SOIL SURVEY OF

Miller and Seminole Counties, Georgia

United States Department of Agriculture
Soil Conservation Service
In cooperation with
University of Georgia, College of Agriculture
Agricultural Experiment Stations

This is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and agencies of the States, usually the Agricultural Experiment Stations. In some surveys, other Federal and local agencies also contribute. The Soil Conservation Service has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in the period 1966-70. Soil names and descriptions were approved in 1971. Unless otherwise indicated, statements in the publication refer to conditions in the counties in 1971. This survey was made cooperatively by the Soil Conservation Service and the University of Georgia, College of Agriculture, Agricultural Experiment Stations. It is part of the technical assistance furnished to the Flint River Soil and Water Conservation District.

HOW TO USE THIS SOIL SURVEY

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

Locating Soils

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

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

Finding and Using Information

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

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

Farmers and those who work with farmers can learn about use and management of the soils from the soil descriptions and from the information in the section "Use and Management of the Soils for Crops and Pasture."

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

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

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

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

Scientists and others can read about how the soils formed and how they are classified in the section "Formation and Classification of the Soils."

Newcomers in Miller and Seminole Counties may be especially interested in the section "General Soil Map," where broad patterns of soils are described. They may also be interested in the information about the counties given in the section "Additional Facts About the Counties."

Cover: Bahiagrass pasture on Grady soils that have been drained.

Contents

	Page
How this survey was made	1
General soil map	2
1. Tifton-Norfolk-Grady association	2
2. Wagram-Troup association	3
3. Lucy-Orangeburg association	4
4. Meggett-Grady association	4
5. Goldsboro-Irvington-Grady association	4
6. Angie-Riverview-Congaree association	5
Descriptions of the soils	5
Angie series	6
Congaree series	7
Esto series	7
Goldsboro series	8
Grady series	9
Irvington series	10
Lucy series	10
Meggett series	11
Norfolk series	12
Ocilla series	13
Orangeburg series	14
Pelham series	15
Riverview series	16
Tifton series	16
Troup series	18
Wagram series	20
Use and management of the soils for crops and pasture	20
General management	20
Capability grouping	22
Estimated yields	23
Use of the soils for woodland	23
Use of the soils for wildlife habitat	26
Engineering uses of the soils	28
Engineering soil classification systems	28
Soil test data	28
Soil properties significant to engineering	29
Engineering interpretations of soils	29
Soils for recreational development	39
Formation and classification of the soils	39
Formation of soils	39
Parent material	39
Climate	40
Relief	40
Plants and animals	40
Time	40
Classification of the soils	40
Additional facts about the counties	41
Physiography, relief, and drainage	41
Water supply	41
Climate	42
Literature cited	43
Glossary	43
Guide to mapping units Following	44

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SOIL SURVEY OF MILLER AND SEMINOLE COUNTIES, GEORGIA

BY ROYCE G. MIDDLETON AND ERNEST H. SMITH, SOIL CONSERVATION SERVICE

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

MILLER AND SEMINOLE COUNTIES are in the southwestern part of Georgia (fig. *1*). They have a total area of about 533 square miles, or 340,864 acres. Miller County has a total area of 183,680 acres, and Seminole County 157,184 acres.

All of the survey area is in the Southern Coastal Plain Major Land Resource Area. Most of the area is made up of broad, level to gently sloping uplands. The flood plains along the rivers and larger creeks are level or nearly level.

Most of the soils are only slightly eroded. The surface layer is mainly sandy but, in some places, is loamy. Many of the soils have a yellowish or brownish loamy subsoil that is moderately permeable.

Most soils in the two counties are well suited to many kinds of crops. The climate is favorable. Summers generally are warm, and winters are only moderately cold. Precipitation normally is ample for most crops and is well distributed throughout the year. Excellent sources of water are available for industry, home, and farm.

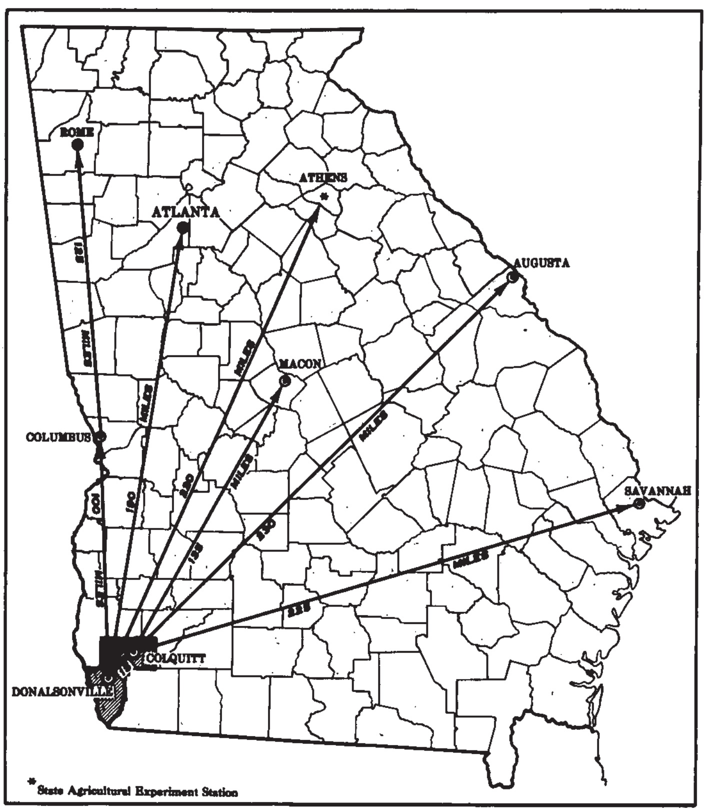

***Figure 1.*—Location of Miller and Seminole Counties in Georgia.**

How This Survey Was Made

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

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

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, all the soils of one series have major horizons that are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Tifton and Norfolk, for example, are the names of two soil series. All the soils in the United States having the same series are essentially alike in those characteristics that affect their behavior in the undisturbed landscape.

Soils of one series can differ in texture of the surface layer and in slope, stoniness, or some other characteristic that affects use of the soils by man. On the basis of such differences, a soil series is divided into phases. The name of a soil phase indicates a feature that affects management. For example, Tifton sandy loam, 2 to 5 percent slopes, is one of several phases within the Tifton series.

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

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

Some mapping units are made up of soils of different series, or of different phases within one series. One such kind of mapping unit is shown on the soil map of Miller and Seminole Counties: the undifferentiated group.

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

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

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

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

General Soil Map

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

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

The soil associations in Miller and Seminole Counties are discussed in the following pages.

1. Tifton-Norfolk-Grady association

Nearly level and very gently sloping, well-drained to very poorly drained loamy or sandy soils that have a brownish or grayish loamy or clayey subsoil

This association is mainly on broad, nearly level to very gently sloping uplands, but a small part is along drainageways and in upland depressions. Slopes are mainly 0 to 5 percent.

This association makes up about 55 percent of the two counties and is about evenly distributed over Miller and Seminole Counties. Tifton soils make up about 50 percent of the association, Norfolk soils about 20 percent, Grady soils about 12 percent, and minor soils the remaining 18 percent.

The Tifton soils are well drained and are on smooth, higher parts of the landscape. Typically, the surface layer is dark grayish-brown sandy loam about 7 inches thick. The subsoil, extending to a depth of 62 inches, is yellowish-brown sandy clay loam that has strong-brown, brownish-yellow, and red mottles in the lower part. Soft plinthite is in the lower part of the subsoil.

The Norfolk soils are well drained and are on level to very gently sloping uplands. Typically, the surface layer is dark grayish-brown loamy sand about 7 inches thick. The subsoil, extending to a depth of 62 inches, is yellowish-brown sandy loam or sandy clay loam that has strong-brown, pale-brown, and yellowish-red mottles in the lower part. A few small concretions of iron are in the upper part of the profile.

The Grady soils are very poorly drained and are in depressions. Typically, the surface layer is very dark gray sandy loam about 5 inches thick. The upper 6 inches of the subsoil is grayish-brown sandy clay loam. Below this, and extending to a depth of 62 inches, is gray clay that has yellowish-brown and yellowish-red mottles.

Minor soils in this association are the Wagram, Goldsboro, and Irvington soils. The Wagram soils have a sandy surface layer that is 21 to 37 inches thick. The moderately well drained Goldsboro and Irvington soils are in areas slightly lower in elevation than the Norfolk and Tifton soils.

This association is well suited to cultivated crops and pasture, and a significant acreage is cultivated. The main crops are corn, peanuts, cotton, and small grain. Crops grown on these soils respond well to good management. A considerable acreage is pastured and is suited to bahiagrass and bermudagrass.

Farms in this association average about 250 acres in size and are of the general type.

The major part of this association has slight limitations for most nonfarm uses in community development, such as light industry, dwellings, septic tank absorption fields, sewage lagoons, sanitary landfills, local roads and streets, picnic areas, campsites, and playgrounds, but the Grady soils have severe limitations for these uses because of wetness.

2. *Wagram-Troup association*

Nearly level and very gently sloping, well-drained sandy soils that have a brownish or yellowish loamy subsoil

This association is mainly on broad, nearly level to very gently sloping landscapes that have few natural drainageways. Most of the association is in the southeastern part of Miller County and the eastern part of Seminole County. Slopes are mainly 0 to 5 percent.

This association makes up about 20 percent of the two counties. Wagram soils make up about 48 percent of the association, Troup soils about 35 percent, and minor soils the remaining 17 percent.

The Wagram soils are well drained. Typically, the surface layer is dark grayish-brown loamy sand about 5 inches thick. It is underlain by light yellowish-brown loamy sand that extends to a depth of 23 inches. Below this, and extending to a depth of 62 inches, is yellowish-brown to brownish-yellow sandy loam or sandy clay loam.

The Troup soils are also well drained. Typically, the surface layer is very dark grayish-brown sand about 4 inches thick (fig. 2). It is underlain by yellowish-brown and light yellowish-brown sand that extends to a depth of about 57 inches. Below this, and extending to a depth of 78 inches, is yellowish-brown sandy loam or sandy clay loam that has a few strong-brown mottles in the lower part.

Minor soils in this association are the Grady, Ocilla, and Norfolk soils. The Grady and Ocilla soils are in areas slightly lower in elevation than the Wagram and Troup soils. The Norfolk soils are well drained and have more fine material in the upper part of the profile than the major soils.

Less than half of this association is cultivated or pastured; about 60 percent of it is woodland. The soils are suited to most crops grown locally, but the response to management is only fairly good because the soils are droughty. The main crops are peanuts, corn, and small grain. A considerable acreage is pastured and is suited to bahiagrass and bermudagrass.

Farms in this association average about 400 acres in size and are of the general type.

The major part of this association has slight to moderate limitations for most nonfarm uses associated with community development, such as light industry, dwellings, septic tank absorption fields, sanitary landfills, and local roads and streets. Limitations are moderate to severe, however, for picnic areas, campsites, and playgrounds.

***Figure 2.*—Typical vegetation of scrub oak and scattered pine on Troup sand, 0 to 5 percent slopes.**

3. *Lucy-Orangeburg association*

Nearly level to gently sloping, well-drained sandy soils that have a reddish loamy subsoil

This association is mainly on broad, nearly level ridgetops that gently slope to drainageways or depressions. Slopes are mainly 0 to 5 percent, but some are as much as 8 percent.

This association makes up about 6 percent of the two counties. Lucy soils make up about 68 percent of the association, Orangeburg soils about 25 percent, and minor soils the remaining 7 percent.

The Lucy soils are mainly on smooth parts of the association. Typically, the surface layer is very dark grayish-brown loamy sand about 7 inches thick. It is underlain by brown to dark-brown loamy sand that extends to a depth of about 31 inches. The subsoil, extending to a depth of 65 inches, is red to yellowish-red sandy loam or sandy clay loam.

The Orangeburg soils are on nearly level to gently sloping uplands. Slopes are 0 to 8 percent. Typically, the surface layer is brown loamy sand about 5 inches thick. The subsoil, extending to a depth of 63 inches, is red or yellowish-red sandy clay loam and sandy loam.

Minor soils in this association are the well-drained Norfolk, Wagram, and Troup soils and the somewhat poorly drained Ocilla soils.

This association is suited to cultivated crops and pasture, and plants respond well to good management. A significant acreage is cultivated. Corn, peanuts, cotton, and small grain are the chief crops. A considerable acreage is in bahiagrass or bermudagrass pasture. The soils are less droughty and better suited to general farming than those of the Wagram-Troup association.

Farms in this association average about 400 acres. Most farming is of the general type, and some livestock, both beef cattle and hogs, are raised on most farms.

The major part of this association has slight limitations for most nonfarm uses in community development, such as light industry, dwellings, septic tank absorption fields, sanitary landfills, and local roads and streets; but it has slight to moderate limitations for picnic areas, campsites, and playgrounds.

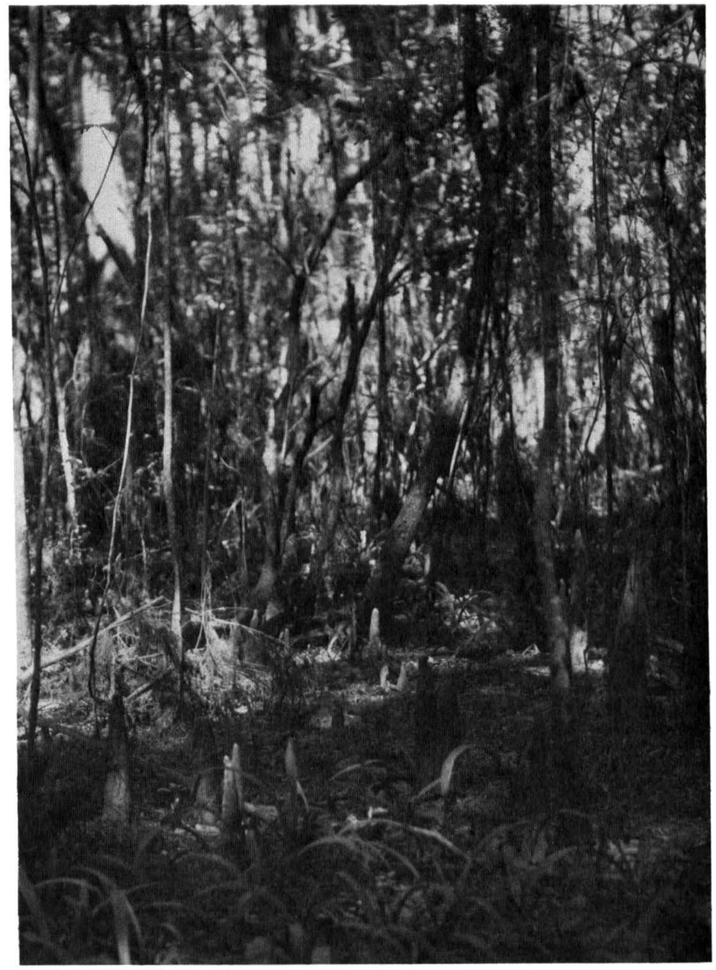

***Figure 3.*—Typical vegetation of gum, cypress, water oak, yellow-poplar, and ash on Meggett soils along the flood plain of Spring Creek.**

4. *Meggett-Grady association*

Nearly level, poorly drained and very poorly drained loamy soils that have a grayish clayey subsoil

This association is mainly in long, narrow areas along creeks and in upland depressions. Most of the association is flooded at times. Slopes are less than 1 percent.

