and sandy clay in nearly level to sloping areas. Their A horizon is a grayish-brown to pale-brown sand to loamy fine sand that ranges from 5 to 18 inches in thickness. It is underlain by a B2t horizon that is friable to firm, pale-brown to light yellowish-brown sandy loam to sandy clay loam that extends to a depth of 10 to 30 inches. The B horizon is underlain by a clay to sandy clay IIC horizon that is highly mottled with various shades of yellow, red, and gray. In most places the IIC horizon is stratified with lenses of sandy clay loam.

Esto soils have slow to moderate surface drainage and slow internal drainage. Permeability is moderate in the A horizon and slow in the B. The IIC horizon is moderately dense, poorly aerated, and not favorable for development of roots. The available moisture capacity is low in the A horizon and is moderate in the B2t horizon. Natural fertility is low.

Profile of an Esto soil in a moist wooded site (NW¼SE¼ sec. 28, T. 4 N., R. 12 W.):

A1—0 to 7 inches, grayish-brown (2.5Y 5/2) sand; single grain; loose; abundant fine roots and few medium roots; low organic-matter content; strongly acid; boundary gradual and wavy.

A2—7 to 13 inches, pale-brown (10YR 6/3) sand; single grain; loose; plentiful fine roots and few medium roots; strongly acid; boundary gradual and smooth.

A3—13 to 15 inches, pale-brown (10YR 6/3) loamy sand; weak, fine, granular structure; very friable; few fine and medium roots; strongly acid; boundary gradual and smooth.

B21t—15 to 17 inches, pale-brown (10YR 6/3) light sandy clay loam; weak, medium, subangular blocky structure that, with slight pressure, breaks to moderate, medium, crumb structure; friable; few fine and medium roots; plentiful fine pores and few medium pores; strongly acid; boundary gradual and smooth.

B22t—17 to 26 inches, light yellowish-brown (10YR 6/4) sandy clay loam; moderate, medium, subangular blocky structure; friable; few fine roots; plentiful fine pores and few medium pores; strongly acid; boundary gradual and wavy.

IIC1—26 to 36 inches, pale-brown (10YR 6/3) sandy clay with common, coarse, distinct, strong-brown (7.5YR 5/8) mottles, common, coarse, faint, light brownish-gray (2.5Y 6/2) mottles, and few, fine, distinct, brownish-yellow (10YR 6/6), red (2.5YR 5/8), and light-gray (N 7/0) mottles; weak, coarse, subangular blocky structure; firm when moist and very hard when dry; strongly acid; boundary gradual and irregular.

IIC2—36 to 52 inches +, mottled pale-brown (10YR 6/3), strong-brown (7.5YR 5/8), light brownish-gray (2.5Y 6/2), red (2.5YR 5/8), and light-gray (N 7/0) clay with lenses of sandy clay and sandy clay loam; massive; very firm when moist and very hard when dry; strongly acid.

LYNCHBURG SERIES: The soils in this series are on nearly level to sloping uplands and are deep, somewhat poorly drained, and strongly acid. They developed from thick beds of acid sandy loam and sandy clay loam. The A1 horizon is black to gray loamy fine sand. The B horizon is within 30 inches of the surface and is friable to slightly sticky fine sandy loam to fine sandy clay loam. It is light olive brown to light yellowish brown mottled with various shades of gray, yellow, brown, and red. The B horizon is underlain by highly mottled fine sandy clay loam to clay C1g and IIC2g horizons that are somewhat stratified in places.

Lynchburg soils have slow surface runoff and internal drainage. Permeability is moderately rapid to rapid in the A horizon and moderate to slow in the B horizon. Soil aeration is poor because normally the water table is high and sometimes rises very close to the surface in wet periods. These soils have moderate natural fertility.

Profile of a Lynchburg soil in a moist pasture of carpetgrass (NE¼SE¼ sec. 21, T. 5 N., R. 13 W.):

A1—0 to 5 inches, black (10YR 2/1) loamy fine sand; moderate, medium and fine, granular structure; very friable; abundant fine roots; medium organic-matter content; strongly acid; boundary clear and smooth.

A2—5 to 10 inches, dark grayish-brown (2.5Y 4/2) loamy fine sand with common, medium, distinct root channels filled with very dark gray (10YR 3/1) and very dark grayish-brown (2.5Y 3/2) soil material; moderate, medium and fine, granular structure; very friable; plentiful fine roots; strongly acid; boundary gradual and wavy.

B1—10 to 17 inches, light yellowish-brown (2.5Y 6/4) fine sandy loam with few, medium, distinct root channels filled with very dark gray (N 3/0) soil material; weak, medium, subangular blocky structure that, with slight pressure, breaks to moderate, medium, granular structure; friable; plentiful fine roots; few fine pores; strongly acid; boundary gradual and wavy.

B2tg—17 to 30 inches, light olive-brown (2.5Y 5/4) fine sandy clay loam with common, medium, distinct, yellowish-brown (10YR 5/6) mottles, few, medium, distinct, gray (N 5/0) and strong-brown (7.5YR 5/8) mottles, and common, medium, faint, light brownish-gray (2.5Y 6/2) mottles; moderate, medium, subangular blocky structure; friable to firm when moist and very hard when dry; few fine roots and pores; strongly acid; boundary gradual and wavy.

B3g—30 to 42 inches, mottled yellowish-brown (10YR 5/6), gray (10YR 6/1 and 10YR 5/1), red (2.5YR 4/8), and light olive-brown (2.5Y 5/4) fine sandy clay loam; moderate, medium, subangular blocky structure; firm when moist and extremely hard when dry; strongly acid; boundary gradual and wavy.

C1g—42 to 56 inches, mottled gray (N 5/0), light-gray (N 7/0), light olive-brown (2.5Y 5/4), yellowish-brown (10YR 5/6), and red (2.5YR 4/8) fine sandy clay loam; weak, coarse, subangular blocky structure; firm when moist and extremely hard when dry; strongly acid; boundary gradual and wavy.

IIC2g—56 to 72 inches +, mottled weak-red (10R 5/4), red (10R 4/8), gray (N 6/0), pale-yellow (2.5Y 8/4), brownish-yellow (10YR 6/6), and strong-brown (7.5YR 5/6) clay with thin lenses of fine sandy clay; massive; very firm when moist and extremely hard when dry; strongly acid.

RED-YELLOW PODZOLIC SOILS (INTERGRADING TOWARD REGOSOLS)

Red-Yellow Podzolic soils that intergrade toward Regosols have less soil horizonation than typical Red-Yellow Podzolic soils and a much thinner solum, but they are more like typical Red-Yellow Podzolic soils than Regosols. They developed from thick beds of acid sandy clay and clay intermixed with thin lenses of coarse-textured material.

In Washington County, only Cuthbert soils are in this group. They are scattered among other soils and are extensive throughout the county. The A horizon is dark-gray to dark grayish-brown loamy fine sand to sand. It grades abruptly to a firm IIB2 horizon that is yellowish-red to red sandy clay or clay and 4 to 8 inches thick. The IIB3 horizon is dominantly red but is mottled with various hues of red, yellow, and brown. The IIB horizon is underlain by sandy clay parent material that is very slowly permeable, highly mottled, and compact.

CUTHBERT SERIES: The soils in this series are on gently sloping to steep uplands and are deep, moderately well drained, and strongly acid. These soils developed from thick beds of acid sandy clay and clay intermixed with thin lenses of coarse-textured material. The A horizon is dark-gray to very dark grayish-brown sandy clay loam to coarse sand. It grades abruptly to a yellowish-red, firm sandy clay or clay IIB horizon that ranges from 4 to 8 inches in thickness. The IIB3 horizon is dominantly red mottled with various hues of red, yellow, and brown. The IIB horizon is underlain by a IIC horizon that is very slowly permeable, highly mottled, compact sandy clay stratified with sandy loam or sandy clay in most areas.

Cuthbert soils have medium to rapid surface runoff and slow to medium internal drainage. Permeability is rapid to moderately slow in the A horizon and slow to very slow in the IIB horizon. Because the IIB horizon is dense and poorly aerated, it has low available moisture capacity in the root zone and is unfavorable for development of roots.

Profile of a Cuthbert soil in a moist wooded area (NE¼NE¼ sec. 18, T. 3 N., R. 12 W.):

A1—0 to 5 inches, very dark grayish-brown (2.5Y 3/2) loamy sand; weak, fine, granular structure; very friable; plentiful fine and medium roots; low organic-matter content; strongly acid; boundary gradual and wavy.

A2—5 to 9 inches, dark-brown (10YR 4/3) loamy sand; weak, fine, granular structure; very friable; plentiful fine and medium roots; strongly acid; boundary abrupt and wavy.

IIB2t—9 to 13 inches, yellowish-red (5YR 4/8) sandy clay; strong, medium, angular and subangular blocky structure; very firm when moist, very sticky when wet, and extremely hard and brittle when dry; distinct clay skins; few small quartz pebbles; plentiful fine roots and few medium roots; few fine pores; strongly acid; boundary gradual and irregular.

IIB3—13 to 21 inches, yellowish-red (5YR 4/8) sandy clay with common, medium, distinct, brownish-yellow (10YR 6/6) mottles and few, fine, faint, red (2.5YR 4/8) mottles; strong, medium, angular and subangular blocky structure; very firm when moist, very sticky when wet, and extremely hard and brittle when dry; distinct clay skins; very few fine roots; few fine and medium pores; strongly acid; boundary gradual and irregular.

IIC1—21 to 29 inches, yellowish-red (5YR 4/8) light sandy clay with common, medium, distinct, yellowish-brown (10YR 5/8) mottles, common, coarse, faint, red (2.5YR 4/8) mottles, few, medium, distinct, dark-red (10R 3/6) mottles, and few, fine, prominent, very pale brown (10YR 7/4) mottles; strong, medium, angular and subangular blocky structure; firm when moist, very sticky when wet, and extremely hard when dry; distinct clay skins; few fine and medium pores; strongly acid; boundary gradual and wavy.

IIIC—29 to 42 inches +, mottled yellowish-red (5YR 4/8), yellowish-brown (10YR 5/8), dark-red (10R 3/6), red (2.5YR 4/8), and very pale brown (10YR 7/4) light sandy clay loam; strong, medium, angular and subangular blocky structure; firm when moist, very sticky when wet, and extremely hard when dry; distinct clay skins; strongly acid.

Ground-Water Podzols

Ground-Water Podzol soils are a group of somewhat poorly drained, nearly level soils that developed from sandy material in a humid climate. These soils are intrazonal and have a thin, organic A1 horizon over an A2 horizon of strongly leached light-gray sand. The A2 horizon grades abruptly to a dark-brown or dark reddish-brown to black organic pan, or Bh horizon. The soils are moderately deep to deep and strongly acid to very strongly acid.

In Washington County Leon coarse sand is the only Ground-Water Podzol. This soil developed from moderately thick beds of acid sand and has a gray to dark-gray coarse sand A1 horizon and a light-gray coarse sand A2 horizon. It has a small amount of organic material in the A1 horizon, and the A2 horizon is highly leached. The B horizon is 6 to 8 inches thick and consists of medium sand or coarse sand in which organic matter has accumulated and formed a pan. It is at a depth of 14 to 42 inches and is underlain by brown to light-gray coarse sand that extends to a depth of more than 42 inches.