This association makes up about 6 percent of the two counties. Meggett soils make up about 41 percent of the association, Grady soils about 40 percent, and minor soils the remaining 19 percent.

The Meggett soils are poorly drained and are on the flood plains along the creeks (fig. 3). Typically, the surface layer is very dark gray loam about 7 inches thick. The upper 4 inches of the subsoil is dark-gray clay. Below this, and extending to a depth of 62 inches, is gray clay and sandy clay. Beginning at a depth of about 28 inches, the subsoil has distinct, yellowish-brown mottles. Medium-sized and large concretions of iron and manganese are common at a depth of about 60 inches.

The Grady soils are very poorly drained and are in upland depressions. Typically, the surface layer is very dark gray sandy loam about 5 inches thick. The upper 6 inches of the subsoil is grayish-brown sandy clay loam. Below this, and extending to a depth of 62 inches, is gray clay that has yellowish-brown and yellowish-red mottles.

Minor soils in this association are the Goldsboro and Irvington soils. They are moderately well drained and are in areas slightly higher in elevation than the Meggett and Grady soils.

A large part of this association is in its natural vegetation of mixed hardwoods. Some pine trees are in the slightly better drained areas, and blackgum and cypress are in the wetter areas.

The farms in this association average about 350 acres in size and are of the general type.

Because of wetness and flooding, the major parts of this association have severe limitations for most nonfarm uses in community development, such as light industry, dwellings, septic tank absorption fields, sewage lagoons, sanitary landfills, picnic areas, campsites, and playgrounds.

5. *Goldsboro-Irvington-Grady association*

Nearly level, moderately well drained and very poorly drained loamy soils that have a brownish, yellowish, or grayish loamy or clayey subsoil

This association is mainly on broad flats that have slopes of less than 1 percent and in slightly depressed areas. The association is mainly in the western part of Miller County and the north-central part of Seminole County.

This association makes up about 11 percent of the two counties. Goldsboro soils make up about 58 percent of the association, Irvington soils about 14 percent, Grady soils about 13 percent, and minor soils the remaining 15 percent.

The Goldsboro soils are moderately well drained and are in low, flat areas. Typically, the surface layer is very dark gray sandy loam about 5 inches thick. The next 4 inches is grayish-brown sandy loam. Beneath this, and extending to a depth of 65 inches, is brownish-yellow or light yellowish-brown sandy clay loam that has strong-brown and yellowish-brown mottles. Light-gray mottles begin at a depth of about 24 inches.

The Irvington soils are moderately well drained and are in low, flat areas. Typically, the surface layer is dark grayish-brown sandy loam about 7 inches thick. Many small concretions of iron are on the surface. The subsoil, to a depth of 29 inches, is yellowish-brown sandy clay loam that has strong-brown and light-gray mottles in the lower part. A fragipan begins at a depth of about 29 inches and is about 15 inches thick. It is yellowish brown and has light-gray, strong-brown, and red mottles. The fragipan is 15 percent soft plinthite. Beneath the fragipan, and extending to a depth of about 62 inches, is light-gray, brownish-yellow, and red sandy clay loam.

The Grady soils are very poorly drained and are in upland depressions. Typically, the surface layer is very dark gray sandy loam about 5 inches thick. The upper 6 inches of the subsoil is grayish-brown sandy clay loam. Below this, and extending to a depth of 62 inches, is gray clay that has distinct, yellowish-brown and yellowish-red mottles.

Minor soils in this association are the Ocilla, Norfolk, and Tifton soils. The Ocilla soils are somewhat poorly drained and are in areas slightly lower in elevation than the well-drained Norfolk and Tifton soils.

About 20 percent of the acreage in this association is cultivated or pastured; the rest is wooded. If the Goldsboro and Irvington soils are adequately drained, they are suited to most locally grown crops. The main crops are corn, peanuts, and small grain. Crops grown on these soils respond well to good management. These soils are also well suited to pine trees and pasture grasses. The wet Grady soils are not suitable for cultivation, but if they are adequately drained, they can be used for pasture.

Farms in this association average about 300 acres in size and are of the general type.

The major part of this association has moderate to severe limitations for most nonfarm uses in community development, such as light industry, dwellings, septic tank absorption fields, sewage lagoons, sanitary landfills, and local roads and streets. This association generally has slight limitations for picnic areas, campsites, and playgrounds, but the Grady soils have severe limitations for these uses because of wetness.

6. *Angie-Riverview-Congaree association*

Nearly level, moderately well drained and well drained loamy soils that have mainly a brownish or grayish loamy or clayey subsoil or underlying layers

This association is in long, fairly broad, nearly level areas along the Chattahoochee River and on the islands in Lake Seminole. Slopes are mainly 0 to 2 percent.

This association makes up about 2 percent of the two counties, and all of it is in Seminole County. Angie soils make up about 45 percent of the association, Riverview soils about 20 percent, Congaree soils about 13 percent, and minor soils the remaining 22 percent.

The Angie soils are moderately well drained and are on the smooth, higher parts of the landscape. Typically, the surface layer is very dark grayish-brown fine sandy loam about 4 inches thick. Below this is 3 inches of light brownish-gray fine sandy loam. The upper 15 inches of the subsoil is yellowish-brown silty clay loam that has red mottles. Between depths of 22 and 57 inches, the subsoil is yellowish-brown, red, and light-gray silty clay that has prominent mottles. Below this, and extending to a depth of 65 inches, is light-gray silty clay loam that has yellowish-brown mottles.

The Riverview soils are well drained and are along the larger streams on the lower part of the landscape. These soils are occasionally flooded. Typically, the surface layer is dark-brown loam about 6 inches thick. Below this, and extending to a depth of 62 inches, is yellowish-red sandy clay loam. Small pockets of sandy loam are common in the upper 46 inches of these soils.

The Congaree soils are well drained and are along the larger streams on the lower part of the landscape. These soils are occasionally flooded. Typically, the surface layer is dark-brown loam about 5 inches thick. Beneath this is about 33 inches of brown loam. Below this, and extending to a depth of 65 inches, is brown or dark-brown very fine sandy loam or fine sandy loam.

Minor soils in this association are the Orangeburg and Lucy soils. These soils are well drained and have more sand throughout the profile than the Congaree, Riverview, and Angie soils. They are also on slightly higher parts of the landscape.

A large part of this association is in its native vegetation of mixed hardwoods. Some pine trees are in the areas of Angie soils. About 35 percent of the acreage is cultivated or pastured. This association is well suited to pasture; the Riverview and Congaree soils are also well suited to cultivation, and plants respond well to good management. Corn, small grain, and grain sorghum are the chief crops.

A large part of this association bordering on Lake Seminole is owned by the Federal Government. The rest is mostly privately owned. Farms in this association average about 1,500 acres in size and are of the general type.

The major part of this association has severe or moderate limitations for most nonfarm uses in community development, such as light industry, dwellings, septic tank absorption fields, sewage lagoons, sanitary landfills, and local roads and streets. Limitations are moderate for picnic areas, campsites, and playgrounds.

Descriptions of the Soils[1]

This section describes the soil series and mapping units in Miller and Seminole Counties. Each soil series is described in detail, and then, briefly, each mapping unit in that series. Unless it is specifically mentioned otherwise, it is to be assumed that what is stated about the soil series holds true for the mapping units in that series. Thus, to get full informa-

[1] J. N. NASH, conservation agronomist, Soil Conservation Service, supplied information concerning management of the soils for crops and pasture.

tion about any one mapping unit, it is necessary to read both the description of the mapping unit and the description of the soil series to which it belongs.

An important part of the description of each soil series is the soil profile, that is, the sequence of layers extending from the surface downward to rock or other underlying material. Each series contains twc descriptions of this profile. The first is brief and in terms familiar to the layman. The second is much more detailed and is for those who need to make thorough and precise studies of soils. The profile described in the series is representative for mapping units in that series. If the profile of a given mapping unit is different from the one described for the series, these differences are stated in describing the mapping unit, or they are differences that are apparent in the name of the mapping unit.

Descriptions, names, and delineations of soils in this soil survey do not fully agree with those of the soil maps in nearby counties published at different dates. Differences are the result of better knowledge of soils, modifications in series concepts, intensity of mapping, and the extent of soils in the survey area.

Following the name of each mapping unit is a symbol in parentheses. This symbol identifies the mapping unit on the detailed soil map. Listed at the end of each description of a mapping unit is the capability unit and woodland suitability group in which the mapping unit has been placed. An explanation of the capability classification system is given in the section "Capability Grouping." A discussion of woodland suitability groups is given in the section "Use of the Soils for Woodland." The "Guide to Mapping Units" at the back of this survey shows the capability unit and woodland suitability group for each soil in the survey area.

The acreage and proportionate extent of each mapping unit are shown in table 1. Many of the terms used in describing soils can be found in the Glossary, and more detailed information about the terminology and methods of soil mapping can be obtained from the Soil Survey Manual (*6*).[2]

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

Soil	Miller County	Seminole County	Total	
	Acres	*Acres*	*Acres*	*Percent*
Angie fine sandy loam	----------	4,085	4,085	1.2
Esto loamy sand, 2 to 5 percent slopes	295	585	880	.2
Esto loamy sand, 5 to 17 percent slopes	195	955	1,150	.3
Goldsboro sandy loam, 0 to 2 percent slopes	23,135	9,490	32,625	9.7
Grady soils	26,125	14,415	40,540	11.9
Irvington sandy loam	3,760	2,315	6,075	1.8
Lucy loamy sand, 0 to 5 percent slopes	6,080	12,165	18,245	5.4
Meggett soils	7,850	655	8,505	2.5
Norfolk loamy sand, 0 to 2 percent slopes	21,070	6,580	27,650	8.1
Norfolk loamy sand, 2 to 5 percent slopes	5,980	7,945	13,925	4.1
Ocilla loamy sand	5,260	6,045	11,305	3.3
Orangeburg loamy sand, 0 to 2 percent slopes	110	1,580	1,690	.5
Orangeburg loamy sand, 2 to 5 percent slopes	2,405	2,680	5,085	1.5
Orangeburg loamy sand, 5 to 8 percent slopes, eroded	145	365	510	.1
Pelham sand	1,310	195	1,505	.4
Riverview and Congaree soils	----------	2,670	2,670	.8
Tifton sandy loam, 0 to 2 percent slopes	27,230	22,185	49,415	14.5
Tifton sandy loam, 2 to 5 percent slopes	23,640	23,865	47,505	13.9
Troup sand, 0 to 5 percent slopes	8,275	19,814	28,089	8.2
Troup sand, 5 to 8 percent slopes	485	820	1,305	.4
Wagram loamy sand, 0 to 5 percent slopes	20,330	17,775	38,105	11.2
Total	183,680	157,184	340,864	100.0

Angie Series

The Angie series consists of moderately well drained soils that have a clayey subsoil and are on stream terraces. Some areas are subject to occasional flooding. These soils formed in clayey alluvium that washed mostly from the Coastal Plain but partly from the Piedmont Plateau. The Angie soils are in Seminole County mainly along the Chattahoochee River and on the islands in Lake Seminole.

In a representative profile, the surface layer is very dark grayish-brown fine sandy loam about 4 inches thick. Beneath this is 3 inches of light brownish-gray fine sandy loam. The subsoil extends to a depth of 57 inches. The upper 15 inches of the subsoil is yellowish-brown silty clay loam that has red mottles, and the lower part is yellowish-brown, red, and light-gray silty clay that has prominent mottles. Below this, and extending to a depth of 65 inches, is light-gray silty clay loam that has yellowish-brown mottles.

These soils are low to moderate in natural fertility and contain only a small amount of organic matter. Permeability is slow, and available water capacity is medium to high. Tilth generally is poor, and the rooting zone is moderately deep. These soils are strongly acid to very strongly acid throughout.

Because of slow permeability and poor tilth, Angie soils are not well suited to cultivated crops. Most of the acreage is woodland, but some is used for cultivated crops and pasture. The native vegetation consists chiefly of mixed pines and hardwoods.

Representative profile of Angie fine sandy loam in a wooded area five-eighths mile east of the Chattahoochee River and 2⅝ miles south of the Early County line, Seminole

[2] Italic numbers in parentheses refer to Literature Cited, p. 43.

County:

A1—0 to 4 inches, very dark grayish-brown (10YR 3/2) fine sandy loam; weak, medium, granular structure; friable; many fine and medium roots; strongly acid; clear, smooth boundary.

A2—4 to 7 inches, light brownish-gray (2.5Y 6/2) fine sandy loam; weak, fine, granular structure; very friable; common fine and medium roots; strongly acid; clear, smooth boundary.

B21t—7 to 22 inches, yellowish-brown (10YR 5/6) silty clay loam; common, fine, prominent, red mottles; moderate, medium, subangular blocky structure; firm; clay films on ped surfaces; few fine and medium roots; very strongly acid; gradual, wavy boundary.

B22t—22 to 46 inches, mottled yellowish-brown (10YR 5/6), red (2.5YR 4/8), and light-gray (10YR 7/2) silty clay; moderate, medium, subangular blocky structure; firm; few fine and medium roots; clay films on ped surfaces; very strongly acid; gradual, wavy boundary.

B23t—46 to 57 inches, mottled light-gray (10YR 7/2), red (2.5YR 4/8) and yellowish-brown (10YR 5/8) silty clay; moderate, medium, subangular blocky structure; firm; few fine and medium roots; clay films on ped surfaces; very strongly acid; gradual, wavy boundary.

B24tg—57 to 65 inches, light-gray (10YR 7/1) silty clay loam; common, medium, distinct, yellowish-brown (10YR 5/8) mottles; moderate, medium, subangular blocky structure; firm, few patchy clay films on ped surfaces; very strongly acid.

The A horizon ranges from 6 to 10 inches in thickness and from very dark gray to brown in color. The B21t horizon is mostly yellowish brown but ranges through strong brown and has brown, red, and gray mottles. Gray mottles begin at a depth of 9 to 28 inches. The Bt horizon ranges from silty clay loam to silty clay in texture.

Angie soils commonly occur with Orangeburg, Riverview, and Congaree soils. They are not so well drained as the Orangeburg soils and have more clay in the Bt horizon than those soils. Angie soils have more clay in the C horizon than the Congaree soils.

Angie fine sandy loam (Av).—Some areas of this soil are as much as 150 to 200 acres in size. Slopes are mainly 0 to 1 percent but may range to 2 percent.

Included with this soil in mapping are areas of Riverview, Congaree, and Orangeburg soils.

About 75 percent of the acreage is in woodland that consists of a mixed stand of pines and hardwoods. The rest has been cleared and is used for pasture or is cultivated. Because of slow permeability and poor tilth, this soil is only fairly well suited to cultivated crops, but it is well suited to woodland.

This soil can be tilled year after year, and the risk of erosion is only slight. Any suitable crop can be grown if fertilizer is added and if enough plant residue is returned to maintain good tilth. A planned sequence of crops aids in the control of weeds, insects, and plant diseases and results in far more efficient use of fertilizer. All plant residue should be left on the surface between seasons of crop growth.

The response to fertilizer is good if moisture conditions are favorable, but during prolonged dry periods when adequate moisture is lacking, crops do not get maximum benefit from the fertilizer.

This soil is not well suited to sprinkler irrigation, because of its clayey subsoil and slow permeability. Nevertheless, row crops and pasture plants respond if supplemental water is applied during prolonged dry periods. Capability unit IIw-3; woodland suitability group 2w8.

Congaree Series

The Congaree series consists of well-drained, loamy soils on flood plains. These soils formed in alluvium, 2 to 6 feet thick, that washed from soils of the Piedmont and the Coastal Plain. Congaree soils are only in Seminole County, and all of the acreage mapped is along the Chattahoochee River.

In a representative profile, the surface layer is dark-brown loam about 5 inches thick. Beneath this is about 33 inches of brown loam. Below this, and extending to a depth of 64 inches, is brown or dark yellowish-brown very fine sandy loam or fine sandy loam.

These soils are low to moderate in natural fertility and contain only a small amount of organic matter. Available water capacity is medium, and permeability is moderate. The rooting zone is deep, and tilth generally is good. Some areas are flooded occasionally for short periods. These soils are slightly acid to strongly acid throughout.

These soils are among the best in the two counties for farming. They are suited to most locally grown crops, and crops respond well to good management. About 40 percent of the acreage is pastured or cultivated; the rest is in native vegetation, chiefly mixed hardwoods.

In this survey area, Congaree soils are mapped only in an undifferentiated group with the Riverview soils. A description of this mapping unit can be found under the heading "Riverview Series."

Representative profile of Congaree loam in an area of Riverview and Congaree soils, in a pasture, 350 feet south of Georgia Highway 91 and 600 feet east of the Chattahoochee River, Seminole County:

Ap—0 to 5 inches, dark-brown (10YR 3/3) loam; moderate, medium, granular structure; friable; many fine roots; few wormholes; common fine mica flakes; strongly acid; clear, smooth boundary.

C1—5 to 18 inches, brown (10YR 4/3) loam; weak, medium, subangular blocky structure; common fine mica flakes; friable; fine and medium roots; common worm and root holes filled with material from the A horizon; strongly acid; gradual, wavy boundary.

C2—18 to 38 inches, brown (10YR 4/3) loam; moderate, medium, granular structure; friable; common fine mica flakes; fine and medium roots; few small layers or lenses of sandy loam; medium acid; gradual, wavy boundary.

C3—38 to 52 inches, brown (10YR 4/3) very fine sandy loam; weak, medium, subangular blocky structure; friable; common fine mica flakes; few fine and medium roots; medium acid; gradual, wavy boundary.

C4—52 to 64 inches, dark yellowish-brown (10YR 4/4) fine sandy loam; weak, fine, granular structure; friable; common fine mica flakes; few fine roots; strongly acid.

The A horizon ranges from 4 to 7 inches in thickness and from brown to dark brown in color. The upper part of the C horizon is mainly loam, but the lower part ranges from loam to sand. Mica flakes range from few to common.

Congaree soils commonly occur with the Riverview, Orangeburg, and Angie soils. They do not have so much profile development as the Riverview soils. They have more silt in the upper part of the profile than the Orangeburg soils. The Congaree soils are better drained and have less clay in the underlying layer than the Angie soils.

Esto Series

The Esto series consists of well-drained soils that are chiefly on knolls and in areas where the slopes are short and choppy. These soils formed in beds of clayey material and stratified clayey and sandy material. Areas of these soils are in the two counties and are rather small.

In a representative profile, the surface layer is very dark grayish-brown loamy sand about 3 inches thick. Beneath this is about 5 inches of dark grayish-brown sandy loam. The subsoil extends to a depth of 65 inches. In the upper 4 inches it is strong-brown sandy clay loam, but below this, it is strong-brown or yellowish-brown sandy clay that has yellowish-red, red, and light-gray mottles.

These soils are low in natural fertility and contain only a small amount of organic matter. Available water capacity is medium, and permeability is slow. These soils are strongly acid to very strongly acid throughout.

Esto soils are not well suited to cultivated crops. Most of the acreage is used for pasture or woodland. The native vegetation is chiefly pines and mixed hardwoods.

Representative profile of Esto loamy sand, 2 to 5 percent slopes, 2¾ miles east of Georgia Highway 39 and 25 feet north of Georgia Highway 253, Seminole County:

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

A2—3 to 8 inches, dark grayish-brown (10YR 4/2) sandy loam; weak, fine, granular structure; very friable; many small roots; very strongly acid; gradual, smooth boundary.

B1t—8 to 12 inches, strong-brown (7.5YR 5/6) sandy clay loam; weak, medium, subangular blocky structure; very friable; few small roots; very strongly acid; gradual, smooth boundary.

B21t—12 to 22 inches, strong-brown (7.5YR 5/6) sandy clay; common, medium, distinct, yellowish-red (5YR 5/8) mottles; moderate, medium, subangular blocky structure; friable; clay films on ped surfaces; very strongly acid; gradual, wavy boundary.

B22t—22 to 36 inches, yellowish-brown (10YR 5/8) sandy clay; common, medium, distinct, yellowish-red (5YR 5/6) mottles and a few, fine, distinct, light-gray (10YR 7/2) mottles; moderate, medium, angular blocky structure; firm; clay films on ped surfaces; very strongly acid; gradual, wavy boundary.

B23t—36 to 65 inches, mottled brownish-yellow (10YR 6/6), red (2.5YR 4/8), and light-gray sandy clay; strong, medium and coarse, angular blocky structure; firm; clay films on ped surfaces; very strongly acid.

The A horizon ranges from 3 to 14 inches in thickness. In some areas a few small quartz pebbles are on the surface and in the A horizon. The B2t horizon is brownish yellow to yellowish red and ranges from sandy clay to clay. The A2 and B1 horizons are lacking in some places. The gray mottles in the upper part of the B22t horizon range from light gray to gray and do not indicate wetness.

Esto soils commonly occur with Norfolk, Orangeburg, Wagram, and Troup soils. They have more clay in the B horizon than the Norfolk and Orangeburg soils. The sandy A horizon of the Esto soils is thinner than the A horizon of Wagram or Troup soils.

Esto loamy sand, 2 to 5 percent slopes (EuB).—This soil has the profile described as representative of the Esto series. Included with it in mapping are many small areas of Norfolk, Wagram, and Troup soils.

Because of the sandy surface layer, low natural fertility, and clayey subsoil, this soil is not well suited to cultivated crops. Most of the acreage is used for pasture plants or pine trees, to which the soil is well suited. Tilth is good.

Because of slope and slow permeability, erosion is a hazard in cultivated areas. Tilling on the contour, terracing, and stripcropping help to control erosion in these areas.

This soil should be managed so that soil losses from erosion are within allowable limits. The steepness and length of slopes or the erosion control practices installed govern the minimum cropping systems needed to check soil losses. An example of a suitable cropping system, where slopes are 3 percent and the soil is farmed on the contour, is 6 years of grass and 2 years of row crops, such as peanuts. All plant residue should be left on the surface between seasons of crop growth.

Organic matter is depleted at a moderately rapid rate, even if management is good. Turning under crop residue and including cover crops in the rotation are ways to maintain the content of organic matter and to increase the available water capacity.

This soil is not well suited to sprinkler irrigation, because of the fine-textured subsoil and slow permeability. Nevertheless, row crops and pasture grasses respond if supplemental water is added during prolonged dry periods. Capability unit IIIe-3; woodland suitability group 3o1.

Esto loamy sand, 5 to 17 percent slopes (EuE).—This soil chiefly has short slopes along the sides of the larger drainageways. Included with it in mapping are some areas of Norfolk, Wagram, Troup, and Orangeburg soils.

Because of slope and the fine-textured subsoil, the hazard of erosion is severe and the soil is not suited to cultivated crops. It is only fairly well suited to pasture plants, but a very small acreage is in bahiagrass and Coastal bermudagrass. This soil is well suited to pine trees. Capability unit VIe-2; woodland suitability group 3o1.

Goldsboro Series

The Goldsboro series consists of moderately well drained, nearly level soils. These soils formed in thick beds of loamy marine deposits. The largest areas are in the western part of Miller County and in the north-central part of Seminole County.

In a representative profile, the surface layer is very dark gray sandy loam about 5 inches thick. It is underlain by grayish-brown sandy loam 4 inches thick. The subsoil extends to a depth of 65 inches. It is light yellowish-brown sandy loam in the upper 5 inches and, to a depth of 48 inches, is brownish-yellow or light yellowish-brown sandy clay loam that is mottled with shades of brown and gray in the middle part. Light-gray mottles begin at a depth of about 24 inches. The lower part of the subsoil is light-gray sandy clay loam that is mottled with shades of brown.

These soils are low to moderate in natural fertility and contain only a small amount of organic matter. Available water capacity is medium, and permeability is moderate. The rooting zone is thick, and tilth generally is good. The water table is deeper than 60 inches much of the time, but during heavy rains in winter and early in spring, it is at a depth of about 24 inches for 1 to 4 months and water may stand on the surface for a few days at a time. These soils are very strongly acid throughout.

Goldsboro soils are suited to cultivated crops, pasture plants, and pine trees. During wet periods, drainage is needed to prevent loss of crops. Some areas are cultivated, but most of them are used for pasture or woodland. The natural vegetation is mostly pine, but there are some scattered hardwoods that have an understory of gallberry.

Representative profile of Goldsboro sandy loam, 0 to 2 percent slopes, in a wooded area 2¾ miles south and 1⅝ miles east of the Early County line, Miller County:

A1—0 to 5 inches, very dark gray (10YR 3/1) sandy loam; weak, fine, granular structure; very friable; many fine roots; very strongly acid; clear, smooth boundary.

A2—5 to 9 inches, grayish-brown (10YR 5/2) sandy loam; weak; fine, granular structure; very friable; many fine roots; very strongly acid; gradual, smooth boundary.

B1—9 to 14 inches, light yellowish-brown (2.5YR 6/4) sandy loam; medium, fine, granular structure; very friable; few fine roots; very strongly acid; gradual, smooth boundary.

B21t—14 to 24 inches, light yellowish-brown (2.5Y 6/4) sandy clay loam; common, fine, faint, yellowish-brown mottles; weak, medium, subangular blocky structure; friable; sandy grains coated and bridged with clay; patchy clay films on some ped surfaces; very strongly acid; gradual, smooth boundary.

B22t—24 to 34 inches, brownish-yellow (10YR 6/6) sandy clay loam; common, medium, distinct, strong-brown (7.5YR 5/6) and light-gray (2.5Y 7/2) mottles; weak, medium, subangular blocky structure; friable; patchy clay films on some ped surfaces; very strongly acid; gradual, smooth boundary.

B23t—34 to 48 inches, mottled, strong-brown (7.5YR 5/8) and light-gray (2.5Y 7/2) sandy clay loam; weak, medium, subangular blocky structure; friable; patchy clay films on some ped surfaces; very strongly acid; gradual, smooth boundary.

B24tg—48 to 65 inches, light-gray (2.5Y 7/2) sandy clay loam; common, medium, distinct, brownish-yellow (10YR 6/6) mottles and few, fine, distinct, strong-brown mottles; weak, medium, subangular blocky structure; friable; sand grains coated and bridged with clay; very strongly acid.

The A horizon ranges from 7 to 11 inches in thickness. Some profiles do not have a B1 horizon. The B2 horizon is yellowish brown, brownish yellow, and light yellowish brown and has strong-brown, reddish-yellow, brownish-yellow, red, and gray mottles. The gray mottles begin at a depth of 22 to 29 inches.

Goldsboro soils commonly occur with Norfolk and Grady soils. They closely resemble the Norfolk soils but are not so well drained. They are better drained than the Grady soils, which have a gray, clayey B horizon.

Goldsboro sandy loam, 0 to 2 percent slopes (GmA).—This soil is generally in rather small areas. Included with it in mapping are small areas of Norfolk and Grady soils.

A small acreage of this soil is cultivated, but most of it is used for pasture or woodland. The soil is well suited to pine trees and pasture plants.

This soil can be tilled continuously with little risk of erosion, but wetness is a hazard. This soil should be adequately drained if row crops are to be grown. After the water problem is solved, any suitable crop can be grown continuously if enough plant residue is returned to maintain good tilth (fig. 4). A planned sequence of crops aids in the control of weeds, insects, and plant diseases and results in the far more efficient use of fertilizer. All plant residue should be left on the surface between seasons of crop growth. The response to fertilizer is good.