LEON SERIES: The soils in this series are deep and strongly acid or very strongly acid. They developed from moderately thick beds of acid sand and loamy sand on somewhat poorly drained, nearly level to gently sloping uplands. These soils have a gray to dark-gray sand to coarse sand A1 horizon 2 to 6 inches thick. The A2 horizon of light-gray to gray sand is abruptly underlain by a cemented pan, or Bh horizon, that is very dark brown or dark reddish brown to black and is high in organic-matter content. The Bh horizon occurs at a depth of 14 to 42 inches and is underlain by dark grayish-brown or yellowish-brown to light-gray sand to coarse sand that extends to a depth of more than 42 inches.

Leon soils have slow surface runoff and internal drainage. These coarse-textured soils have very poor soil qualities, do not retain plant nutrients well, and have very low natural fertility.

Profile of a Leon soil in a moist wooded site (NW¼NW¼ sec. 24, T. 3 N., R. 16 W.):

A1—0 to 2 inches, dark-gray (N 4/0) coarse sand; single grain; loose; abundant fine and medium roots; strongly acid; boundary clear and smooth.

A2—2 to 23 inches, gray (N 5/0) coarse sand with few, medium, distinct, light-gray (N 7/0) splotches; single grain; loose; plentiful fine and medium roots, but the number decreases with increasing depth; strongly acid; boundary abrupt and smooth.

B2h—23 to 31 inches, very dark brown (10YR 2/2) coarse sand; massive; strongly cemented; few fine roots; strongly acid; boundary gradual and smooth.

B3h—31 to 36 inches, very dark grayish-brown (10YR 3/2) coarse sand; single grain; loose; strongly acid; boundary gradual and wavy.

C1—36 to 42 inches, dark grayish-brown (10YR 4/2) coarse sand; single grain; loose; strongly acid; boundary gradual and wavy.

C2—42 to 53 inches +, yellowish-brown (10YR 5/4) coarse sand; single grain; loose; strongly acid.

Humic Gley soils

The Humic Gley great soil group consists of hydromorphic intrazonal soils that are poorly drained to very poorly drained. These soils have moderately thick, dark-colored, organic-mineral horizons underlain by gleyed-mineral horizons. They developed from marine sediments of the Coastal Plain formation in a warm moist climate. The vegetation was of the swamp type, mainly gum, bay, cypress, and many kinds of water-tolerant shrubs. These soils have a fairly thick, black A horizon that contains a large amount of organic matter. They are medium acid or strongly acid.

In Washington County the Bayboro, Pocomoke, and Rutlege soils are in the Humic Gley great soil group. The Bayboro and Pocomoke soils have a thick, black A horizon. The B horizon of the Bayboro soils is sandy clay to clay. In most places the B horizon of the Pocomoke soils is loam to light sandy clay loam, but in some places in this county it is heavy fine sandy clay loam. The Rutlege soils are coarser textured than the Bayboro or Pocomoke soils and have a fine sand or sand C horizon at a depth of more than 42 inches.

BAYBORO SERIES: The soils in this series are deep, very poorly drained, and strongly acid. They developed from thick beds of acid sandy clay and clay in nearly level depressions or ponded areas in low positions on the uplands. Because the vegetation was dense and the water table high, a large amount of organic matter accumulated and is still present. The A1 horizon is black to very dark gray loamy sand to clay loam that is high in organic-matter content and ranges from 8 to 12 inches in thickness. Within 18 inches of the surface is a IIB2g horizon of gray or dark-gray sandy clay or clay mottled with yellow, brownish yellow, or red. Parent material consisting of gray or light-gray sandy clay loam to clay occurs below the B horizon.

Very little water runs off the Bayboro soils. Internal drainage is very slow because of the plastic, fine-textured B horizon. Permeability is rapid to moderately rapid in the A horizon and is very slow in the B horizon. Aeration is very poor, and natural fertility is moderate.

Profile of a Bayboro soil in a wet, wooded site with a cover of gum, bay, and scattered cypress trees (SE¼NE¼ sec. 21, T. 5 N., R. 13 W.):

A1—0 to 15 inches, black (N 2/0) very fine sandy loam; weak, medium, subangular blocky structure that breaks, with slight pressure, to strong, medium, crumb structure; slightly sticky to sticky when wet, friable when moist, and slightly hard when dry; many fine roots and few medium and large roots; many fine pores; high organic-matter content; very strongly acid; boundary gradual and smooth.

B1g—15 to 20 inches, dark-gray (N 4/0) fine sandy clay loam; moderate, medium, subangular blocky structure; sticky when wet, firm when moist, and hard when dry; few, fine, medium and large roots; very strongly acid; boundary clear and smooth.

IIB2g—20 to 44 inches, gray (N 5/0) clay with common, medium, distinct, dark-gray (N 4/0) mottles and few, fine, faint, yellowish-brown (10YR 5/6) mottles along root channels; massive when wet and weak, medium, blocky structure when dry; very sticky and very plastic when wet, extremely firm when moist, and extremely hard when dry; few large roots; very strongly acid; boundary gradual and smooth.

IIC1g—44 to 54 inches +, mottled light-gray (10YR 7/1) and gray (N 5/0) heavy sandy clay; massive; very sticky and very plastic when wet and extremely hard when dry; very strongly acid.

POCOMOKE SERIES: The soils in this series are deep, very poorly drained, and very strongly acid. They developed in fairly thick beds of acid sandy loam and sandy clay loam in nearly level depressions or ponded areas in low positions on the uplands. The A1 horizon is very dark gray to black, mucky loamy fine sand to loamy fine sand that ranges from 8 to 14 inches in thickness and is high in organic-matter content. The B horizon occurs within 30 inches of the surface. It is gray to light-gray sandy loam to sandy clay loam that is mottled with pale brown, yellowish brown, and strong brown in most places. The B horizon is underlain by a C horizon of slightly to distinctly mottled sandy clay and sandy clay loam.

Profile of a Pocomoke soil in a wet area (NE¼SE¼ sec. 24, T. 4 N., R. 16 W.):

A11—0 to 8 inches, black (N 2/0), mucky loamy fine sand; moderate, medium, granular structure; friable; matted with fine roots; high organic-matter content; very strongly acid; boundary gradual and smooth.

A12—8 to 13 inches, very dark gray (10YR 3/1) loamy fine sand with few, fine, distinct, yellowish-brown (10YR 5/8) streaks of root stains; moderate, medium, granular structure; friable; abundant fine roots; very strongly acid; boundary gradual and smooth.

A2—13 to 16 inches, dark-gray (N 4/0) loamy sand with few, fine, distinct, yellowish-brown (10YR 5/8) streaks, or root stains; weak, medium, granular structure; friable; few fine roots; very strongly acid; boundary gradual and smooth.

B1g—16 to 31 inches, gray (N 5/0) sandy loam with few, fine, faint, pale-brown (10YR 6/3) mottles; moderate, medium, subangular blocky structure; firm when moist, slightly sticky when wet, and hard when dry; very strongly acid; boundary clear and smooth.

B2g—31 to 48 inches, gray (N 5/0) and dark-gray (N 4/0) light sandy clay loam with common, fine, distinct, yellowish-brown (10YR 5/8) mottles; strong, medium, subangular blocky structure; firm when moist and hard when dry; very strongly acid; boundary gradual and smooth.

C1g—48 to 55 inches, gray (N 5/0) and dark-gray (N 4/0) sandy clay loam with few thin lenses or streaks of sandy loam and sandy clay and common, fine, distinct, yellowish-brown (10YR 5/8) mottles; weak, medium, subangular blocky structure; firm when moist, slightly plastic when wet, and hard when dry.

RUTLEGE SERIES: The soils in this series are deep, poorly drained to very poorly drained, and strongly acid to very strongly acid. They developed from thick beds of sand and loamy sand. Rutlege soils are normally in low, nearly level areas on uplands, but in a few small areas, particularly in the central part of the county, they occur in seepage areas on steeper slopes. The A1 horizon is black or very dark gray fine sand to loamy fine sand, 8 to 24 inches thick, that is high in organic matter. At a depth of more than 42 inches, the A horizon is underlain by a C horizon of dark-gray to white coarse sand to loamy fine sand. Some areas, however, have a finer textured IIC horizon at a depth of 30 to 42 inches.

Rutlege soils have slow surface runoff and internal drainage. Permeability is rapid. Because of the deep, coarse-textured material and excessive wetness, leaching is rapid and aeration is poor throughout the subsoil.

Profile of a Rutlege soil in a wet, wooded area (NE¼NW¼ sec. 2, T. 2 N., R. 13 W.):

A11—0 to 9 inches, black (10YR 2/1) loamy fine sand; single grain; loose; abundant fine roots and few medium roots; high organic-matter content; very strongly acid; boundary gradual and wavy.

A12—9 to 12 inches, very dark gray (10YR 3/1) sand; single grain; loose; few fine roots; very strongly acid; boundary gradual and smooth.

A13—12 to 17 inches, dark-gray (10YR 4/1) sand; single grain; loose; few roots; strongly acid; boundary gradual and smooth.

AC—17 to 22 inches, grayish-brown (10YR 5/2) coarse sand; single grain; loose; very few fine roots; strongly acid; boundary gradual and smooth.

C1g—22 to 54 inches +, gray (10YR 6/1) coarse sand; single grain; loose; strongly acid; water table at a depth of 22 inches.

Low-Humic Gley soils

The Low-Humic Gley soils are poorly drained and have a thin surface layer that is moderately high in organic matter. The A horizon is underlain by mottled gray and brown, gleyed mineral horizons that differ little in texture. These gleyed soils developed under impeded drainage.

In Washington County the soils of this group have a thin sand to clay loam A1 horizon that normally has moderate, medium, crumb structure. The IIB horizon is gray or mottled coarse sand to clay. The characteristics of these soils are moderately well developed and reflect the influence of nearly level relief, a high water table, and impeded drainage more strongly than the effect of climate and living organisms. The native vegetation is mainly swamp forest.

In this county the soils of the Grady, Plummer, Bladen, and Rains series are in the Low-Humic Gley group. The Rains soils are good examples of this group. They are poorly drained and have a thin, very dark gray to gray loamy sand A horizon. The B horizon is dominantly gray fine sandy clay loam with some mottling and generally has moderate, medium, subangular blocky structure.

The Grady and Rains soils have similar colors in the A and B horizons, but the Grady soils are finer textured in the B horizon than the Rains and generally are massive.

The Plummer soils are similar to the Rains soils in drainage. They have much less horizonation than Rains

soils, for their A horizon is thinner and a textural B horizon is missing.

The Bladen are similar to the Rains soils in color and drainage, but Bladen soils are finer textured throughout. Bladen soils and Rains soils occur in similar positions.

BLADEN SERIES: The soils in this series are deep, poorly drained, and strongly acid. They developed from thick beds of acid clay and sandy clay in low, nearly level areas or depressions on the uplands. Their A horizon is gray to very dark gray loamy sand to clay loam. Within 14 inches of the surface is a IIB horizon of very firm, plastic clay or sandy clay. The IIB horizon ranges from dark gray to grayish brown but is dominantly gray with few to common mottles of various shades of yellow, brown, gray, and, in places, red. Below the IIB horizon is highly mottled clay to sandy clay parent material.