During dry periods in summer, the supply of moisture may not be adequate for cultivated crops or pasture plants. Crops generally respond if supplemental water is applied at this time. This soil is suited to sprinkler irrigation, and a supply of water can be obtained from deep wells. Capability unit IIw-2; woodland suitability group 2w8.

Figure 4.—**Corn growing in a drained area of Goldsboro sandy loam, 0 to 2 percent slopes.**

Grady Series

The Grady series consists of very poorly drained soils that are typically in depressions, many of which do not have outlets. These soils formed in clayey marine sediments. They occur throughout the two counties.

In a representative profile, the surface layer is very dark gray sandy loam about 5 inches thick. The subsoil extends to a depth of 62 inches. It is grayish-brown sandy clay loam in the upper 6 inches and, below this, is gray clay that has yellowish-brown and yellowish-red mottles.

These soils are low in natural fertility and contain a small to medium amount of organic matter. Available water capacity is medium, and permeability is slow. Tilth generally is poor. The water table is near the surface for 4 to 8 months each year, and water stands on the surface for long periods in wet seasons. These soils are very strongly acid throughout.

Grady soils are not suited to cultivated crops. Most of the acreage is wooded, but some is pastured. The native vegetation is mainly mixed hardwoods. Pines grow in areas that are ponded for only about 1 to 3 months. Cypress and blackgum are in the areas that are ponded for longer periods.

Representative profile of Grady sandy loam in an area of Grady soils, in a wooded area 1.6 miles west of the Baker County line, 25 feet south of Georgia Highway No. 91, Miller County:

A1—0 to 5 inches, very dark gray (10YR 3/1) sandy loam; few, fine, distinct, light-gray (2.5Y 7/2) mottles; weak, fine, granular structure; very friable; many fine roots; very strongly acid; clear, smooth boundary.

B1tg—5 to 11 inches, grayish-brown (2.5Y 5/2) sandy clay loam; common, medium, distinct pockets of very dark gray (10YR 3/1) loam; weak, medium, subangular blocky structure; friable; very strongly acid; clear, smooth boundary.

B21tg—11 to 28 inches, gray (10YR 6/1) clay; common, medium, distinct, yellowish-brown (10YR 5/6) mottles and few, fine, prominent, yellowish-red mottles; moderate, medium, subangular blocky structure; firm; clay films on ped surfaces; very strongly acid; gradual, smooth boundary.

B22tg—28 to 62 inches, gray (10YR 6/1) clay; common, medium, prominent, yellowish-brown (10YR 5/6) mottles; moderate, medium, subangular blocky structure; firm; clay films on ped surfaces; common small pores; very strongly acid.

The A horizon ranges from dark to very dark gray or black in color, from 3 to 7 inches in thickness, and ranges from sandy loam to clay loam in texture. Some profiles do not have a B1tg horizon. The B2tg horizon is gray clay or sandy clay that is mottled with variable amounts of red, yellow, and brown. This horizon is hard when dry and sticky when wet.

Grady soils commonly occur with Goldsboro, Ocilla, and Pelham soils. They are not so well drained as the Goldsboro and Ocilla soils, and they have more clay in the B2 horizon than those soils. Grady soils have a thinner A horizon than Pelham soils.

Grady soils (Grd).—These very poorly drained soils are in upland depressions. Slopes are 0 to 2 percent. The surface layer is variable but is typically sandy loam around the edge of the depressions and finer textured in the center. In areas that are ponded for long periods, the surface layer has a higher content of organic matter.

Included with these soils in mapping are some small areas of Goldsboro and Ocilla soils.

Most areas of these soils are flooded each year for long periods. Because of wetness and the hazard of flooding, the soils are not suited to cultivated crops. Most of the areas are in woodland, and they are better suited to woodland than to most other uses. The present vegetation consists mainly of mixed oak, blackgum, cypress, and slash pine. If adequately drained, these soils can be used for pasture, but only fair response can be expected for bahiagrass, white clover, and other pasture crops. Capability unit Vw-1; woodland suitability group 2w9.

Irvington Series

The Irvington series consists of moderately well drained, nearly level soils on uplands. These soils have a fragipan or cemented layer in the subsoil. They formed in loamy marine deposits. Generally, these soils occur between ponded areas and well-drained soils and are in rather small areas throughout most of the two counties.

In a representative profile, the surface layer is dark grayish-brown sandy loam about 7 inches thick. Few to many small concretions of iron are on the surface. The subsoil, to a depth of 29 inches, is yellowish-brown sandy clay loam that has strong-brown, yellowish-red, and light-gray mottles in the lower part. Beneath this is a yellowish-brown fragipan, about 15 inches thick, that has light-gray, strong-brown, and red mottles. It contains about 15 percent soft plinthite. Beneath the fragipan, and extending to a depth of about 62 inches, is mottled light-gray, brownish-yellow, and red sandy clay loam.

These soils are moderately low in natural fertility and contain only a small amount of organic matter. Permeability is moderate in the upper part of the profile and slow or moderately slow in the lower part. Available water capacity is medium. The rooting zone is moderately thick, and tilth is good. These soils are strongly acid to very strongly acid throughout.

Irvington soils are suited to most locally grown cultivated crops, and most of the acreage is cultivated. They are also well suited to pasture plants and pine trees. The natural vegetation is mixed hardwoods and pine trees.

Representative profile of Irvington sandy loam, one-half mile east of Early County line and three-eighths mile north of Seminole County line, Miller County:

Apcn—0 to 7 inches, dark grayish-brown (10YR 4/2) sandy loam; weak, fine, granular structure; very friable; many small concretions of iron; strongly acid; abrupt, smooth boundary.

B1cn—7 to 11 inches, yellowish-brown (10YR 5/4) sandy clay loam; weak, medium, subangular blocky structure; friable; common small concretions of iron; common wormholes filled with material from the A horizon; very strongly acid; gradual, smooth boundary.

B21cn—11 to 21 inches, yellowish-brown (10YR 5/6) sandy clay loam; few fine, faint, strong-brown (7.5YR 5/6) mottles; moderate, medium, subangular blocky structure; friable; common small concretions of iron; about 1 percent plinthite; very strongly acid; gradual, smooth boundary.

B22—21 to 29 inches, yellowish-brown (10YR 5/6) sandy clay loam; common, medium, distinct, light-gray (2.5Y 7/2) and yellowish-red (5YR 5/8) mottles; moderate, medium, subangular blocky structure; friable; about 3 percent plinthite; very strongly acid; gradual, smooth boundary.

Bx—29 to 44 inches, yellowish-brown (10YR 5/6) sandy clay loam; common, medium, distinct, light-gray (2.5Y 7/2) and red (2.5YR 4/6) mottles and common, medium, faint, strong-brown (7.5YR 5/6) mottles; moderate, medium, subangular blocky structure; friable, slightly brittle; common small voids; about 15 percent plinthite; very strongly acid; gradual, smooth boundary.

B3—44 to 62 inches, mottled light-gray (2.5Y 7/2), brownish-yellow (10YR 6/6), and red (2.5YR 4/6) sandy clay loam; moderate, medium, subangular blocky structure; friable; about 3 percent soft plinthite; very strongly acid.

The A1 or Ap horizon is 6 or 7 inches thick. The small concretions of iron range from common to many in the A and B1 horizons and in the upper part of the B2 horizon. Depth to the fragipan ranges from 22 to 32 inches. The fragipan ranges from 14 to 33 inches in thickness and is 5 to 20 percent plinthite.

Irvington soils commonly occur with Tifton and Grady soils. They have a fragipan, which is lacking in the Tifton and Grady soils. They are not so well drained as the Tifton soils, but they are better drained than the Grady soils.

Irvington sandy loam (Ig).—This moderately well drained, pebbly soil is in areas adjacent to, but slightly higher than, ponded areas or in slightly lower areas than the adjacent well-drained soils. Slopes range from 0 to 2 percent. The water table is at a depth of about 22 to 30 inches for a period of 1 to 2 months late in winter or in spring. Water stands on the surface for short periods in some areas in wet weather.

Included with this soil in mapping is a small acreage of soils that are similar in drainage and color but do not have a fragipan. Also included are some small areas of Tifton soils.

This soil generally needs drainage for cultivated crops. If drained, it is well suited to most locally grown crops and to pasture plants and pine trees. Crops respond well to fertilization and other good management practices.

This soil can be tilled year after year, and the risk of erosion is only slight. Excess water is the main hazard, and the soil should be adequately drained if it is used for row crops. After the water problem is solved, any suitable crop can be grown continuously if enough plant residue is returned to maintain good tilth. A planned sequence of crops aids in the control of weeds, insects, and plant diseases, and results in the far more efficient use of fertilizer. All plant residue should be left on the surface between seasons of crop growth. The response to fertilizer is good.

During dry periods in summer, the supply of moisture may not be adequate for cultivated crops or pasture plants. Crops generally respond if supplemental water is applied at this time. This soil is suited to sprinkler irrigation, and a supply of water can be obtained from deep wells. Capability unit IIw-2; woodland suitability group 2o7.

Lucy Series

The Lucy series consists of well drained, level to very gently sloping soils on uplands. These soils formed in loamy marine deposits. They occupy mostly rather large areas in the southeastern parts of Seminole and Miller Counties.

In a representative profile, the surface layer is very dark grayish-brown loamy sand about 7 inches thick (fig. 5). Next is a layer of brown loamy sand that extends to a depth of about 31 inches. The subsoil, to a depth of 65 inches, is yellowish-red sandy loam and red sandy clay loam.

These soils are low in natural fertility and contain only a small amount of organic matter. Permeability is rapid through the loamy sand part of the profile and moderate through the finer textured subsoil. Available water capacity is low. Tilth is good, and the rooting zone is deep. These soils are strongly acid to very strongly acid throughout.

Lucy soils are suited to most locally grown crops, but they are droughty. Most of the acreage is cultivated, but some is used for pasture and woodland. The natural vegetation is mainly pine trees.

Representative profile of Lucy loamy sand, 0 to 5 percent slopes, on the south side of Georgia Highway 253, 700 yards west of the Decatur County line, Seminole County:

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

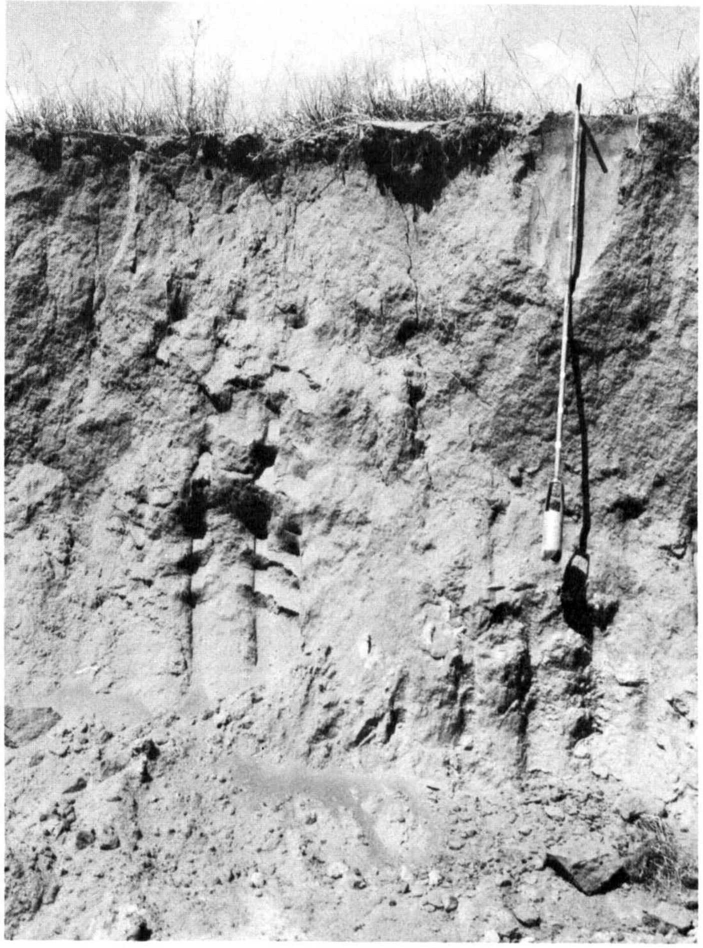

Figure 5.—**Profile of Lucy loamy sand, 0 to 5 percent slopes, in a borrow pit.**

A2—7 to 31 inches, brown (7.5YR 4/4) loamy sand; weak, fine, granular structure; very friable; few fine roots; strongly acid; gradual, smooth boundary.

B1t—31 to 36 inches, yellowish-red (5YR 4/6) sandy loam; weak, fine, granular structure; very friable; very strongly acid; gradual, smooth boundary.

B2t—36 to 65 inches, red (2.5YR 5/6) sandy clay loam; weak, medium, subangular blocky structure; friable; clay bridgings between sand grains; very strongly acid.

The A1 or Ap horizon is very dark grayish brown to dark grayish brown and ranges from 5 to 8 inches in thickness. The A2 horizon ranges from grayish brown or brown to strong brown or yellowish brown. The combined thickness of the A horizons is 22 to 38 inches. The B1 horizon is yellowish-red to red sandy loam. The B2t horizon is red to yellowish-red sandy clay loam in most places, but it ranges through sandy loam.

Lucy soils commonly occur with Orangeburg, Wagram, and Troup soils. They have less clay within 20 inches of the surface than the Orangeburg soils. They are redder in the B horizon than the Wagram soils, and they have more clay within 40 inches of the surface than the Troup soils.

Lucy loamy sand, 0 to 5 percent slopes (LMB).—This well-drained soil is in rather large areas on uplands. Included with it in mapping are small areas of Orangeburg, Wagram, and Troup soils.

Most locally grown crops can be grown, but crop response is only fair because the soil is droughty. Most of the acreage is cultivated. Pasture plants and pine trees do well on this soil.

This soil can be tilled every year, and the risk of erosion is only slight. Lack of moisture in the hot summer frequently causes crop damage. Because organic matter is depleted at a moderately rapid rate, large amounts of crop residue should be returned to the soil if cultivated crops are grown. A cropping sequence that includes perennial grasses is most beneficial. An example of a suitable cropping system is a 3-year rotation consisting of 1 year of peanuts, followed by rye for grazing and cover, and then 2 years of corn. All plant residue should be left on the surface between seasons of crop growth.

Soil blowing is a hazard in large, open fields. It can be checked by planting close-growing crops and clean-tilled crops in alternate strips, either on the contour or at right angles to the prevailing wind.

This soil is well suited to sprinkler irrigation. Row crops and pasture plants respond if supplemental water is applied during prolonged dry periods. An adequate supply of water can be obtained from deep wells. Capability unit IIs-1; woodland suitability group 3s2.

Meggett Series

The Meggett series consists of poorly drained soils that formed mainly in clayey marine deposits along the flood plains of streams. Most of the acreage is in Miller County along the major creeks.

In a representative profile, the surface layer is very dark gray loam about 7 inches thick. The subsoil extends to a depth of about 62 inches. It is dark-gray clay in the upper 4 inches and, below this, gray clay and sandy clay. Distinct yellowish-brown mottles begin at a depth of about 28 inches. A few large concretions of iron and manganese are at a depth of about 60 inches.

Meggett soils are low in natural fertility and contain a small to medium amount of organic matter. Available water capacity is medium, and permeability is slow. Runoff is slow. These soils are flooded several times yearly, and the water table is within 15 inches of the surface for 1 to 6 months in most years. Tilth is poor, and the seasonal high water table causes the rooting zone to be shallow for most plants. These soils are neutral to mildly alkaline throughout.

These soils are not suited to cultivated crops. Most of the acreage is woodland, but a small acreage is used for pasture. The native vegetation is mainly mixed hardwoods. Some pines grow in less wet areas, and cypress and blackgum grow in the wetter areas.

Representative profile of a Meggett loam in an area of Meggett soils, in a wooded area along Cypress Creek, 200 feet north of Georgia Highway 91, Miller County:

A1—0 to 7 inches, very dark gray (10YR 3/1) loam; moderate, medium, granular structure; friable; many fine and medium roots; neutral; abrupt, smooth boundary.

B21tg—7 to 11 inches, dark-gray (10YR 4/1) clay; moderate, medium, subangular blocky structure; firm; common fine and medium roots; plastic when wet; few clay films on ped surfaces; few fine sand pockets; neutral; clear, wavy boundary.

B22tg—11 to 28 inches, gray (10YR 5/1) clay; moderate, medium, subangular blocky structure; firm; few medium roots; plastic when wet; thin clay films on ped surfaces; few thin lenses of sand; few fine pores; neutral; clear, wavy boundary.

B23tg—28 to 46 inches, gray (10YR 5/1) clay; common, distinct, yellowish-brown (10YR 5/4) mottles; moderate, medium, subangular blocky structure; firm; few fine and medium roots; plastic when wet; thin clay films on ped surfaces; few fine sand pockets; mildly alkaline; gradual, wavy boundary.

B24tg—46 to 62 inches, gray (10YR 6/1) sandy clay; many medium, distinct, yellowish-brown (10YR 5/6) and light yellowish-brown (2.5Y 6/4) mottles; moderate, medium, subangular blocky structure; firm; few medium roots; common medium and large concretions of iron and manganese in the lower 2 to 4 inches; mildly alkaline.

The A horizon ranges from 4 to 18 inches in thickness and from loamy sand to loam in texture. The B2t horizon is dark gray, gray, or light gray and ranges from clay to sandy clay. The yellowish-brown, yellowish-red, and olive-yellow mottles in the Bt horizon range from few to many. Concretions of iron and manganese are present in the lower part of the Bt horizon in some places.

Meggett soils commonly occur with the Grady and Goldsboro soils. They closely resemble the Grady soils but are neutral or mildly alkaline, whereas the Grady soils are very strongly acid. Meggett soils are not so well drained as the Goldsboro soils and have more fine material in the Bt horizon than those soils. The Goldsboro soils are very strongly acid.

Meggett soils (Myt).—These soils are on flood plains of the creeks, in areas 100 to 600 yards wide and about 5 to 14 miles long. Slopes are 0 to about 1 percent. These soils are flooded several times yearly.

In most places the soils have a profile similar to the one described as representative of the Meggett series, but within the mapping unit are small areas of soils that have a loamy subsoil. These soils lack the abrupt textural change between the surface layer and subsoil that is common to the Meggett soils. Flooding and wetness control the soil behavior for the anticipated uses; thus, it is not practical to map the soils separately.

Included with these soils in mapping are some small areas of Grady and Goldsboro soils.

Because of flooding and a seasonal high water table, these Meggett soils are not suited to cultivated crops. A small acreage has been cleared and used for pasture plants. The soils are fairly well suited to bahiagrass, white clover, and other pasture plants. About 98 percent of the acreage is in woodland that consists of cutover mixed hardwoods. Some pines grow in the slightly better drained areas, and cypress and blackgum grow on the wetter sites. Capability unit Vw-1; woodland suitability group 1w9.

Norfolk Series

The Norfolk series consists of well-drained, level to very gently sloping soils on uplands. These soils formed in deep beds of loamy marine deposits. They are extensive and occur throughout the two counties.

In a representative profile, the surface layer is dark grayish-brown loamy sand about 7 inches thick. The subsoil, extending to a depth of 62 inches, is yellowish-brown sandy loam and sandy clay loam that has strong-brown, yellowish-red, and very pale yellow mottles in the lower part. A few small concretions of iron are in the upper part of the profile.

These soils are moderately low in natural fertility and contain only a small amount of organic matter. Permeability is moderate, and available water capacity is medium. Tilth is good, and the rooting zone is thick. These soils are strongly acid to very strongly acid throughout.

Norfolk soils are some of the best in the survey area for farming. Most of the acreage is cultivated. These soils are well suited to locally grown crops, grasses, and pine trees. The natural vegetation is pines and some mixed hardwoods.

Representative profile of Norfolk loamy sand, 0 to 2 percent slopes, 3⅞ miles north of the Seminole County line and one-half mile east of Georgia Highway 45, on the west side of the road, Miller County:

Ap—0 to 7 inches, dark grayish-brown (2.5Y 4/2) loamy sand; weak, fine, granular structure; very friable; few small concretions of iron; strongly acid; clear, smooth boundary.

B1t—7 to 12 inches, yellowish-brown (10YR 5/6) sandy loam; moderate, medium, granular structure; friable; few small concretions of iron; strongly acid; gradual, smooth boundary.

B21t—12 to 40 inches, yellowish-brown (10YR 5/6) sandy clay loam; weak, medium, subangular blocky structure; friable; patchy clay films on ped surfaces; very strongly acid; gradual, smooth boundary.

B22t—40 to 48 inches, yellowish-brown (10YR 5/8) sandy clay loam; few, fine, faint, strong-brown mottles; weak, medium, subangular blocky structure; friable; patchy clay films on ped surfaces; very strongly acid; gradual, smooth boundary.

B23t—48 to 62 inches, yellowish-brown (10YR 5/8) sandy clay loam; common, medium, distinct, strong-brown (7.5YR 5/6) and very pale brown (10YR 7/3) mottles and common, medium, prominent, yellowish-red (5YR 4/6) mottles; weak, medium, subangular blocky structure; friable; patchy clay films on ped surfaces; 3 percent plinthite; very strongly acid.

The A1 or Ap horizon is dark grayish-brown to grayish-brown loamy sand that ranges from 5 to 9 inches in thickness. The A2 horizon, where present, is yellowish-brown to light yellowish-brown loamy sand 3 to 9 inches thick. The B1 horizon is strong brown to light yellowish brown. The B2 horizon is strong brown to yellowish brown. The B23t horizon has few to common mottles of strong brown, very pale brown, and yellowish red. Gray mottles are at a depth of more than 40 inches in some places.

Norfolk soils commonly occur with Tifton, Wagram, Goldsboro, and Grady soils. They have fewer concretions of iron than Tifton soils and lack soft plinthite in the lower part of the B horizon. Within 20 inches of the surface, they have finer textured material than Wagram soils. Norfolk soils are better drained than Goldsboro and Grady soils and have a less clayey B horizon than Grady soils.

Norfolk loamy sand, 0 to 2 percent slopes (NhA).—This well-drained soil is on uplands. It has the profile described as representative of the Norfolk series. Included with this soil in mapping are small areas of Goldsboro and Tifton soils.

This Norfolk soil is one of the better soils in the survey area for farming. Runoff is slow, and erosion is not a hazard. Tilth is good. This soil is well suited to most locally grown crops and to pasture plants and pine trees. Crops respond well to fertilization and other good management practices (fig. 6). Most of the acreage is cultivated.

This soil can be tilled intensively, and the risk of erosion is minimal. Any suitable crop can be grown continuously if enough plant residue is returned to maintain good tilth. A planned sequence of crops aids in the control of weeds, insects, and plant diseases and results in the far more efficient use of fertilizer. All plant residue should be left on the surface between seasons of crop growth.

Figure 6.—**Peanuts growing on Norfolk loamy sand, 0 to 2 percent slopes.**

Organic matter is depleted at a moderately rapid rate, even if management is good. Turning under all crop residue each year and including a cover crop in the cropping system are ways to maintain the content of organic matter and to increase the available water capacity.

This soil is well suited to irrigation. Row crops and pasture grasses respond if supplemental water is applied during prolonged dry periods. An adequate supply of water can be obtained from deep wells. Capability unit I-1; woodland suitability group 2o1.

Norfolk loamy sand, 2 to 5 percent slopes (NhB).—This well-drained soil is on uplands. It has a surface layer of grayish-brown or dark grayish-brown loamy sand about 5 to 6 inches thick. The rest of the profile is similar to the one described as representative of the Norfolk series.

Included with this soil in mapping are a few small areas that are moderately eroded. In a few places the surface layer is sandy loam. Also included are some small areas of Tifton and Esto soils.

This Norfolk soil is one of the better soils in the survey area for farming. Tilth is good. This soil is well suited to most locally grown crops and to pasture plants and pine trees. Crops respond well to fertilization and other good management practices. Most of the acreage is cultivated.

Because of slope, the hazard of erosion is moderate. Tilling on the contour, terracing, and stripcropping help to control erosion in cultivated areas.

The soil should be managed so that soil losses from erosion are within allowable limits. The steepness and length of slope or the erosion control practices installed govern the minimum cropping system needed to accomplish this. An example of a suitable cropping system, where slopes are 3 percent and the soil is terraced and cultivated on the contour, is a 3-year rotation consisting of 1 year peanuts, 1 year of small grain and grain sorghum, and 1 year of corn. All plant residue should be left on the surface between seasons of crop growth.

Organic matter is depleted at a moderately rapid rate, even if management is good. The return of crop residue and including cover crops in the rotation are ways to maintain the content of organic matter and to increase the available water capacity.

This soil is well suited to sprinkler irrigation. Row crops and pasture plants respond if supplemental water is applied during prolonged dry periods. An adequate supply of water can be obtained from deep wells. Capability unit IIe-1; woodland suitability group 2o1.

Ocilla Series

The Ocilla series consists of somewhat poorly drained soils in nearly level areas and slight depressions. These soils formed in thick beds of loamy marine deposits. Most of the acreage is in the central part of Seminole County and the southeastern part of Miller County.

In a representative profile, the surface layer is dark-gray loamy sand about 6 inches thick. Beneath this, and extending to a depth of 34 inches, is pale-yellow or light yellowish-brown loamy sand that has a few, fine, yellowish-brown mottles; this layer has a few light-gray mottles in the lower part. The subsoil, reaching to a depth of 65 inches, is light yellowish-brown sandy loam and yellow sandy clay loam that has yellowish-brown and light-gray mottles.

These soils are low in natural fertility and contain only a small amount of organic matter. Available water capacity is low, and permeability is rapid in the upper 34 inches of the profile and moderate in the subsoil. The rooting zone is thick, and tilth is good. These soils are very strongly acid throughout.

Although these soils have a thick rooting zone, they are only fairly suitable for cultivated crops and for pasture plants because they are sandy and have a high water table in wet seasons. They are well suited to woodland. Most of the acreage is woodland, but some is used for cultivated crops or pasture. The natural vegetation is pines and mixed hardwoods.

Representative profile of Ocilla loamy sand, in a wooded area 2 miles southwest of the junction of Georgia Highway 91 and U.S. Highway 27, seven-eighths mile south of Georgia Highway 91, Miller County:

A1—0 to 6 inches, dark-gray (10YR 4/1) loamy sand; weak, fine, granular structure; very friable; few fine roots; very strongly acid; clear, smooth boundary.

A21—6 to 19 inches, light yellowish-brown (2.5Y 6/4) loamy sand; few, fine, distinct, yellowish-brown mottles; weak, fine, granular structure; very friable; few fine roots; common clean sand grains; very strongly acid; gradual, wavy boundary.

A22—19 to 28 inches, pale-yellow (2.5Y 7/4) loamy sand; few, fine, faint, yellowish-brown mottles; weak, fine, granular structure; very friable; common clean sand grains; very strongly acid; gradual, wavy boundary.

A23—28 to 34 inches, pale-yellow (2.5Y 8/4) loamy sand; common, medium, distinct, yellowish-brown (10YR 5/8) mottles and few, fine, distinct, light-gray mottles; weak, fine, granular structure; very friable; very strongly acid; gradual, wavy boundary.

B1t—34 to 48 inches, light yellowish-brown (10YR 6/4) sandy loam; common, medium, distinct, yellowish-brown (10YR 5/8) and light-gray (2.5Y 7/2) mottles; weak, medium, subangular blocky structure; friable; few, firm, yellowish-brown peds; very strongly acid; gradual, wavy boundary.

B2t—48 to 65 inches, yellow (10YR 7/6) sandy clay loam; common, medium, distinct, yellowish-brown (10YR 5/8) and light-gray (2.5Y 7/2) mottles; weak, medium, subangular blocky structure; friable; sand grains coated and bridged with clay; very strongly acid.

The A1 or Ap horizon ranges from 4 to 8 inches in thickness. The sandy A horizon ranges from 24 to 38 inches in thickness. The B2 horizon is yellow, light-gray, or light yellowish-brown sandy loam or sandy clay loam that has common mottles in shades of gray, yellow, brown, and red. In some places the B2 horizon lacks a matrix color.

Ocilla soils commonly occur with the Pelham and Wagram soils. They are not so poorly drained as the Pelham soils. They are not so well drained as the Wagram soils.

Ocilla loamy sand (Oh).—This soil is generally in rather small areas. Slopes range from 0 to 2 percent. Included with this soil in mapping are some areas of Wagram, Goldsboro, and Pelham soils.

Because this soil is sandy to a depth of about 24 to 38 inches and has a seasonal high water table in wet seasons, only a small acreage is cultivated. The soil is well suited to pine trees.