Bladen soils are ponded or have very slow surface runoff and internal drainage. Permeability is rapid to moderately rapid in the A horizon and very slow in the IIB horizon. The available moisture capacity is moderately high. The very poorly aerated IIB horizon restricts the root zone. These soils have medium organic-matter content and moderate natural fertility. They waterlog in wet seasons.

Profile of a Bladen soil in a wet pasture of bahiagrass (NW¼NE¼ sec. 28, T. 4 N., R. 12 W.):

Ap—0 to 6 inches, very dark gray (10YR 3/1) loamy fine sand; moderate, medium and fine, crumb structure; friable; medium organic-matter content; abundant fine roots and few medium roots; strongly acid; boundary gradual and wavy.

B1g—6 to 8 inches, dark-gray (10YR 4/1) light fine sandy clay loam with common, medium, distinct root channels filled with very dark gray (10YR 3/1) loamy fine sand; few, fine, distinct, grayish-brown (2.5Y 5/2) mottles; weak, medium, subangular blocky structure; friable; abundant fine roots; strongly acid; boundary clear and wavy.

IIB21g—8 to 11 inches, grayish-brown (2.5Y 5/2) clay with few root channels and insect burrows filled with dark-gray (10YR 4/1) light fine sandy clay loam; massive to weak, medium, subangular blocky structure; very firm when moist and extremely hard when dry; plentiful fine roots; strongly acid; boundary gradual and wavy.

IIB22g—11 to 15 inches, grayish-brown (2.5Y 5/2) clay with few, fine, distinct, light olive-brown (2.5Y 5/4) mottles; weak, coarse, subangular blocky structure; very firm when moist, extremely hard when dry, and plastic when wet; few fine roots; strongly acid; boundary gradual and wavy.

IIB3g—15 to 27 inches, gray (10YR 5/1) clay with common, medium, distinct, brownish-yellow (10YR 6/6) mottles, common, coarse, distinct, light yellowish-brown (10YR 6/4) mottles, few, fine, distinct, yellowish-red (5YR 4/8) mottles, and few, fine, faint, pale-red (10R 6/3) mottles; weak, coarse, subangular blocky structure; very firm when moist, extremely hard when dry, and plastic when wet; very few fine roots; strongly acid; boundary gradual and wavy.

IIC1g—27 to 40 inches, gray (N 5/0) clay with common, medium, distinct, strong-brown (7.5YR 5/8), and yellowish-brown (10YR 5/4) mottles, few, fine, distinct, red (10R 4/6) mottles, and few, fine, faint, pale-red (10R 6/3) mottles; massive; very firm when moist, extremely hard when dry, and plastic when wet; strongly acid; boundary gradual and wavy.

IIC2g—40 to 52 inches +, gray (N 5/0) clay with few, medium, distinct, weak-red (10R 5/4), and red (2.5YR 4/8) mottles and few, fine, distinct, light yellowish-brown (10YR 6/4) mottles; massive; extremely firm when moist, extremely hard when dry, and plastic when wet; strongly acid.

GRADY SERIES: The soils in this series are deep, poorly drained to very poorly drained, and strongly acid. They developed from thick beds of acid sandy clay and clay in low, nearly level depressions on the uplands. Natural drainage outlets are very poor. The Grady soils have a black to dark-gray fine sandy loam to loam A1 horizon 3 to 6 inches thick. In most places the A1 horizon grades rather abruptly to a B horizon that is dark-gray to light-gray, tough, plastic fine sandy clay to clay mottled with yellow to yellowish red. In some places, however, at a depth of not more than 8 to 10 inches, the A1 horizon, grades to an A2 horizon of dark-gray to gray fine sandy loam to fine sandy clay loam.

Surface drainage is poor, and water moves very slowly through the B horizon. Drainage from the depressions is underground. Permeability is slow in the B horizon, aeration is very poor, and natural fertility is moderate.

Profile of a Grady soil in a wet area of longleaf pine, blackgum, and cypress (NW¼NE¼ sec. 28, T. 5 N., R. 13 W.):

A1—0 to 6 inches, black (N 2/0) loam; strong, medium, crumb structure; friable; abundant fine roots and plentiful large and medium roots; medium organic-matter content; strongly acid; boundary clear and smooth.

B1g—6 to 17 inches, dark-gray (N 4/0) fine sandy clay with many, fine, distinct, yellowish-brown (10YR 5/8) stains from roots; moderate, coarse, subangular blocky structure; sticky and plastic when wet, firm to very firm when moist, and very hard when dry; plentiful fine medium and large roots; plentiful fine pores; abundant fine root channels; strongly acid; boundary gradual and smooth.

B2g—17 to 36 inches, dark-gray (N 4/0) and gray (N 6/0) clay with common, fine, distinct, yellowish-brown (10YR 5/8) mottles; massive; very sticky and very plastic when wet, extremely firm when moist, and extremely hard when dry; strongly acid; boundary clear and smooth.

C1g—36 to 49 inches, light-gray (N 7/0) clay with common, coarse, distinct, yellowish-brown (10YR 5/6) mottles and few, fine, distinct, yellowish-red (5YR 5/8) mottles; massive; very sticky and very plastic when wet, extremely firm when moist, and extremely hard when dry; strongly acid; boundary clear and smooth.

C2g—49 to 55 inches +, mottled yellowish-red (5YR 5/8), strong-brown (7.5YR 5/8), yellowish-brown (10YR 5/6), very pale brown (10YR 8/3), and light-gray (10YR 7/1) clay; massive; very sticky and very plastic when wet, extremely firm when moist, and extremely hard when dry; strongly acid.

PLUMMER SERIES: The soils in this series are deep, poorly drained, and very strongly acid to strongly acid. They occur on broad flats, in drainageways, in shallow intermittent ponds, and in seepage areas on nearly level to sloping uplands. They developed from moderately thick to thick beds of acid sand and loamy sand that are underlain by sandy clay loam and sandy clay at a depth of more than 30 inches. These soils have a black to gray fine sand to coarse sand A1 horizon. Where the A1 horizon is black or very dark gray, it is less than 6 inches thick and is underlain by a gray to dark-gray AC horizon. The C horizon is gray to light-gray or white coarse sand to fine sand that, in some places, is slightly or moderately mottled with various shades of gray, brown, and yellow. Normally, the C horizon extends to a depth below 42 inches, but in some areas, a sandy loam to sandy clay IIC horizon occurs at a depth of 30 to 42 inches.

Surface drainage is poor, and internal drainage is slow to very slow because of the permanently high water table. Permeability is generally rapid, but it is moderate

to slow where the finer textured IIC horizon occurs at a depth of 30 to 42 inches.

Representative profile of a Plummer soil (NW¼NW¼ sec. 10, T. 1 N., R. 16 W.):

A1—0 to 5 inches, black (10YR 2/1) sand; weak, medium, crumb structure; very friable; plentiful fine roots; high organic-matter content; very strongly acid; boundary clear and smooth.

AC—5 to 14 inches, dark-gray (10YR 4/1) sand; single grain; loose; few fine roots; strongly acid; boundary gradual and smooth.

C1g—14 to 19 inches, gray (10YR 5/1) sand; single grain; loose; few fine roots; strongly acid; boundary gradual and smooth.

C2g—19 to 28 inches, light-gray (2.5Y 7/2) sand with few, medium, faint, grayish-brown (2.5Y 5/2) mottles; single grain; loose; very few fine roots; strongly acid; boundary gradual and smooth.

C3g—28 to 46 inches, light-gray (2.5Y 7/2) sand; single grain; loose; very few fine roots; strongly acid; boundary gradual and smooth.

C4g—46 to 60 inches +, mottled pale-yellow (2.5Y 7/4), light brownish-gray (2.5Y 6/2), and gray (N 6/0) sand; single grain; loose; strongly acid.

RAINS SERIES: The soils in this series are deep, poorly drained, and strongly acid. They developed from thick beds of sandy clay and sandy loam on nearly level, low, flat or depressional uplands and along poorly defined drainageways. In a few places they are on toe slopes at the foot of the uplands and receive seepage. Rains soils have a very dark gray to gray loamy sand A1 horizon 3 to 6 inches thick. Within 30 inches of the surface is a B horizon of friable to firm sandy loam to fine sandy clay loam. The B horizon is dominantly gray or light gray mottled with pale brown, pale yellow, strong brown, yellowish brown, and yellowish red. It is underlain by a mottled sandy clay loam to clay C horizon.

Rains soils have slow surface drainage and very slow internal drainage. They have a high water table and, in many places, are saturated most of the time. Permeability is moderate in the A horizon and subsoil. Because of the high water table and poor aeration in the B horizon, the root zone is shallow. The available moisture capacity is moderate to low, and natural fertility is low.

Profile of a Rains soil in a wet, wooded area (SE¼SE¼ sec. 21, T. 5 N., R. 13 W.):

A1—0 to 3 inches, very dark gray (10YR 3/1) loamy sand; weak, medium, granular structure; very friable; abundant fine roots; moderately high organic-matter content; very strongly acid; boundary clear and wavy.

A2—3 to 8 inches, gray (10YR 5/1) loamy sand; moderate, fine and medium, granular structure; very friable; plentiful fine roots; very strongly acid; boundary gradual and wavy.

B1g—8 to 14 inches, gray to light-gray (10YR 6/1) sandy loam; moderate, medium, granular structure; friable when moist and hard when dry; few fine roots; very strongly acid; boundary gradual and smooth.

B21g—14 to 20 inches, gray to light-gray (10YR 6/1) light sandy clay loam; medium, subangular blocky structure that breaks easily, with slight pressure, to moderate, medium and fine, crumb structure; friable when moist and hard when dry; very few fine roots; few fine and medium pores; very strongly acid; boundary gradual and smooth.

B22g—20 to 34 inches, gray (N 5/0) light sandy clay loam with common, medium, faint, pale-yellow (2.5Y 7/4) mottles and few, fine, distinct, strong-brown (7.5YR 5/8) mottles; moderate, medium, subangular blocky structure; firm when moist, sticky when wet, and very hard when dry; very few fine roots; plentiful fine and medium pores; very strongly acid; boundary gradual and wavy.

B3g—34 to 42 inches, gray (N 5/0) fine sandy clay loam with many, medium, prominent, strong-brown (7.5YR 5/8) mottles and few, medium, distinct, yellowish-red (5YR 5/8) mottles; weak, coarse, subangular blocky structure; firm when moist, slightly sticky when wet, and very hard when dry; plentiful fine and medium pores; strongly acid; boundary clear and wavy.

Cg—42 to 51 inches +, mottled gray (N 5/0), strong-brown (7.5YR 5/8), and brownish-yellow (10YR 6/8) fine sandy clay loam; weak, medium, subangular blocky structure; friable when moist, slightly sticky when wet, and hard when dry; fine and medium pores; strongly acid.

Regosols

Regosols are soils in recent deposits of soil material that is too young to have developed soil characteristics, and soils derived from nearly inert parent material that have remained unaltered by weathering. In Washington County most of the Regosols formed from deep inert quartz sand that has changed very little since it was laid down in past geologic ages. About the only evidence of profile development is the A horizon in which organic matter has stained the top 6 or 7 inches.

The Regosols in Washington County are the Lakeland, Eustis, Blanton, Klej, and Scranton soils. All these soils except the Scranton are representative Regosols; the Scranton soils are Regosols that intergrade toward Humic Gley soils. All these soils developed from moderately thick to thick beds of acid sand that is underlain by finer textured material at a depth of more than 30 inches.

Lakeland and Eustis soils are well drained and are nearly level to steep. They have a dark-gray to grayish-brown coarse sand to sand A1 horizon. Lakeland and Eustis soils are similar, but the C horizon of Eustis soils is strong-brown to yellowish-red coarse sand or sand, and that of the Lakeland soils is yellow to yellowish-brown coarse sand or sand. The sand of these soils generally extends to a depth of 42 to more than 60 inches, but in some areas fine-textured material is 30 to 42 inches below the surface.

The Blanton and Klej soils are deep, moderately well drained, and strongly acid. Their A1 horizon is gray to dark-gray sand to fine sand. Blanton and Klej soils are somewhat similar, but the C horizon in Blanton soils is dominated by very pale brown or light gray, and that of the Klej soils by yellow. Also, Blanton soils are less well drained than Lakeland soils. Klej and Blanton soils are influenced by a water table that is usually within 42 inches from the surface.

BLANTON SERIES: The soils in this series are deep, moderately well drained, and strongly acid. They developed from thick beds of acid sand in low positions on nearly level to sloping uplands. The A1 horizon is gray to very dark gray sand or fine sand and extends to a depth of 2 to 4 inches. A transitional AC horizon grades to a gray, very pale brown or light brownish-gray C horizon of fine sand to coarse sand that is mottled or splotched with various hues of yellow to a depth of more than 42 inches.

In the Blanton soils, permeability is very rapid, plant nutrients leach rapidly, and available moisture capacity is low.

Representative profile of a Blanton soil in a moist pasture of native grasses (NE¼NE¼ sec. 18, T. 1 N., R. 14 W.):

A1—0 to 4 inches, very dark gray (10YR 3/1) sand; single grain; loose; abundant fine roots; strongly acid; boundary clear and smooth.

AC—4 to 10 inches, gray (10YR 5/1) sand with common, medium, faint, gray (10YR 6/1) mottles; common, fine, distinct, yellowish-brown (10YR 5/8) stains from roots; single grain; loose; few fine roots; strongly acid; boundary gradual and wavy.

C1—10 to 15 inches, light brownish-gray (10YR 6/2) sand with common, fine, distinct, yellowish-brown (10YR 5/8) stains from roots; single grain; loose; few fine roots; strongly acid; boundary gradual and smooth.

C2—15 to 38 inches, light-gray (10YR 7/2) sand with few, fine, distinct, brownish-yellow (10YR 6/8) mottles; single grain; loose; strongly acid; boundary gradual and irregular.

C3—38 to 48 inches, mixed yellow (10YR 7/8) and white (10YR 8/2) sand with few, fine, distinct, yellowish-brown (10YR 5/8) mottles; single grain; loose; strongly acid; boundary gradual and irregular.

C4—48 to 76 inches +, white (10YR 8/2) sand with many, coarse, distinct, very pale brown (10YR 7/4) and yellowish-brown (10YR 5/8) mottles; single grain; loose; strongly acid.

EUSTIS SERIES: The soils in this series are on nearly level to steep uplands and are deep, well drained to excessively drained, and strongly acid. They developed from moderately thick beds of acid sand and loamy sand that are underlain by finer textured sediments at a depth of more than 30 inches below the surface. They have a dark-gray to very dark grayish-brown coarse sand or sand A horizon 3 to 7 inches thick. The A horizon is underlain by a transitional AC horizon that grades to a strong-brown to a yellowish-red coarse sand or sand C horizon. In most places the C horizon extends to a depth of 30 to more than 60 inches, but in some areas finer textured material is at a depth of 30 to 42 inches. This finer textured material is normally strong-brown to red sandy loam to sandy clay loam.

In the Eustis soils, surface drainage is good, internal drainage is very rapid, and natural fertility is low.

Profile of a Eustis soil in a moist wooded site (SE¼NW¼ sec. 36, T. 2 N., R. 15 W.):

A11—0 to 5 inches, very dark grayish-brown (10YR 3/2) coarse sand; single grain; loose; abundant fine roots; low organic-matter content; strongly acid; boundary gradual and smooth.

A12—5 to 10 inches, brown to dark-brown (10YR 4/3) coarse sand; single grain; loose; plentiful fine roots; strongly acid; boundary gradual and wavy.

AC—10 to 17 inches, brown to dark-brown (7.5YR 4/4) coarse sand; single grain; loose; plentiful fine roots; strongly acid; boundary gradual and wavy.

C1—17 to 67 inches, yellowish-red (5YR 5/6) coarse sand; single grain; loose; few fine roots; strongly acid; boundary gradual and smooth.

C2—67 to 82 inches, strong-brown (7.5YR 5/8) coarse sand; single grain; loose; strongly acid; boundary gradual and smooth.

C3—82 to 96 inches +, reddish-yellow (7.5YR 7/8) coarse sand; single grain; loose; strongly acid.

KLEJ SERIES: The soils in this series are on nearly level to sloping uplands and are deep, moderately well drained, and strongly acid. They developed from thick beds of acid sand and loamy sand that are underlain by sandy clay loam and sandy clay. They have a gray to very dark gray sand to fine sand A1 horizon that ranges from 2 to 5 inches in thickness. Underlying the A horizon is a yellowish-brown to yellow C horizon. Sand or fine sand generally extends from the surface to a depth below 42 inches, but in some areas finer textured material is at a depth of 30 to 42 inches. Mottles of various shades of yellow and brown normally occur at a depth of 16 to 30 inches, but in some areas the depth to mottling ranges from 14 to 36 inches. As depth increases, the C horizon becomes more distinctly mottled with various shades of yellow, brown, white, and gray.

In the Klej soils surface runoff is slow and internal drainage is restricted by the moderately high water table. Permeability is very rapid, and natural fertility is low.

Profile of a Klej soil in a moist wooded area (NW¼NW¼ sec. 17, T. 1 N., R. 14 W.):

A11—0 to 3 inches, very dark gray (10YR 3/1) sand; single grain; loose; abundant fine roots; low organic-matter content; strongly acid; boundary gradual and smooth.

A12—3 to 6 inches, dark-gray (10YR 4/1) sand; single grain; loose; plentiful fine roots; strongly acid; boundary gradual and irregular.

C1—6 to 16 inches, light yellowish-brown (10YR 6/4) sand with common, fine and medium, distinct root stains of yellowish brown (10YR 5/8) and few, medium, distinct streaks of dark gray (10YR 4/1) that have penetrated along the root channels from above; single grain; loose; few fine roots; strongly acid; boundary gradual and irregular.

C2—16 to 32 inches, brownish-yellow (10YR 6/6) sand with common, fine and medium, distinct mottles of strong brown (7.5YR 5/6) and few, fine, faint streaks of light gray (10YR 7/2); single grain; loose; few fine roots; strongly acid; boundary gradual and wavy.

C3—32 to 55 inches, mottled brownish-yellow (10YR 6/6), light-gray (10YR 7/2), and strong-brown (7.5YR 5/6) sand; single grain; loose; few fine roots; strongly acid; boundary gradual and irregular.

C4—55 to 77 inches, light-gray (10YR 7/2) sand with many, coarse, distinct, very pale brown (10YR 7/4) mottles and common, medium, distinct, yellowish-brown (10YR 5/8) mottles; single grain; loose; very few fine roots; strongly acid; boundary gradual and smooth.

C5—77 to 90 inches, yellow (10YR 8/6) sand with few, fine, distinct, strong-brown (7.5YR 5/6) mottles and common, medium, distinct, white (10YR 8/2) mottles; single grain; loose; strongly acid.

LAKELAND SERIES: The soils in this series are on nearly level to steep uplands and are deep, well drained to excessively drained, and strongly acid. They developed from thick beds of acid sand and loamy sand that are underlain by finer textured sediments at a depth of more than 30 inches. They have gray or dark-gray to dark grayish-brown coarse sand to fine sand A horizon 2 to 4 inches thick. An AC horizon underlies the A horizon and grades to a coarse sand to fine sand C horizon. In some areas finer textured material is at a depth ranging from 30 to 42 inches, but generally it is deeper. The finer textured material is sandy loam to sandy clay. Normally, the upper 4 to 8 inches of the C horizon is light yellowish-brown, and the lower part is yellow to yellowish brown. Below a depth of 42 to 60 inches, the C horizon may grade to coarse sand, fine sand, or loamy sand that is pale brown mottled with yellowish brown, brownish yellow, light gray, or white.

The surface drainage of Lakeland soils is good, and internal drainage is very rapid throughout. Natural fertility is low. Because these soils are coarse textured, they retain plant nutrients poorly.

Profile of a Lakeland soil in a moist wooded area (SE¼SE¼ sec. 5, T. 1 N., R. 14 W.):

A1—0 to 3 inches, dark-gray (10YR 4/1) coarse sand; single grain; loose; abundant fine roots and few medium roots; low organic-matter content; strongly acid; boundary gradual and smooth.

AC—3 to 7 inches, grayish-brown (10YR 5/2) coarse sand; single grain; loose; plentiful fine roots; strongly acid; boundary gradual and smooth.

C1—7 to 14 inches, light yellowish-brown (10YR 6/4) coarse sand; single grain; few fine roots; strongly acid; boundary gradual and smooth.

C2—14 to 43 inches, yellow (10YR 7/6) coarse sand; single grain; loose; few fine roots; strongly acid; boundary clear and smooth.

C3—43 to 72 inches, very pale brown (10YR 8/4) coarse sand with common, medium, distinct, brownish-yellow (10YR 6/6) mottles; single grain; loose; strongly acid; boundary gradual and smooth.

C4—72 to 100 inches +, very pale brown (10YR 8/3) coarse sand with common, medium, distinct, yellowish-brown (10YR 5/6) mottles; single grain; loose; strongly acid.

REGOSOLS (INTERGRADING TOWARD HUMIC GLEY SOILS)

Scranton soils are Regosols that intergrade toward Humic Gley soils. They are more poorly drained than typical Regosols, and they have a prominent A1 horizon, but they are more like Regosols than Humic Gley soils.

Scranton soils occur among Red-Yellow Podzolic soils. They are somewhat poorly drained and formed from thick beds of acid marine sand and loamy sand, mainly under coniferous forest and an understory of bay and myrtle, native grasses, and weeds.