This soil can be tilled every year, and the risk of erosion is only slight. Excess water is the main limitation. This soil should be adequately drained if it is used for row crops. After the water problem is solved, any suitable crop can be grown continuously if enough plant residue is returned to maintain good tilth. A planned sequence of crops aids in the control of weeds, insects, and plant diseases and results in more efficient use of fertilizer. All plant residue should be left on the surface between seasons of crop growth.

Organic matter is depleted at a moderately rapid rate, even if management is good. Returning all crop residue to the soil and including cover crops in the cropping system are ways to maintain the content of organic matter and to increase the available water capacity. The response to fertilizer is fair. Plant nutrients are readily leached from this soil. Capability unit IIIw-1; woodland suitability group 3w2.

Orangeburg Series

The Orangeburg series consists of well-drained soils on uplands. These soils are on smooth landscapes and in areas where slopes are short. They formed in loamy marine deposits. Slopes range from 0 to 8 percent. Orangeburg soils make up only a fairly small acreage in the two counties, but they are important to farming.

In a representative profile, the surface layer is brown loamy sand about 5 inches thick. The subsoil extends to a depth of about 63 inches. It is yellowish-red sandy loam in the upper 4 inches and is red sandy clay loam in the middle and lower parts.

These soils are moderately low in natural fertility and contain only a small amount of organic matter. Permeability is moderate, and the available water capacity is medium. Tilth is mainly good, and the rooting zone is thick. These soils are strongly acid to very strongly acid throughout.

The less sloping Orangeburg soils are some of the best in the two counties for farming. Most of the acreage is cultivated or pastured. These soils are well suited to the locally grown crops, grasses, and pine trees. They respond well to fertilization and other good management practices. The natural vegetation is mainly mixed hardwoods and pines.

Representative profile of Orangeburg loamy sand, 2 to 5 percent slopes, three-eighths mile south of Early County line and 1 1/2 miles east of the Chattahoochee River, Seminole County:

Ap—0 to 5 inches, brown (7.5YR 4/2) loamy sand; weak, fine, granular structure; very friable; many fine roots; strongly acid; clear, smooth boundary.

B1t—5 to 9 inches, yellowish-red (5YR 4/8) sandy loam; weak, medium, granular structure; very friable; few fine roots; strongly acid; gradual, smooth boundary.

B21t—9 to 20 inches, red (2.5YR 4/6) sandy clay loam; weak, medium, subangular blocky structure; friable; few clay films on ped surfaces; very strongly acid; gradual, smooth boundary.

B22t—20 to 47 inches, red (2.5YR 4/8) sandy clay loam; moderate, medium, subangular blocky structure; friable; few clay films on ped surfaces; very strongly acid; gradual, smooth boundary.

B23t—47 to 63 inches, red (2.5YR 4/8) sandy clay loam; weak, medium, subangular blocky structure; friable; clay films on ped surfaces; very strongly acid.

The Ap horizon ranges from 5 to 8 inches in thickness and from dark grayish brown to brown and reddish brown in color. The B1 horizon is sandy loam or sandy clay loam. The B2t horizon ranges from yellowish red to red; it is mainly sandy clay loam but ranges to sandy loam in a few places. The solum is more than 60 inches thick.

Orangeburg soils commonly occur with Tifton, Lucy, and Norfolk soils. They lack the many iron concretions throughout the profile and the plinthite in the lower part of the profile that are in the Tifton soils. They have more clay within 20 inches of the surface than the Lucy soils. Orangeburg soils have a redder B horizon than the Norfolk soils.

Orangeburg loamy sand, 0 to 2 percent slopes (OeA).—This well-drained soil is on uplands. It has a profile similar to the one described as representative of the Orangeburg series, but the surface layer is brown or dark grayish-brown loamy sand 5 to 8 inches thick.

Included with this soil in mapping are a few small areas that are eroded and some areas in which the surface layer is dark reddish brown. Also included are some small areas of Lucy and Tifton soils.

This Orangeburg soil is one of the best in the survey area for farming. Runoff is slow, and erosion is not a hazard. Tilth is good, and the soil is well suited to most locally grown crops. It is also well suited to pasture plants and to pine trees. Most of the acreage is cultivated.

This soil can be tilled intensively, and the risk of erosion is minimal. Any suitable crop can be grown continuously if enough plant residue is returned to maintain good tilth (fig. 7). A planned sequence of crops aids in the control of weeds, insects, and plant diseases and results in the more efficient use of fertilizer. All plant residue should be left on the surface between seasons of crop growth.

Organic matter is depleted at a moderately rapid rate, even if management is good. Returning all crop residue to the soil and including a cover crop in the cropping system are ways to maintain the content of organic matter and to increase the available water capacity.

This soil is well suited to irrigation. Row crops and pasture grasses respond if supplemental water is applied during prolonged dry periods. An adequate supply of water can generally be obtained from deep wells. Capability unit I-1; woodland suitability group 2o1.

Orangeburg loamy sand, 2 to 5 percent slopes (OeB).—This well-drained soil is on uplands. It has the profile described as representative of the Orangeburg series.

Included with this soil in mapping are a few areas of a similar soil in which the surface layer is dark reddish brown and, in some places, the lower part of the subsoil is sandy clay. Also included are some small areas of Lucy and Tifton soils.

This Orangeburg soil is one of the better soils in the survey area for farming. Tilth is good, and the soil is well suited to most crops grown locally and to pasture plants and pine trees. Crops respond well to fertilization and to other good management. Most of the acreage is cultivated.

Because of slope, the hazard of erosion is moderate. Tilling on the contour, terracing, and stripcropping help to control erosion in cultivated areas.

This soil should be managed so that soil losses from erosion are within allowable limits. The steepness and length of slopes or the erosion control practices installed govern the kind of cropping system needed to accomplish this. An example of a suitable cropping system, where slopes are 3 percent and the soil is terraced and cultivated on the contour, is a 3-year rotation of 1 year of peanuts, followed by rye for grazing and cover, then 2 years of corn. All plant residue should be left on the surface between seasons of crop growth.

Organic matter is depleted at a moderately rapid rate, even if management is good. The return of crop residue and including cover crops in the rotation are ways to maintain the organic-matter content and to increase the available water capacity.

This soil is well suited to sprinkler irrigation. Row crops and pasture grasses respond if supplemental water is applied during prolonged dry periods. An adequate supply of water can generally be obtained from deep wells. Capability unit IIe-1; woodland suitability group 2o1.

Orangeburg loamy sand, 5 to 8 percent slopes, eroded (OeC2).—This well-drained soil is in small areas and has short slopes. The original surface layer has been thinned by erosion and is now reddish-brown to brown loamy sand 3 to 5 inches thick. The plow layer extends into the upper part of the subsoil in many places, and there are patches where the subsoil of red to yellowish-red sandy loam or sandy clay loam is exposed. The rest of the profile is similar to the one described as representative of the Orangeburg series. A few shallow gullies and rills have been formed in some areas, and an occasional deep gully occurs in a few areas.

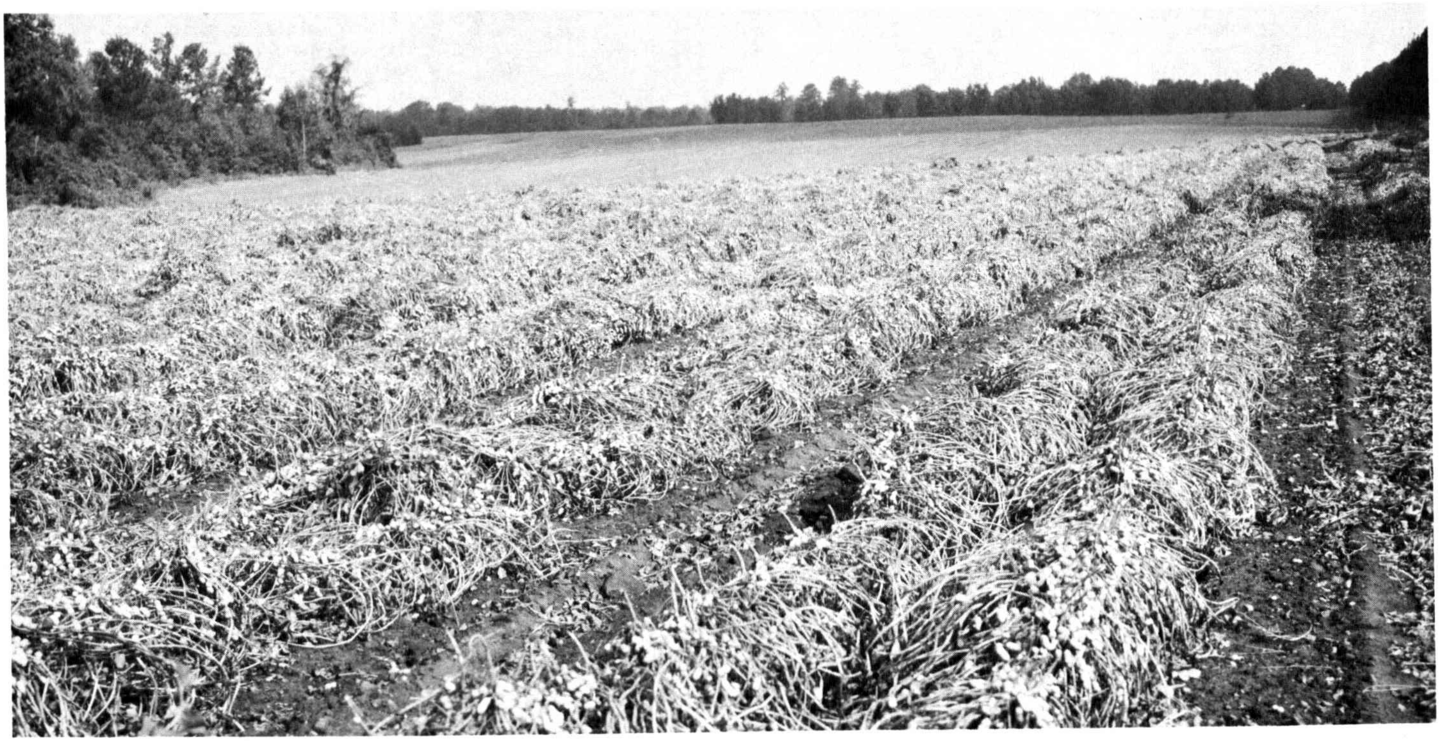

Figure 7.—**Harvest of peanuts on Orangeburg loamy sand, 0 to 2 percent slopes.**

Included with this soil in mapping are a few small areas of Esto and Tifton soils. Also included are a few areas that are only slightly eroded.

This soil is suited to most crops grown locally. Some of the acreage is cultivated, but most of it is in pasture or trees. Tilth is good except in places where the subsoil is exposed. This soil is well suited to pasture plants and to pine trees.

Because of slope and the thin surface layer, the hazard of erosion is severe. Tilling on the contour, terracing, and stripcropping help to control erosion in cultivated areas.

The soil should be managed so that soil losses from erosion are within allowable limits. The length of slopes or the erosion control practice installed governs the kind of cropping system needed to accomplish this. An example of a suitable cropping system, where slopes are 6 percent and the soil is cultivated on the contour, is 4 years of perennial grass and 2 years of row crops, such as peanuts. All plant residue should be left on the soil surface between seasons of crop growth.

Organic matter is depleted at a moderately rapid rate, even if management is good. Incorporating crop residue in the soil and including cover crops in the rotation are ways to maintain the content of organic matter and to increase the available water capacity.

Because of slope, this soil is not well suited to irrigation. Nevertheless, row crops and pasture grasses respond if supplemental water is applied during prolonged dry periods. Capability unit IIIe-1; woodland suitability group 2o1.

Pelham Series

The Pelham series consists of poorly drained, nearly level soils. These soils are on broad flats and in depressions and drainageways. They formed in unconsolidated loamy marine deposits. Most of the acreage is in Miller County; the Pelham soils do not make up a significant part of the two counties.

In a representative profile, the surface layer is very dark gray sand about 6 inches thick. The subsurface layer is light brownish-gray and grayish-brown sand that extends to a depth of about 34 inches. The subsoil, reaching to a depth of 61 inches, is light-gray sandy clay loam that has strong-brown, yellowish-red, and yellowish-brown mottles.

These soils are low in natural fertility and contain only a small amount of organic matter. Available water capacity is low, and permeability is rapid in the upper 2 or 3 feet of sandy material and moderate in the subsoil. The rooting zone is moderately thick to thick, depending upon the depth to the water table. Tilth is generally good. These soils are very strongly acid throughout.

In their natural state, Pelham soils are too wet for cultivated crops. A small acreage has been drained and is used for pasture, but most of the acreage is in its natural vegetation of mixed hardwoods and pines.

Representative profile of Pelham sand, in a wooded area 2 5/8 miles west of Baker County line and 3 miles north of Decatur County line, 50 feet west of a dirt road, Miller County:

A1—0 to 6 inches, very dark gray (10YR 3/1) sand; single grained; loose; mixture of very dark gray organic matter and clean, uncoated, white sand grains; many fine roots; very strongly acid; clear, smooth boundary.

A21—6 to 23 inches, grayish-brown (2.5Y 5/2) sand; single grained; loose; few fine roots; very strongly acid; gradual, smooth boundary.

A22—23 to 34 inches, light brownish-gray (2.5Y 6/2) sand; single grained; loose; very strongly acid; gradual, smooth boundary.

B21tg—34 to 41 inches, light-gray (2.5Y 7/2) sandy clay loam; few, fine, distinct, yellowish-brown (10YR 5/6) mottles; weak, medium, subangular blocky structure; friable; acid; gradual, smooth boundary.

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B22tg—41 to 61 inches, light-gray (10YR 7/1) sandy clay loam; common, medium, distinct, strong-brown (7.5YR 5/8) and yellowish-red (5YR 5/6) mottles; weak, medium, subangular blocky structure; friable; very strongly acid.

The A horizon ranges from 24 to 38 inches in thickness. The Bt horizon is sandy clay loam, but in many places it has lenses of sandier material as well as lumps of sandy clay. It has variable amounts of yellow, brown, and red mottles. Water stands in some areas for long periods in wet periods in winter and spring.

Pelham soils commonly occur with the Grady and Ocilla soils. Pelham soils do not have so much fine-textured material within 40 inches of the surface as the Grady soils, which have a more clayey B horizon. The Pelham soils are wetter than the Ocilla soils.