SCRANTON SERIES: The soils in this series are on low, nearly level to gently sloping uplands and are deep, somewhat poorly drained, and strongly acid. They developed from thick beds of acid sand and loamy sand that are underlain by sandy clay loam and sandy clay. The A11 and A12 horizons are black to very dark gray fine sand and are high in organic matter. The A12 horizon extends to a depth of 8 to 14 inches. A transitional AC horizon of grayish-brown sand, 2 to 8 inches thick, grades to a C horizon of light yellowish-brown fine sand that is mottled with various hues of yellow, brown, and gray. The C horizon generally extends to a depth of more than 42 inches, but in some areas finer textured material occurs at a depth of 30 to 42 inches. Scranton soils are distinguished from other coarse-textured soils by a dark-colored, highly organic A1 horizon over a yellowish C horizon or underlying material. Their water table is high enough to affect, through capillary action, the amount of moisture within a depth of 48 inches.

Surface runoff is slow in the Scranton soils, and internal drainage is restricted by the high water table. Permeability is very rapid above the finer textured substratum but is moderately slow in it. Available moisture capacity is low, and natural fertility is moderately low.

Profile of a Scranton soil in a moist wooded area (NE¼NE¼ sec. 7, T. 1 N., R. 13 W.):

A11—0 to 5 inches, black (N 2/0) fine sand; moderate, medium, granular structure; very friable; matted with fine roots; few medium roots; high organic-matter content; strongly acid; boundary gradual and smooth.

A12—5 to 8 inches, very dark gray (N 3/0) fine sand; moderate, medium, granular structure; very friable; abundant fine roots and few medium roots; medium organic-matter content; strongly acid; boundary gradual and smooth.

AC—8 to 10 inches, grayish-brown (2.5Y 5/2) fine sand; moderate, medium, granular structure; loose; plentiful fine roots and few medium roots; strongly acid; boundary gradual and smooth.

C1—10 to 15 inches, grayish-brown (2.5Y 5/2) fine sand with common, fine, distinct, olive-gray (5Y 4/2) and light yellowish-brown (2.5Y 6/4) mottles; weak, medium, granular structure; loose; plentiful fine roots; strongly acid; boundary gradual and wavy.

C2—15 to 22 inches, light yellowish-brown (10YR 6/4) fine sand with few, fine, faint, yellowish-brown (10YR 5/6) mottles; weak, medium, granular structure; loose; few fine roots; few iron concretions; strongly acid; boundary gradual and smooth.

C3—22 to 45 inches, light yellowish-brown (10YR 6/4) fine sand with common, coarse, distinct, brownish-yellow (10YR 6/6) and very pale brown (10YR 7/3) mottles; single grain; loose; strongly acid; boundary gradual and smooth.

C4—45 to 52 inches +, light yellowish-brown (10YR 6/4) and very pale brown (10YR 7/3) fine sand; single grain; loose; strongly acid.

General Nature of the County

This section was prepared for those seeking general information about the county. It discusses climate, geology, agriculture, and other subjects of general interest.

Climate [7]

The agriculture in an area depends as much on local climate as it does on the soils. The crops that can be grown, expected yields, and management needed are affected by the average length of the growing season; the amount and distribution of rainfall; and the frequency, intensity, and timing of extremes in temperature and precipitation.

Washington County has long, warm summers and mild winters. Rainfall is abundant and is generally distributed well enough seasonally for most farming. Table 8 summarizes data recorded at weather stations in or immediately adjacent to Washington County.

The Gulf of Mexico largely accounts for the mild, moist climate. Most parts of the county, however, are too far from the gulf coast for sea breezes to be noted regularly in summer. In June, July, and August, the daily maximum temperature averages between 91° and 92° F. and the daily minimum averages between 69° and 71°. Generally, the temperature varies little from day to day during summer. Although the temperature reaches 90° or higher about 90 days a year, temperature of 100° or higher occur only once or twice during an average year.

Because the Gulf of Mexico moderates most of the air masses affecting this area in summer, hot desiccating winds and very high temperatures seldom occur. In December, January, and February, cold air masses frequently move southward from Canada and cause freezing temperatures. Freezing temperature can be expected every year and generally occurs about 20 times a year. Temperature of 20° or lower can be expected at least once in about half the years. Temperature of 20° or lower has occurred about the same number of times in December, January, and February and has been observed late in November. The lowest temperature recorded in Florida—

[7] By K. D. BUTSON, State climatologist, U.S. Weather Bureau.

TABLE 8.—*Climatological summary for Washington County, Florida* [1]

Month	Temperature				Precipitation					Average relative humidity	
	Average daily maximum	Average daily minimum	Two years in 10 will have at least 4 days with—		Average monthly total	One year in 10 will have—		Days with rainfall of—			
			Maximum temperature equal to or higher than—	Minimum temperature equal to or lower than—		Less than—	More than—	0.10 in. or more	0.50 in. or more	1:00 AM	1:00 PM
	°F.	°F.	°F.	°F.	*Inches*	*Inches*	*Inches*	*No.*	*No.*	*Percent*	*Percent*
January	65.4	43.6	79	27	4.15	1.2	7.0	6	3	85	57
February	67.8	45.5	80	30	4.34	1.4	6.7	6	3	84	53
March	73.2	49.3	84	35	6.02	2.6	10.2	6	4	84	52
April	80.4	56.0	88	43	5.30	2.0	10.0	6	3	86	50
May	87.3	63.2	93	52	4.54	1.4	8.2	6	3	86	49
June	91.5	69.3	97	63	5.12	1.6	8.5	8	4	89	56
July	91.6	71.2	97	68	8.38	4.0	12.5	12	6	92	64
August	91.5	71.1	95	67	7.08	3.3	11.0	10	5	91	62
September	88.4	67.6	94	59	5.52	1.6	10.5	7	3	89	61
October	81.7	57.4	89	43	2.20	0.2	4.5	3	1	86	52
November	71.6	47.0	83	32	3.20	0.4	6.4	4	2	85	53
December	65.5	43.5	78	28	4.32	1.6	7.7	6	3	85	58

[1] Except for relative humidity, all data were summarized from records of weather stations in or near Washington County. Relative humidity is from records at Tallahassee, Florida.

2° below zero—was observed at Tallahassee, in nearby Leon County, on February 13, 1899. Cold spells are usually short, and even on the colder days the temperature almost always rises above freezing. In winter, the maximum temperature may vary greatly from day to day in any year, and the daily maximum in winter generally ranges from about 50° to 75°.

A farmer should know, as nearly as possible, the latest date of damaging low temperature in spring and the earliest in fall so that he can select safe planting and harvesting dates. Table 9 gives probabilities of temperatures of 32° and 28° after stated dates in spring and before stated dates in fall. The data in table 9 are based on records at De Funiak Springs, in Walton County, which has climate similar to that of Washington County. Table 9 shows that a temperature of 32° or lower in spring will occur after March 11 in 3 years out of 10, on the average; similarly a temperature of 28° or lower will occur before November 21 in 2 years out of 10, on the average. The chance is only 1 in 10 that there will be a temperature of 28° or lower after March 13 in any year.

For any one month precipitation varies greatly from year to year. Average monthly totals show that there is a period of relatively high rainfall in about March and April and another that extends from about mid-June through mid-September. The least rainfall generally is in October and November. Summer rainfall comes mostly from short local showers and thundershowers that occur in the afternoon or evening. Each year there is an average of about 80 thundershowers, about three-fourths of these occurring in summer. In June, July, and August, measurable amounts of rain can be expected in about half the days. Summer showers are occasionally heavy; 2 or 3 inches of rain may fall in an hour or two. Rains lasting all day are rare in summer and, when they occur, are almost always associated with a tropical storm. Rains in winter and early in spring are often more widespread, more gentle, and longer lasting than those in summer. They are usually a part of general rains over a large area. Occasionally, in winter and in spring, rains last 12 to 36 hours. More than 5 inches of rain in 24 hours can be expected in March or April in about 1 year in 10; more than 8.5 inches can

TABLE 9.—*Chance of last damaging low temperature in spring and first in fall*

[Based on records from 1925 through 1961 at De Funiak Springs, Walton County]

Chance [1]	Spring temperature of—		Fall temperature of—	
	32° F. after—	28° F. after—	32° F. before—	28° F. before—
1 in 10	Mar. 26	Mar. 13	Nov. 4	Nov. 17
2 in 10	Mar. 17	Mar. 3	Nov. 10	Nov. 21
3 in 10	Mar. 11	Feb. 24	Nov. 14	Nov. 25
4 in 10	Mar. 5	Feb. 18	Nov. 18	Nov. 29
5 in 10	Feb. 28	Feb. 13	Nov. 21	Dec. 3
6 in 10	Feb. 23	Feb. 8	Nov. 25	Dec. 10
7 in 10	Feb. 18	Jan. 31	Nov. 29	Dec. 20
8 in 10	Feb. 11	Jan. 23	Dec. 3	Dec. 30
9 in 10	Feb. 2	Jan. 13	Dec. 9	Jan. 10

[1] Chance that there will be temperatures of 32° F. or lower and 28° or lower in spring after date indicated and in fall before date indicated.

be expected sometime during the year in about 1 year in 10.

Nearly all the precipitation in Washington County falls as rain. Hail falls occasionally, almost always during spring thunderstorms. Snowfall is rare, but measurable amounts have been reported several times during the last 40 years. Snow seldom remains on the ground for more than 24 hours.

Tropical storms are the main cause of widespread excessive rainfall and temporary flooding. They generally occur from June through October or early November. Since these storms rapidly diminish in intensity as they move inland, winds of hurricane force (75 miles per hour or greater) seldom blow in Washington County. However, crops and fields in Washington County may be considerably damaged by erosion, flooding, or both, when these storms do occur.

Although the distribution of rainfall through the year is generally good in Washington County, damaging droughts occasionally occur. These droughts may occur during any season, but usually they are in October and November or are late in April, in May, and early in June. Droughts are generally shorter in spring than in fall. At rainfall stations in this area less than 1 inch of rain has been recorded in about four-tenths of the Octobers and in about one-third of the Novembers. The total rainfall in October and November has been less than 2.50 inches in about one-fifth of the years for which records are available. Several times in October and November periods of 30 days without measurable rainfall have been noted.

Prevailing winds in this area are generally southerly in summer and northerly in winter. The wind speed usually ranges from 8 to 15 miles per hour during the day but nearly always drops below 8 miles per hour at night. Relative humidity measured at Tallahassee is listed in table 8 and is typical of the county.

Geology [8]

The geology of Washington County at and near the surface is complicated because several formations overlap, and the effect any one formation has had on soil development is difficult to determine. The county is located near the southern extreme of the Middle Coastal Plain where the surface breaks sharply to the Lower Coastal Plain. The entire area is underlain by Tertiary sediments. Several of the underlying strata are near enough the surface to have influenced soil formation. These strata are exposed only in small areas on slopes where overlying strata have eroded. Only a small acreage of soils has developed directly from weathering of these deposits.

Most areas are capped with a thin layer of sandy sediments that varies from a few inches to 30 feet or more in thickness. This thin layer was deposited over eroded faces of the older, Tertiary strata in Pliocene and Pleistocene times. The layer consists primarily of reworked older sediments and of fluvial materials brought in by streams. Most of the soils of the county were formed from this thin layer. Their subsoil overlies substrata of older formations that do not conform with the material of the thin deposits. Figure 24 shows the geologic formations of the county that are near or fairly near the surface and the position of most soil series.