Pelham sand (Pa).—This soil is in depressions, broad flats, and drainageways. Slopes are 0 to 1 percent. Included with this soil in mapping are some small areas of Grady and Ocilla soils.

Most of the acreage is in its natural vegetation of mixed hardwoods and pines. A small acreage has been cleared and is used for pasture.

This soil is flooded several times each year for short periods, especially in winter and spring. Runoff is slow, and water ponds in many low areas.

Because of flooding, this soil is not well suited to cultivated crops, although a few small areas are cultivated. The soil requires surface drainage if it is used for pasture. It is suitable for woodland, and it provides a fair habitat for woodland and wetland wildlife. Capability unit Vw-2; woodland suitability group 2w3.

Riverview Series

The Riverview series consists of well-drained soils on flood plains. These soils formed in loamy alluvium that washed from soils of the Piedmont and the Coastal Plain. In these counties the Riverview soils occur only with the Congaree soils, and all of the acreage mapped is along the Chattahoochee River in Seminole County.

In a representative profile the surface layer is dark-brown loam about 6 inches thick. The subsoil, to a depth of about 46 inches, is brown silty clay loam. Between depths of 46 and 62 inches, the subsoil is yellowish-red sandy clay loam. Small pockets of sandy loam are common in the upper 46 inches of the profile.

Riverview soils are low to moderate in natural fertility and contain only a small amount of organic matter. Available water capacity is medium, and permeability is moderate. The rooting zone is deep, and tilth is generally good. Some areas are flooded occasionally for short periods. These soils are mainly strongly acid to very strongly acid throughout.

These soils are some of the best in the two counties for farming. They are well suited to most crops grown locally, and crops respond well to good management. About 40 percent of the acreage is used for pasture or is cultivated, and the rest is in native vegetation, chiefly mixed hardwoods.

Representative profile of Riverview loam in an area of Riverview and Congaree soils, in a wooded area 200 yards south of the Early County line and 330 yards east of the Chattahoochee River, Seminole County:

A1—0 to 6 inches, dark-brown (7.5YR 3/2) loam; moderate, medium, granular structure; friable; common fine mica flakes; common fine and medium roots; few wormholes; few small pockets of sandy loam; strongly acid; clear, smooth boundary.

B21—6 to 13 inches, brown (7.5YR 4/4) silty clay loam; moderate, medium, granular structure; friable; common fine mica flakes; common fine and medium roots; common worm and root holes filled with material from A horizon; few small pockets of sandy loam; strongly acid; gradual, wavy boundary.

B22—13 to 28 inches, brown (7.5YR 4/4) silty clay loam; moderate, medium, subangular blocky structure; friable; common fine mica flakes; common fine and medium roots; few small pockets of sandy loam; strongly acid; gradual, wavy boundary.

B23—28 to 46 inches, brown (7.5YR 4/4) silty clay loam; moderate, medium, granular and subangular blocky structure; friable; common fine mica flakes; few fine and medium roots; few small pockets of sandy loam; strongly acid; gradual, wavy boundary.

B3—46 to 62 inches, yellowish-red (5YR 4/8) sandy clay loam; weak, medium, subangular blocky structure; friable; common fine mica flakes; few clay films on some ped surfaces; few fine roots; very strongly acid.

The A1 and Ap horizons are dark-brown, brown, yellowish-brown, or dark yellowish-brown loam or fine sandy loam 4 to 7 inches thick. The B2 horizon is mostly silty clay loam, but in some places it is silt loam to loam. A buried profile or a C horizon occurs below a depth of about 28 inches in some places. It ranges from sandy clay loam to sandy loam. Mica flakes range from few to common throughout the profile.

Riverview soils commonly occur with Congaree and Angie soils and, to a limited extent, with Orangeburg soils. They have a B horizon, whereas Congaree soils do nôt. The Riverview soils do not have so much clay in the B horizon as the Angie soils, and they lack the gray mottles within 30 inches of the surface. They are browner than Orangeburg soils.

Riverview and Congaree soils (Riv).—This undifferentiated group of well-drained, loamy soils is along the flood plain of the Chattahoochee River. These soils occur without regularity of pattern, in areas that range from 200 to 300 acres in size. Slopes range from 0 to 2 percent.

Soils of both series do not occur in every area mapped as this unit, but many of the areas are about one-half Riverview soils and one-third Congaree soils. These soils could be mapped separately if the intensity of their use warranted it. They are mapped together, however, because they are similar in use and behavior and occupy only a relatively small acreage.

Profiles of the Riverview soils and the Congaree soils are similar to the ones described as representative for their respective series, but the surface layer ranges from loam to fine sandy loam.

Included with these soils in mapping are small areas of soils that are similar to Riverview and Congaree soils but are more sandy throughout. Also included are small areas of Angie soils.

Most of the acreage is in a mixed stand of loblolly pine and hardwoods.

Soils of this mapping unit can be tilled every year with little risk of erosion, but in some years they are flooded for short periods. Any suitable crop can be grown year after year if fertilizer is applied and if enough plant residue is returned to maintain good tilth. A planned sequence of crops aids in the control of weeds, insects, and plant diseases and results in the more efficient use of fertilizer. All plant residue should be left on the surface between seasons of crop growth. The response to fertilizer is good.

During prolonged dry periods, the supply of moisture may not be adequate for cultivated crops and pasture. Crops generally respond well if supplemental water is applied during periods of low rainfall. These soils are suited to sprinkler irrigation, and an adequate supply of water can be obtained from the nearby river or Lake Seminole. Capability unit IIw-1; woodland suitability group 1o7.

Tifton Series

The Tifton series consists of well-drained, nearly level to very gently sloping soils on uplands. These soils formed in thick beds of reticular mottled marine deposits, mainly of loamy texture. Tifton soils are important for farming and occur throughout Miller and Seminole Counties.

In a representative profile, the surface layer is dark grayish-brown sandy loam about 7 inches thick (fig. 8). The subsoil, reaching to a depth of 62 inches, is yellowish-brown sandy clay loam that has strong-brown, brownish-yellow, and red mottles in the lower part. Soft plinthite is in the lower part of the subsoil. Common to many small concretions of iron are scattered throughout the upper part of the profile.

These soils are moderately low in natural fertility and contain only a small amount of organic matter. Permeability is moderate, and available water capacity is medium. Tilth is good, and the rooting zone is thick. These soils are strongly acid to very strongly acid throughout.

Tifton soils are among the best in the two counties for farming. They are well suited to locally grown crops, grasses, and pine trees. Most of the acreage is cultivated, but some is pastured or wooded. The natural vegetation is pine trees.

Representative profile of Tifton sandy loam, 0 to 2 percent slopes, one-fourth mile west of U.S. Highway 27 and 2 ½ miles south of the Early County line, Miller County:

Apcn—0 to 7 inches, dark grayish-brown (10YR 4/2) sandy loam; weak, fine, granular structure; very friable; many small concretions of iron; strongly acid; abrupt, smooth boundary.

BAcn—7 to 10 inches, yellowish-brown (10YR 5/4) sandy clay loam and dark grayish-brown (10YR 4/2) sandy loam; weak, fine, subangular blocky structure; very friable; many small concretions of iron; strongly acid; clear, smooth boundary.

B21cn—10 to 38 inches, yellowish-brown (10YR 5/8) sandy clay loam; weak, medium, subangular blocky structure; friable; common small concretions of iron; clay films on ped surfaces and around iron concretions; very strongly acid; gradual, smooth boundary.

B22tcn—38 to 52 inches, yellowish-brown (10YR 5/8) sandy clay loam; few, fine, faint, strong-brown mottles; weak, medium, subangular blocky structure; friable; common small concretions of iron; clay films on ped surfaces and around iron concretions; very strongly acid; gradual, smooth boundary.

B23t—52 to 62 inches, yellowish-brown (10YR 5/6) sandy clay loam; common, medium, faint, strong-brown (7.5YR 5/8) and brownish-yellow (10YR 6/6) mottles and common, medium, prominent, red (2.5YR 4/6) mottles; weak, medium, subangular blocky structure; friable; patchy clay films on ped surfaces; 15 to 20 percent soft plinthite; common small concretions of iron; very strongly acid.

The A1 or Ap horizon is very dark grayish-brown, dark grayish-brown, or yellowish-brown sandy loam that ranges from 4 to 9 inches in thickness. The B1 horizon, where present, is yellowish-brown or dark yellowish-brown sandy loam or sandy clay loam. The B2t horizon is yellowish brown to strong brown in most places but ranges to red in a few places. The small concretions of iron range from ½ to ¾ inch in diameter and make up about 5 to 20 percent, by volume, of the A horizon and upper part of the B horizon. Plinthite is at a depth of about 34 to 52 inches and makes up 10 to 30 percent of the volume of soil material.

Tifton soils commonly occur with Norfolk, Goldsboro, Irvington, and Wagram soils. The Tifton soils have more concretions of iron throughout the profile than the Norfolk and Goldsboro soils. They are better drained than Goldsboro and Irvington soils. Tifton soils lack the thick sandy A horizon that is in the Wagram soils.

Figure 8.—**Profile of Tifton sandy loam, 2 to 5 percent slopes, along a roadbank.**

Tifton sandy loam, 0 to 2 percent slopes (TuA).—This well-drained soil is on uplands. It has the profile described as representative of the Tifton series.

Included with this soil in mapping are a few small areas of Irvington and Norfolk soils.

This Tifton soil is one of the better soils in the survey area for farming. Runoff is slow, and erosion is not a hazard. This soil is well suited to most locally grown crops and to pasture plants and pine trees. Crops respond well to fertilization and other good management practices. Most of the acreage is cultivated.

This soil can be tilled intensively, and the risk of erosion is minimal. Any suitable crop can be grown continuously if enough plant residue is returned to the soil to maintain good tilth. A planned sequence of crops aids in the control of weeds, insects, and plant diseases and results in the more efficient use of fertilizer. Organic matter is depleted at a moderately rapid rate, even if management is good. Incorporating all crop residue and including cover crops in the rotation are ways to maintain the content of organic matter and to increase the available water capacity. In areas where peanuts are grown, small concretions of iron are troublesome because they are mixed with the harvested peanuts. Plant nutrients are not leached so readily from this soil as they are from more sandy soils.

This soil is well suited to irrigation. Row crops and pasture grasses respond if supplemental water is applied during prolonged dry periods. An adequate supply of water can be obtained from deep wells. Capability unit I-2; woodland suitability group 2o1.

Tifton sandy loam, 2 to 5 percent slopes (TuB).—This well-drained soil is on uplands. It has a surface layer of dark grayish-brown or very dark grayish-brown sandy loam 4 to 7 inches thick (fig. 9). The rest of the profile is similar to the one described as representative of the Tifton series.

Included with this soil in mapping are a few small areas

Figure 9.—**Grassed waterway in an area of Tifton sandy loam, 2 to 5 percent slopes.**

that have slopes of less than 2 percent. Also included in some areas are small areas of Norfolk soils.

This Tifton soil is one of the better soils in the survey area for farming. It is well suited to most locally grown crops and to pasture plants and pine trees. Crops respond well to fertilization and other good management practices (fig. 10). Most of the acreage is cultivated.

Because of slope, the hazard of erosion is moderate. Tilling on the contour, terracing, and stripcropping help to control erosion in cultivated areas.

This soil should be managed so that soil losses from erosion are within allowable limits. The steepness and length of slopes or the erosion control practices installed govern the kind of cropping system needed to accomplish this. An example of a suitable cropping system, where slopes are 3 percent and the soil is terraced and farmed on the contour, is a 3-year rotation consisting of 1 year of cotton, 1 year of corn that is "slit" planted, and 1 year of peanuts followed by small grain for cover. All plant residue should be left on the surface between seasons of crop growth.

Organic matter is depleted at a moderately rapid rate, even if management is good. Returning all crop residue and including cover crops in the rotation are ways to maintain the content of organic matter and to increase the available water capacity. In areas where peanuts are grown, small concretions of iron are troublesome because they are mixed with the harvested peanuts. Plant nutrients are not leached so readily from this soil as they are from the more sandy soils.

This soil is well suited to sprinkler irrigation. Row crops and pasture grasses respond if supplemental water is applied during prolonged dry periods. An adequate supply of water can be obtained from deep wells. Capability unit IIe-2; woodland suitability group 2o1.

Troup Series

The Troup series consists of well-drained soils on uplands. These soils occur in fairly large areas where slopes are mainly smooth. Slopes range from 0 to 5 percent. Troup soils formed in sandy and loamy marine deposits. They occupy a sizable acreage in the two counties, but they are not among the more important soils for farming.

In a representative profile, the surface layer is very dark grayish-brown sand about 4 inches thick. It is underlain by yellowish-brown and light yellowish-brown sand that extends to a depth of about 57 inches. Below this, and extending to a depth of 78 inches, is yellowish-brown sandy loam and sandy clay loam that has a few strong-brown mottles in the lower part.

Troup soils are low in natural fertility and contain only a small amount of organic matter. The available water capacity is low, and permeability is moderate to moderately rapid. The rooting zone is deep, and tilth is good. These soils are strongly acid to very strongly acid throughout.

Most crops grown in the survey area can be grown on these soils, but crop response is only fair because the soils are droughty. Most of the acreage is woodland, but some of it is used for cultivated crops and pasture. The native vegetation is mainly a mixed stand of hardwoods and pines.