From the oldest to the youngest, the formations under the surface of the county are Ocala limestone of the upper Eocene Age, Marianna limestone of Oligocene Age, Suwannee limestone of Oligocene Age, Tampa formation of Miocene Age, Alum Bluff group of Miocene Age, and Choctawhatchee formation of Miocene Age. Over the eroded faces of these formations, in varying thickness, are deposits of sand and sandy clay material that were laid down and reworked by shallow waters in Pliocene and Pleistocene Ages.

Figure 25 is a geologic map of the county that shows formations that are at the surface or that have been covered by Pleistocene deposits. The geologic formations along the lines AB and CD on figure 25 are shown by the cross sections in figure 26.

Although Ocala limestone is under the entire county, in most places it is too deep to have affected the formation of soils. This limestone and the Marianna limestone just above it are near the surface only in a small area in the northeastern part of the county. Because both kinds of limestone are about 95 percent pure calcium carbonate, very little soil material was left when they weathered. The soil that overlies these shallow formations developed from materials that were deposited over the limestone. These porous limestones have influenced soil formation primarily by providing good drainage.

Suwannee limestone is the oldest limestone from which soils were formed directly. It is exposed in a few small areas in the northeastern part of the county. About 10 percent of this formation consists of clay and other material that have remained in place when the soluble calcium carbonate dissolved through weathering. From this material the few areas of Oktibbeha and associated soils were formed.

The Tampa formation consists of sandy limestone, dolomite, marl, sand, silt, and clay. The percentage of sand, silt, and clay ranges from about 20 to 70 percent. This formation underlies much of the county and, in most places, is covered by a cap of Pleistocene deposits. It lies near the surface in an area of several square miles in the northeastern part of the county. Only a small area, however, is exposed, and in this area Oktibbeha and associated soils have formed.

The Alum Bluff group consists of interbedded sandy limestone, marl, sand, and sandy clay. It is stratigraphically between the Tampa formation and the Choctawhatchee formation and is exposed in a few places on steeper slopes in the central part of the county, particularly along the escarpment on the south side of Holmes Creek. Where they are exposed, the Alum Bluff materials have weathered to form Cuthbert, Shubuta, and similar soils.

The Choctawhatchee formation is the uppermost of the formations laid down before the Pliocene Age. It consists of interbedded fossiliferous gravel, limestone, shell, clay, and sand. In many parts of the county, this formation is exposed in a few places on the steeper slopes, and in these places Cuthbert, Shubuta, and similar soils have formed. The Choctawhatchee formation underlies sandy deposits in the southern part of the county.

[8] By L. O. ROWLAND, geologist, and DAVID P. POWELL, soil specialist, Soil Conservation Service.

726-719—65——8

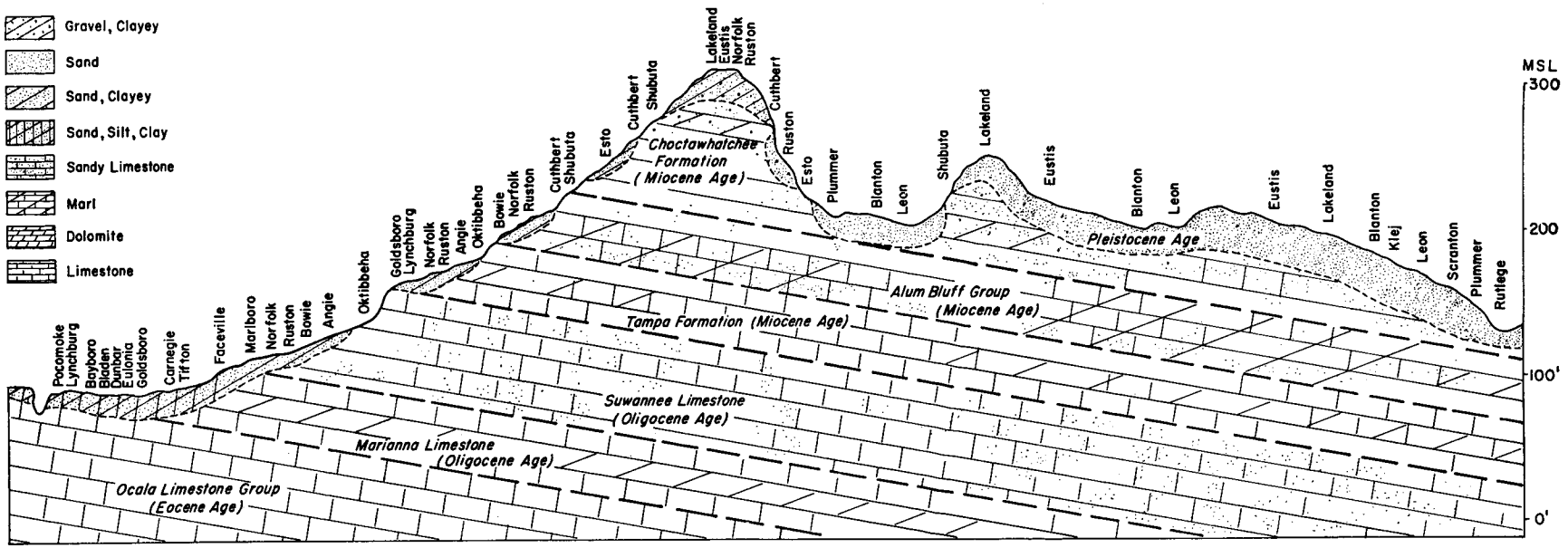

Figure 24.—**Geologic formations of Washington County and the position of most soil series.**

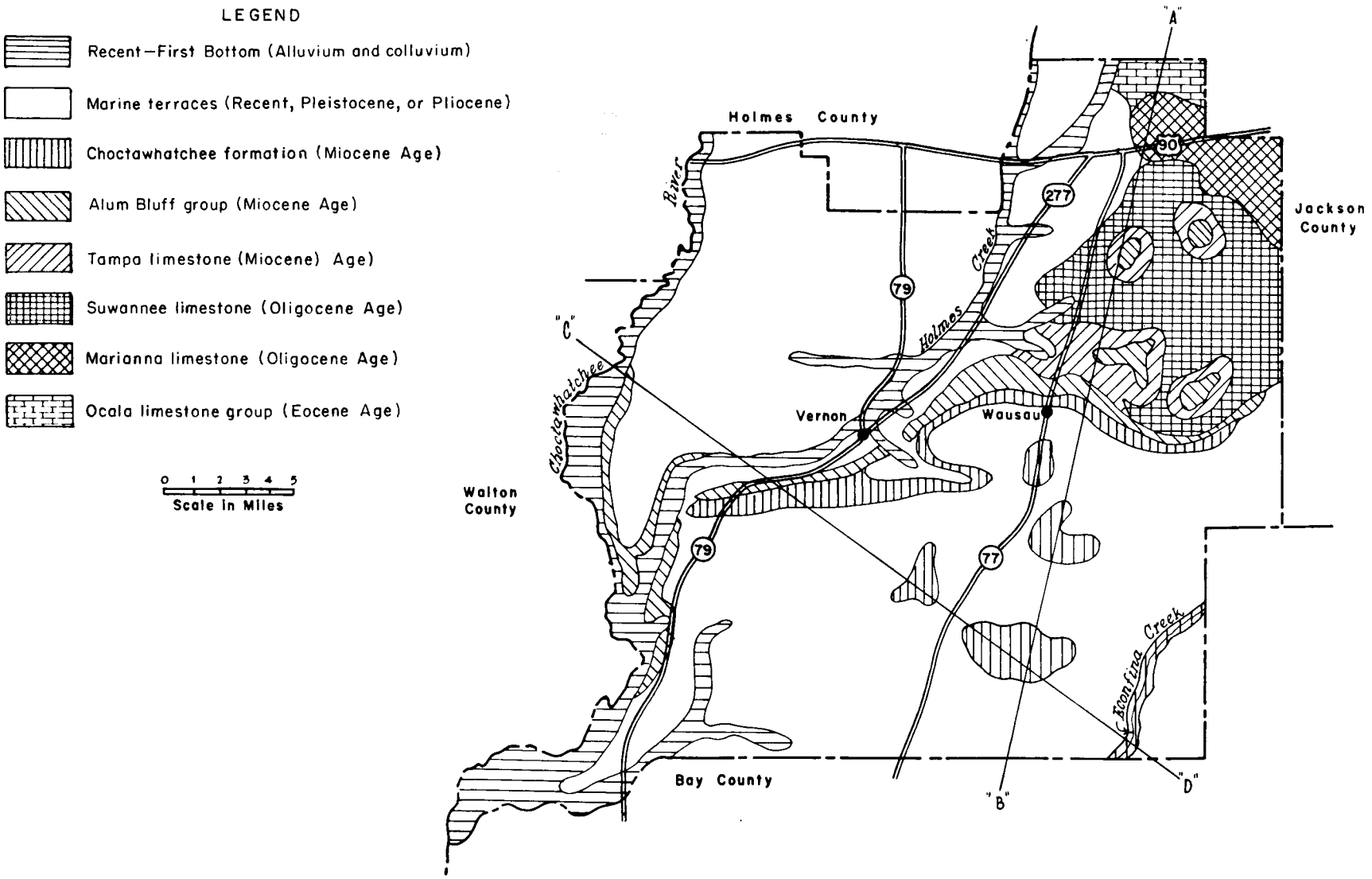

Figure 25.—Geologic map of Washington County, Fla.

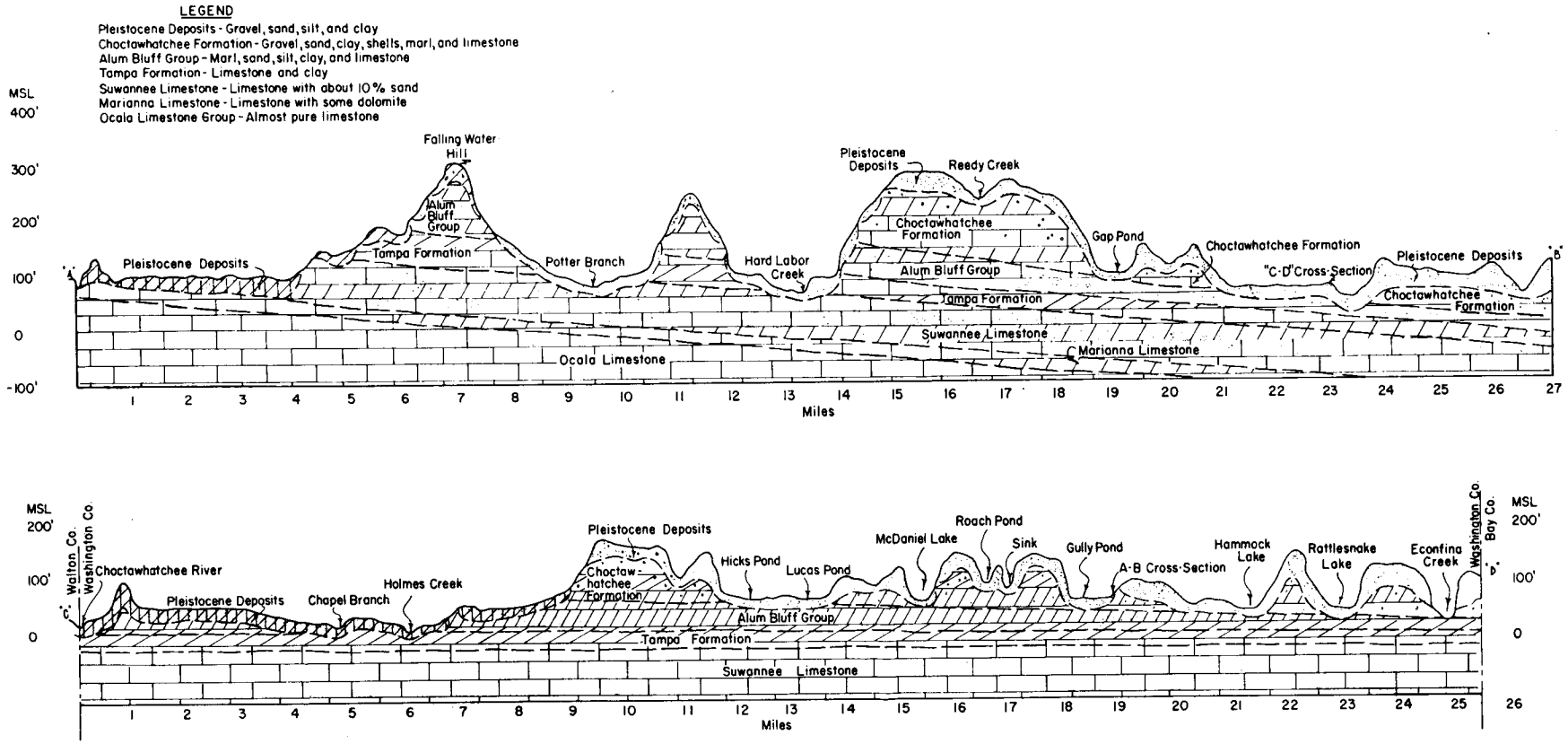

Figure 26.—**Geologic formations along lines AB and CD on figure 25.**

Where these deposits are thin, the Choctawhatchee material is a substratum of the soil that does not conform with the soil profile above it.

Most of the soils in the county formed from a mantle of sand and sandy clay material that ranges in depth from less than a foot to more than 30 feet. This mantle is made up of reworked material from the underlying Tertiary formations and from material brought in by streams and deposited as stream terraces or deltas. The material, which varies in texture, was laid down and reworked several times by the rising and falling seas of the Pleistocene Age. The nature of the deposits reflects the turbulence of the water in which they settled. Most deposits south of the Holmes Creek escarpment are very sandy because the open gulf churned the land surface and sorted the soil particles. The fine particles were removed to settle in less turbulent waters, and the sand was left. These deep sand deposits gave rise to the Lakeland, Blanton, and similar soils.

The lower part of the valley of the Choctawhatchee River and associated streams is part of an old embayment and is lower than the surrounding areas. This area is north of Hard Labor Creek and between Holmes Creek and the Choctawhatchee River. Here sediments from adjacent and upstream areas settled in an orderly manner in relatively still waters. In these sediments are strata of sandy clay, clay, sand, and silt. Patches of alluvial material well above the present flood plain lie adjacent to Holmes Creek and Choctawhatchee River. They occur at four definite levels, each bounded by scarps cut by streams. Each level represents a period of valley drowning that followed a period of valley cutting.[9] These levels correspond generally to those of coastal marine terraces and can be correlated with them. Although a few areas retain a river terrace stratigraphy, most areas show stratigraphic characteristics that are more akin to the marine terraces from which developed the Norfolk, Ruston, Goldsboro, Lynchburg, Pocomoke, and similar soils. The interrelation between river terraces and marine terraces in the valley area, however, is so intricate that precise identification is difficult. Soils known to be on marine terraces are so similar to those of questionable origin that they were not mapped separately.

History

Washington County, named for George Washington, was organized in 1829, a few years after the territorial government of Florida was formed. The county originally covered most of the central part of western Florida but was later subdivided. Among the earliest communities were Orange Hill and Vernon, the first county seat. Chipley, which was originally called Orange, was founded about 1880, when the Pensacola and Atlantic Railroad was built. It was named for Colonel W. D. Chipley, one of the organizers of the railroad. In 1927 the county seat was moved from Vernon to Chipley. Other communities in Washington County are Wausau, Caryville, Ebro, and Greenhead.

[9] ROBERT O. VERNON. GEOLOGY OF HOLMES AND WASHINGTON COUNTIES, FLORIDA. State of Fla., Dept. of Conserv. Geo. Bul. 21, 161 pp., illus. Tallahassee. 1942.

726-719—65——9

Agriculture

Agricultural and forest products are the principal sources of income in Washington County. The county is a general farming area, and the principal crops are corn, watermelons, peanuts, cotton, and small grains. A few other crops are grown. Most cultivated crops are grown in the northeastern part of the county.

Watermelons are the most important cash crop in the county. Several varieties are grown, but the most common is Charleston grey (fig. 27). According to the county agent, about 3,500 acres of watermelons were grown in 1961. Most of the melons are shipped to northern markets.

Figure 27.—**Charleston grey watermelons on Ruston loamy sand, 2 to 5 percent slopes. Class II land.**

According to the county agent, about 10,000 acres of corn and about 1,025 acres of peanuts were grown in the county in 1961. Corn is the most extensive crop grown in the county (fig. 28). Much of the harvested

Figure 28.—**Corn on Tifton loamy sand, 2 to 5 percent slopes. This field is terraced. The terraces empty into the grassed outlet at the left. Class II land.**

corn is fed to livestock on the farm. On many farms peanuts are the main cash crop (fig. 29). Most peanuts are harvested for sale off the farm, but some are fed to hogs. Mechanical harvesting is eliminated when the hogs root the peanuts in the fields.

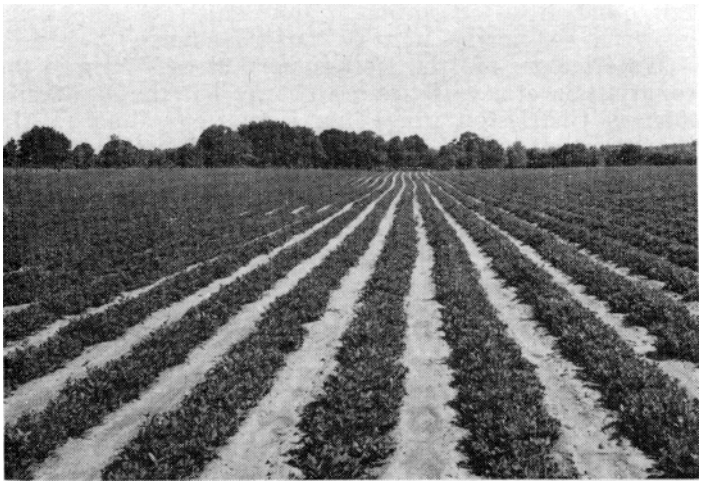

Figure 29.—**Peanuts on Bowie loamy sand, 2 to 5 percent slopes. The rows are planted across the slopes. Class II land.**

Most of the acreage in oats is grazed during winter, but much is combined for grain in the spring. According to the county agent, about 3,000 acres of oats were grown in 1961. Oats are also used for green-manure crops and cover crops.

According to the county agent, about 627 acres were planted to cotton in 1961. Although the acreage in cotton is small, it is an important cash crop on some farms.

Much of the county is in pasture (fig. 30). The Conservation Needs Inventory reports that there were about 14,184 acres of improved pasture in the county in 1959. The number of livestock in the county is increasing. According to the county agent, there were about 10,500 beef cattle in the county in 1961. About 4,500 cattle were sold, and 6,000 were kept in herds. In 1961 dairy cattle totaled about 1,500. About 12,000 hogs were raised on farms, and approximately 10,000 of these were fattened and sold.

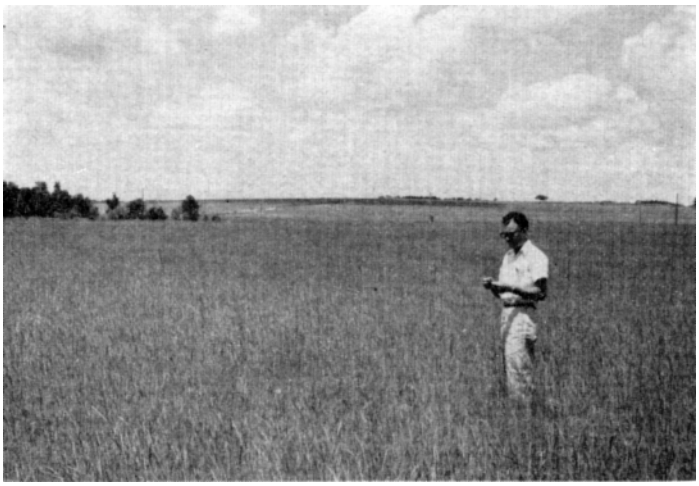

Figure 30.—**This pasture of bahiagrass has gone to seed. After the seed is harvested, the grass will be grazed by cattle.**

The Conservation Needs Inventory reports that in 1959 more than half of the county, or 306,360 acres, was woodland. Lumber, pulpwood, and naval stores supply a large part of the farm income on many farms. For the past several years there has been a general decline in the acreage planted to cultivated crops in the county. This decrease is reflected in an increase in improved pasture, idle land, and land which has been planted to pine trees (fig. 31).

Figure 31.—**These 4-year-old planted slash pines are growing well on this Lakeland sand, shallow, 0 to 5 percent slopes.**

According to the U.S. Census of Agriculture, farms in the county totaled 687 in 1959. In 1954 approximately 46.6 percent of the land in the county was in farms, but in 1959 only about 28.9 percent was in farms. Cropland accounted for 49 percent of the land in farms in 1959. In that year the average size farm was 160.6 acres. There were 579 full owners of farms, 80 part owners, 2 managers, and 26 tenants.

In 1959, there were 223 farms less than 50 acres in size, 155 ranging from 50 to 99 acres, 283 ranging from 100 to 499 acres, 13 ranging from 500 to 999 acres, and 13 more than 1,000 acres.

According to the 1959 census, farm power and mechanical equipment consisted of 502 motortrucks, 390 tractors, 17 grain combines, 32 cornpickers, 30 pickup balers, and 3 field forage harvesters.

Industries

Although Washington County is primarily agricultural, there are a few small industrial plants, the most important of which are wood using. Several sawmills and veneer mills are in Caryville, and a mill that makes wooden spools for paper rolls is in Vernon. Also in the county are small meat-packing plants, mills, and plants that make church furniture, cabinets, and concrete products.

Transportation and Markets

The Louisville and Nashville Railroad provides rail service to the county, and the Greyhound Bus Line provides bus service. Motor freight service is provided by various trucking companies.

U.S. Highway No. 90 extends across the northern part of the county. State Routes 77, 79, 277, 278, 279, 280, and 284 are all-weather roads that serve the various parts of the county. The connecting graded roads are well maintained and are generally passable the year around.

A livestock market is located at Chipley, and some agricultural products are trucked to markets outside the county. The State operates a Farmers' Market at Bonifay, in Holmes County, 9 miles west of Chipley.

Farm, Home, and Community Facilities

Homes in rural areas of Washington County range from well-built, comfortable houses on the more prosperous farms to small houses on some of the tenant farms. Electricity is available in nearly all parts of the county and is supplied by two power companies. More than 95 percent of the farms in the county have electricity. Telephone lines connect all towns in the county, and several extend into rural areas. The 1959 census reported 348 telephones on farms in the county. Mail service is countywide. Most major denominations have churches that are conveniently located in most communities throughout the county. The only local newspaper is a published weekly in Chipley, but daily newspapers are sent in from nearby cities.

The only hospital in Washington County is at Chipley, and it has 52 beds. Other health services are provided by the County Health Department.

Recreational Facilities

Many lakes and ponds throughout Washington County provide excellent boating, fishing, and water skiing and are surrounded by picnicking areas (fig. 32). Also excellent is the boating and fishing on Holmes Creek, which flows through the northwest-central part of the county, and on Choctawhatchee River. Chipley maintains a large, well-shaded park with tennis courts and playground equipment. It also has a country club and a golf course. During the summer, the county provides a supervised recreation program for the youth of the county. Small-game hunting is good. The Gulf of Mexico is easily accessible to residents of Washington County. Falling Water State Park is under development south of Chipley.

Figure 32.—**Porter Lake. The many lakes in the county provide fishing and boating and are surrounded by picnicking areas.**

Schools

The eight elementary and secondary schools in the county had an enrollment of 3,042 for the 1960–61 school year. Students are transported from outlying areas by bus to consolidated schools in the larger communities. A two-year junior college is located at Marianna, in Jackson County, 19 miles east of Chipley. Transportation is provided daily from Washington County to this college. A private school for religious training is located at Graceville, in Jackson County, 12 miles north of Chipley.

Glossary

Acidity, soil. See Reaction.

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

Aggregate, soil. Many fine particles held in a single mass or cluster, such as a clod, crumb, block, or prism.

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.

Concretions. Hard grains, pellets, or nodules that are of various sizes, shapes, and colors and that consist of soil grains cemented together by concentrations of compounds. Some concretions differ in composition from that of the surrounding soil. Calcium carbonate and iron oxide are examples of material commonly found in concretions.

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

Loose. Noncoherent; soil does not hold together in a mass.

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

Firm. When moist, soil crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic. When wet, soil is readily deformed by moderate pressure but can be pressed into a lump; forms a wire if rolled between thumb and forefinger.

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

Hard. When dry, soil moderately resists pressure but can be broken between thumb and forefinger.

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

Cemented. Soil is hard, brittle, and little affected by moistening.

Contour tillage. Plowing or working the soil at right angles to the direction of the slope and at the same level throughout.

Drainage. Conditions of drainage that existed during 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, as natural deepening of channels or filling of depressions and thus blocking drainage outlets. The following terms are used to express natural drainage:

Excessively drained. Water is removed from the soil very rapidly.

Somewhat excessively drained. Water is removed from the soil rapidly.

Well drained. Water is removed readily but not rapidly. A well-drained soil has good drainage.

Moderately well drained. Water is removed from the soil somewhat slowly so that the profile is wet for a small but significant part of the time.

Somewhat poorly drained. Water is removed from the soil slowly enough to keep it wet for significant periods but not all the time.

Poorly drained. Water is removed so slowly that the soil remains wet much of the time. Commonly the water table is at or near the surface.

Very poorly drained. Water is removed from the soil so slowly that the water table remains at or on the surface most of the time. Soils of this class are frequently ponded.

Erosion. The wearing away of the land surface by wind, running water, and other geological agents.

Fertility, soil. The quality of a soil that enables it to provide compounds, in adequate amounts and in proper balance, for the growth of specified plants, when other growth factors, such as light, moisture, temperature, and the physical condition (tilth) of the soil, are favorable.

First bottom. 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 with yellow and gray mottling that is caused by intermittent waterlogging.

Green-manure crop. A crop grown for the purpose of improving the soil by adding organic matter when the crop is turned under at an early stage of maturity or soon after maturity.

Horizon, soil. A layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil-forming processes.

A horizon. The master horizon consisting of (1) one or more mineral horizons of maximum organic accumulation; or (2) surface or subsurface horizons that are lighter in color than the underlying horizon and that contain a high concentration of the more resistant minerals because much of the clay minerals, iron, and aluminum has been lost; or (3) horizons belonging to both of these categories. This horizon may be divided into two or more subhorizons, of which the A0 is not a part of the mineral soil but is an accumulation of organic debris on the surface. Other subhorizons are designated A1, A2, and so on.

B horizon. The master horizon of altered material characterized by (1) an accumulation of clay, iron, or aluminum, and accessory organic material; or (2) blocky or prismatic structure together with other characteristics, such as stronger colors, unlike those of the A horizons or the underlying horizons of nearly unchanged material; or (3) characteristics of both these categories. Commonly, the lower limit of the B horizon corresponds to the lower limit of the solum. This horizon may be divided into several subhorizons, depending on the color, structure, consistence, or other characteristics. These layers are designated B1, B2, B3, and so on. See Subsoil.

C horizon. A layer of unconsolidated material that has been little affected by the influence of organisms. It is presumed to be similar in chemical, physical, and mineralogical composition to the material from which at least a part of the overlying solum has developed.

IIB horizon. A second B horizon, which formed in material that contrasts with the material in the layers above.

R horizon. Underlying consolidated bedrock, such as granite, sandstone, and limestone.

Infiltration. The downward movement of water into the soil.

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.*

Leaching. The removal of soluble materials from soils or other material by percolating water.

Mottled. Irregularly marked with spots of different colors that vary in number and size. Mottling in soils usually indicates poor aeration and lack of drainage. Descriptive terms are as follows: Abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent.* The size measurements are these: *Fine,* less than 5 millimeters (about 0.2 inch) in diameter along the greatest dimension; *medium,* ranging from 5 to 15 millimeters (about 0.2 to 0.6 inch) in diameter along the greatest dimension; and *coarse,* more than 15 millimeters (about 0.6 inch) in diameter along the greatest dimension.

Nutrient, plant. Any element that is taken in by a plant, is essential to its growth, and is used by the plant in producing food and tissue. Important plant nutrients obtained from the soil are nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, zinc, and perhaps others. Those obtained largely from the air and water are carbon, hydrogen, and oxygen.

Permeability, soil. The quality of a soil horizon that enables water or air to move through it. Terms used to describe permeability are as follows: *Very slow, slow, moderately slow, moderate, moderately rapid, rapid,* and *very rapid.*

Profile, soil. A vertical section of the soil through all its horizons and extending into the parent material. See Horizon, soil.

Reaction, soil. The degree of acidity or alkalinity of a soil expressed in pH values. A soil that tests to pH 7.0 is precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed in words thus:

	pH		*pH*
Extremely acid	Below 4.5	Mildly alkaline	7.4 to 7.8
Very strongly acid	4.5 to 5.0	Moderately alkaline	7.9 to 8.4
Strongly acid	5.1 to 5.5	Strongly alkaline	8.5 to 9.0
Medium acid	5.6 to 6.0	Very strongly alkaline	9.1 and higher
Slightly acid	6.1 to 6.5		
Neutral	6.6 to 7.3		

Relief. Elevations or inequalities of the land surface, considered collectively.

Sand. As a soil separate, the mineral soil particles ranging from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz, but they may be of any mineral composition. As a soil textural class, soil material that is 85 percent or more sand and not more than 10 percent clay.

Sheet erosion. The removal of a fairly uniform layer of soil or material from the land surface by the action of rainfall and runoff water.

Silt. As a soil separate, the mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil material that is 80 percent or more silt and less than 12 percent clay.

Single-grain soil. A structureless soil in which each particle exists separately.

Slope, soil. An incline of the surface of a soil, such as that on a hillside or a terrace. Slope is expressed in percent, which equals the vertical distance, divided by the horizontal distance, times 100. Percent of slope is the number of feet of fall per 100 feet of horizontal distance.

Soil. A natural, three-dimensional body on the earth's surface that supports plants and that has properties resulting from the integrated effect of climate and living matter acting upon parent material, as conditioned by relief, over periods of time.

Soil phase. A subdivision of a soil type, series, or other unit in the soil classification system made because of differences in the soil that affect its management but do not affect its classification in the natural landscape. A soil type, for example, may be divided into phases because of differences in slope, stoniness, thickness, or some other characteristic that affects management.

Soil series. A group of soils developed from a particular kind of parent material and having genetic horizons that, except for texture of the surface layer, are similar in differentiating characteristics and in arrangement in the profile.

Soil type. A subdivision of the soil series that is made on the basis of differences in texture of the surface soil.

Solum. The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum in mature soil includes the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying parent material. The living roots and other plant and animal life characteristics of the soil are largely confined to the solum.

Stratified. Composed of, or arranged in, strata or layers, such as stratified alluvium. The term is confined to geological material. Layers in soils that result from the processes of soil formation are called horizons; those inherited from the parent material are called strata.

Structure, soil. The arrangement of primary soil particles into compound particles, or clusters, that are separated from adjoining aggregates and have properties unlike those of an equal mass of unaggregated primary soil particles. The principal forms of soil structure are *platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are (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. In many soils, the B horizon; roughly, the part of the profile below plow depth.

Substratum. Any layer beneath the solum or true soil; the C or D horizon.

Surface layer. A term used in nontechnical soil descriptions for one or more upper layers of soil; includes the A horizon and, in some areas, part of the B horizon; has no depth limit.

Surface runoff. Amount of water removed by flow over the surface of the soil. The amount and rapidity of runoff are affected by texture, structure, and porosity of the surface soil; the plant cover; the prevailing climate; and the slope of the soil. Terms used to express relative degrees of runoff are *very rapid, rapid, medium, slow, very slow,* and *ponded.*

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, about 5 to 8 inches in thickness. The plowed layer.

Terrace, marine. A level or nearly level plain once covered by the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil (see also Clay, Sand, and Silt). The basic textural classes, in order of increasing proportion of fine particles, are as follows: *Sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay.* The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Topsoil. A presumed fertile soil or soil material, ordinarily rich in organic matter, used to topdress roadbanks, lawns, and gardens.

Upland (geologic). Land consisting of material unworked by water in recent geologic time and lying, in general, at a higher elevation than the alluvial plain or stream terrace. Land above the lowlands along the rivers.

Water table. The upper limit of the soil or underlying rock material that is wholly saturated with water. In some places an upper, or perched, water table may be separated from a lower one by a dry zone.

NRCS Accessibility Statement

This document is not accessible by screen-reader software. The Natural Resources Conservation Service (NRCS) is committed to making its information accessible to all of its customers and employees. If you are experiencing accessibility issues and need assistance, please contact our Helpdesk by phone at 1-800-457-3642 or by e-mail at ServiceDesk-FTC@ftc.usda.gov. For assistance with publications that include maps, graphs, or similar forms of information, you may also wish to contact our State or local office. You can locate the correct office and phone number at http://offices.sc.egov.usda.gov/locator/app.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.