Representative profile of Troup sand, 0 to 5 percent slopes, in a wooded area 2 ½ miles south of Georgia Highway 285

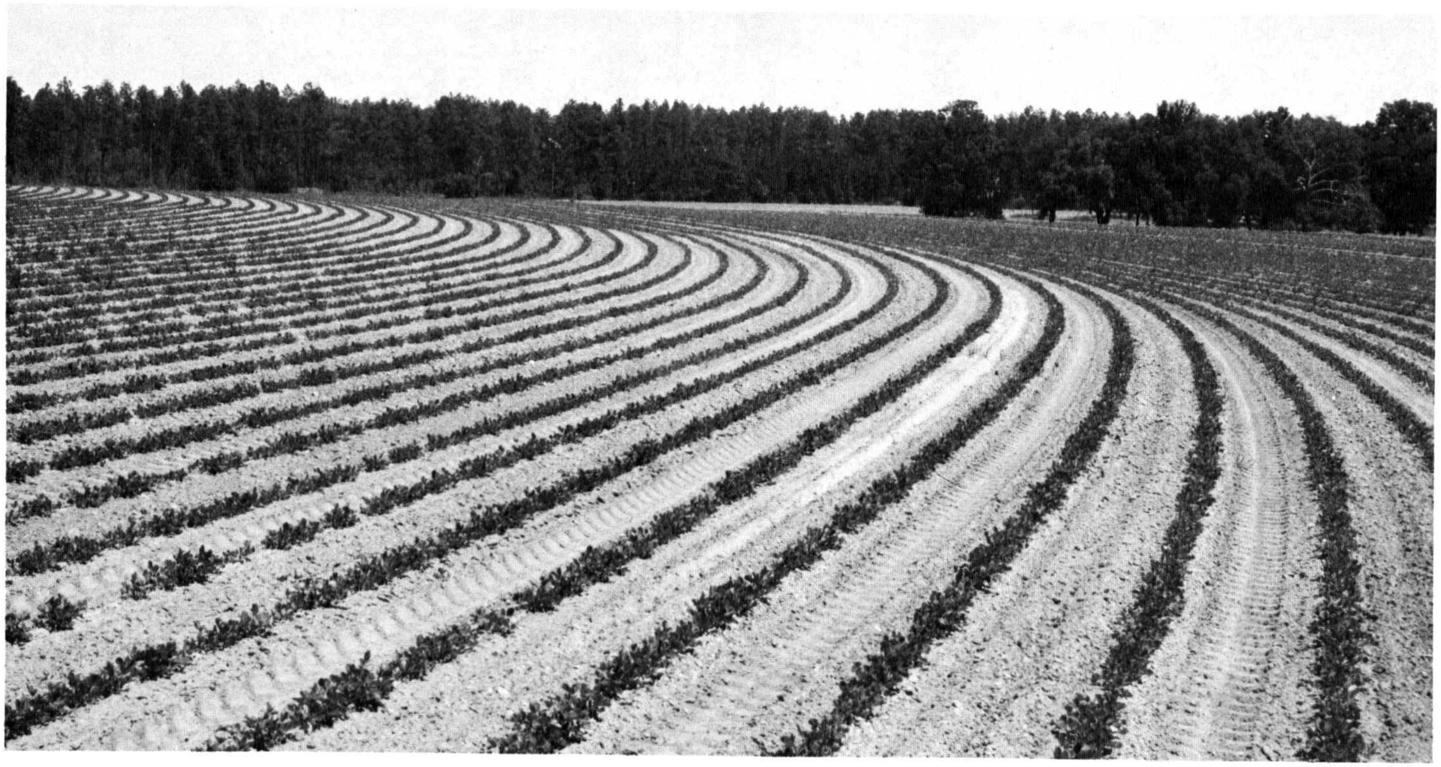

Figure 10.—**Peanuts growing in a contoured and terraced area of Tifton sandy loam, 2 to 5 percent slopes.**

and five-eighths mile west of the Decatur County line, Seminole County:

A1—0 to 4 inches, very dark grayish-brown (10YR 3/2) sand; weak, fine, granular structure; very friable; many fine roots; strongly acid; gradual, smooth boundary.

A21—4 to 42 inches, yellowish-brown (10YR 5/4) sand; single grained; loose; few fine and medium roots; strongly acid; gradual, smooth boundary.

A22—42 to 57 inches, light yellowish-brown (10YR 6/4) sand; single grained; loose; strongly acid; gradual, smooth boundary.

B1t—57 to 65 inches, yellowish-brown (10YR 5/6) sandy loam; moderate, medium, granular structure; very friable; very strongly acid; gradual, smooth boundary.

B2t—65 to 78 inches, yellowish-brown (10YR 5/6) sandy clay loam; few, fine, faint, strong-brown mottles; weak, medium, subangular blocky structure; friable; sand grains coated and bridged with clay; very strongly acid.

The A horizon ranges from 43 to 68 inches in thickness. The A1 horizon is very dark gray, dark grayish brown, or very dark grayish brown. The A2 horizon is brown, light yellowish brown, or yellowish brown. The B2t horizon ranges from yellowish brown to yellowish red. A few plinthite nodules are at a depth of more than 70 inches in some places.

The Troup soils commonly occur with the Lucy, Wagram, and Ocilla soils. They closely resemble the Lucy and Wagram soils, but they are better drained than the Ocilla soils. Troup soils do not have as much fine-textured material within 40 inches of the surface as all of those soils have.

Troup sand, 0 to 5 percent slopes (TzB).—This soil typically occurs in rather large areas. It has the profile described as representative of the Troup series.

Included with this soil in mapping are small areas of Wagram, Lucy, and Ocilla soils. Also included are a few areas where the content of plinthite is 2 to 8 percent at a depth of 55 to 60 inches.

Most crops grown in the survey area can be grown on this soil, but crop responses are only fair because the soil is droughty. Most of the acreage is in trees, but some is used for cultivated crops and pasture.

This soil can be tilled every year, and the risk of erosion is only slight. Crop damage and sometimes crop loss are frequently caused by lack of moisture in the hot summer. Organic matter is depleted at a rapid rate. Therefore, if cultivated crops are grown, large amounts of crop residue should be returned to the soil. A cropping sequence that includes perennial grasses is most beneficial. Annual crops that produce a large amount of residue are also satisfactory. An example of a suitable cropping system is a 4-year rotation consisting of 1 year of peanuts, 1 year of small grain, and 2 years of corn. All plant residue should be left on the surface between seasons of crop growth.

Soil blowing is a hazard in large, open fields. It can be checked by planting close-growing crops and clean-tilled crops in alternate strips that are either on the contour or at right angles to the prevailing wind.

This soil is suited to sprinkler irrigation. Row crops and pasture plants respond if supplemental water is applied during prolonged dry periods. An adequate supply of water can generally be obtained from deep wells. Capability unit IIIs-1; woodland suitability group 3s2.

Troup sand, 5 to 8 percent slopes (TzC).—This soil is in small areas. Its profile is similar to the one described as representative of the Troup series, but the sandy upper part of the profile is about 3 inches thinner.

Included with this soil in mapping are small areas of Wagram and Esto soils. Also included are a few areas in which the content of plinthite is 2 to 8 percent at a depth of 55 to 60 inches.

This soil is droughty and is only fairly suitable for crops grown in the survey area. Because of slope, the hazard of erosion is severe. This soil is suited to pine trees.

Crop damage and sometimes crop loss are frequently caused by a lack of moisture in the hot summer. Organic matter is depleted at a rapid rate. Therefore, if cultivated crops are grown, a large amount of crop residue should be returned to the soil. A cropping sequence that includes perennial grasses is most beneficial. An example of a suitable cropping system is a 6-year rotation consisting of 4 years of perennial grass and 2 years of row crops, such as peanuts. All plant residue should be left on the surface between seasons of crop growth, and all farming should be on the contour. Capability unit IVs-1; woodland suitability group 3s2.

Wagram Series

The Wagram series consists of well-drained soils on uplands. These soils are in rather large areas on smooth landscapes. They formed in sandy and loamy marine deposits. Slopes range from 0 to 5 percent. These soils make up a sizable acreage in both Miller and Seminole Counties.

In a representative profile the surface layer is dark grayish-brown loamy sand about 5 inches thick. Next is a layer of light yellowish-brown loamy sand that extends to a depth of about 23 inches. The subsoil, extending to a depth of 62 inches, is yellowish-brown and brownish-yellow sandy loam and sandy clay loam.

These soils are low in natural fertility and contain only a small amount of organic matter. Permeability is rapid through the upper loamy sand part of the profile and moderately rapid through the subsoil. Available water capacity is low. Tilth is good, and the rooting zone is thick. These soils are strongly acid to very strongly acid throughout.

Wagram soils are suited to most locally grown crops, but crop response is only fair because the soils are droughty. Most of the acreage is cultivated, but some is pastured and wooded. The natural vegetation is mixed hardwoods and pines.

Representative profile of Wagram loamy sand, 0 to 5 percent slopes, 3 ½ miles west of Baker County line and 2 miles south of Georgia Highway 91, Miller County:

Ap—0 to 5 inches, dark grayish-brown (10YR 4/2) loamy sand; weak, fine, granular structure; very friabie; many fine roots; strongly acid; clear, smooth boundary.

A2—5 to 23 inches, light yellowish-brown (10YR 6/4) loamy sand; weak, fine, granular structure; very friable; few fine roots; very strongly acid; gradual, smooth boundary.

B1t—23 to 32 inches, brownish-yellow (10YR 6/6) sandy loam; weak, medium, subangular blocky structure; friable; very strongly acid; gradual, smooth boundary.

B21t—32 to 56 inches, yellowish-brown (10YR 5/6) sandy clay loam; weak, medium, subangular blocky structure; few clay films on ped surfaces; very strongly acid; gradual, smooth boundary.

B22t—56 to 62 inches, brownish-yellow (10YR 6/6) sandy clay loam; few, medium, faint, strong-brown (7.5YR 5/8) mottles; weak, medium, subangular blocky structure; friable; few clay films on ped surfaces; very strongly acid.

The A1 or Ap horizon is dark grayish brown to very dark grayish brown and ranges from 5 to 8 inches in thickness. The A2 horizon ranges from light yellowish brown to yellowish brown. The combined thickness of the A horizons is 21 to 37 inches. The Bt horizon is light yellowish brown to strong brown and ranges from sandy loam to sandy clay loam. Some profiles have mottles of red, brown, and gray below a depth of 32 inches.

Wagram soils commonly occur with Norfolk, Lucy, and Troup soils. They have less fine-textured material within 20 inches of the surface than the Norfolk soils. Their B horizon is not so red as that of the Lucy soils, and they have more fine material within 40 inches of the surface than the Troup soils.

Wagram loamy sand, 0 to 5 percent slopes (WeB).—This well-drained soil is on uplands and typically occurs in large areas. Included with it in mapping are small areas of Norfolk, Troup, and Lucy soils.

Most locally grown crops can be grown, but crop response is only fair because the soil is droughty. Most of the acreage is cultivated, but pasture plants and pine trees do well on this soil.

This soil can be tilled every year, and the risk of erosion is only slight. Lack of moisture in the hot summer frequently causes crop damage. Organic matter is depleted at a moderately rapid rate. If cultivated crops are grown, large amounts of crop residue should be returned to the soil. A cropping sequence that includes perennial grasses is more beneficial than other cropping sequences. An example of a suitable cropping system is a 3-year rotation consisting of 1 year of peanuts, 1 year of small grain, and 1 year of corn. All plant residue should be left on the surface between seasons of crop growth.

Soil blowing is a hazard in large, open fields. It can be checked by planting close-growing crops and clean-tilled crops in alternate strips, either on the contour or at right angles to the prevailing wind.

This soil is well suited to sprinkler irrigation. Row crops and pasture plants respond if supplemental water is applied during prolonged dry periods. An adequate supply of water can generally be obtained from deep wells. Capability unit IIs-1; woodland suitability group 3s2.

Use and Management of the Soils for Crops and Pasture

This section describes behavior and management of soils in Miller and Seminole Counties under specified conditions. These interpretations include the management of soils for crops and pasture. This section also explains the system of capability classification used by the Soil Conservation Service. The capability classification of each soil mapped in the counties can be learned by referring to the "Guide to Mapping Units." Information about its management is given in the section "Descriptions of the Soils."

Good reasoning must be used in the application of these interpretations because new technology, improved techniques, and economic changes are among the factors that influence alternative use and management of soils. Changes in the behavior of soils that are under new and different management techniques are not unusual and should be anticipated.

Because the concepts of many soil series have undergone changes in the last 10 to 20 years, present interpretations and predictions about a particular soil should be carefully studied before applying them to the soils of the same name in older published surveys.

General Management

In this section, general practices of management are discussed. Suitable plans and suitable cropping systems are discussed in each description of each mapping unit in the section "Descriptions of the Soils."

Management is needed on the soils in Miller and Seminol·

Counties mainly to control erosion, dispose of excess water, and maintain good tilth and productivity. These general practices are discussed mainly according to capability classes and subclasses.

Soils such as the nearly level Norfolk and Tifton soils in capability class I have only slight limitations. Any suitable crop can be grown continuously if enough plant residue is returned to maintain good tilth. A planned sequence of crops aids in the control of weeds, insects, and plant diseases and results in the more efficient use of adequate fertilizer.

Sloping Norfolk and Tifton soils, as well as similar soils, are susceptible to erosion. Consequently, they are in capability subclasses IIe and IIIe. The degree of susceptibility depends on the erodibility of the soil, the frequency and intensity of rainfall, the degree of slope, and the length of slope. These properties determine whether the farmer uses straight rows, contour cultivation with or without terraces, or stripcropping. The more gently sloping soils need only contour cultivation and a cropping system that provides medium to large amounts of crop residue. Sloping soils may need a combination of straight-row farming, contour farming without terraces, or stripcropping, and a cropping system that includes annual close-growing crops, high residue producing crops, or perennial crops. A grassed waterway or drainage outlet is essential in managing these soils (fig. 11).

For some of the soils, especially the sandy ones, such as the Lucy and Wagram soils in capability subclass IIs, it is mainly necessary to return large amounts of crop residue and to manage this residue. Cropping sequences that include perennial grasses or legumes are beneficial. Stripcropping and contour cultivation are also important.

Excess water is the main limitation in several soils, such as the Goldsboro and Irvington soils in capability subclass IIw. The drainage needed depends on the amount of water in the soil and the kinds of crops grown. Two methods are generally used, open ditches and covered tile drains. After the water is controlled, only practices that help to maintain productivity and good tilth are needed.

Several management practices contribute to maintenance of soil productivity and good tilth and help to prevent soil losses. Among these are—

1. Regular applications of lime and fertilizer according to the needs of the crop.
2. Good management of crop residue, generally by shredding and leaving the residue on the soil surface between seasons of crop growth.
3. Use of suitable cropping systems.

Among other practices that may be needed are—

1. Grassed waterways or outlets. These are essential for the disposal of the runoff that results from straight-row farming, contour farming, terraces, or stripcropping.
2. A field border of perennial grass. This is needed to control erosion in some places at the edge of fields and to reduce weed growth. Such a border is attractive and allows more efficient operation of farm equipment.
3. Farm roads and fences. These should be located on the crest of the slopes, where the watershed divides, or on the contour. They should permit field and row arrangement that facilitates efficient farming operations. Fences may be located in or adjacent to natural waterways.

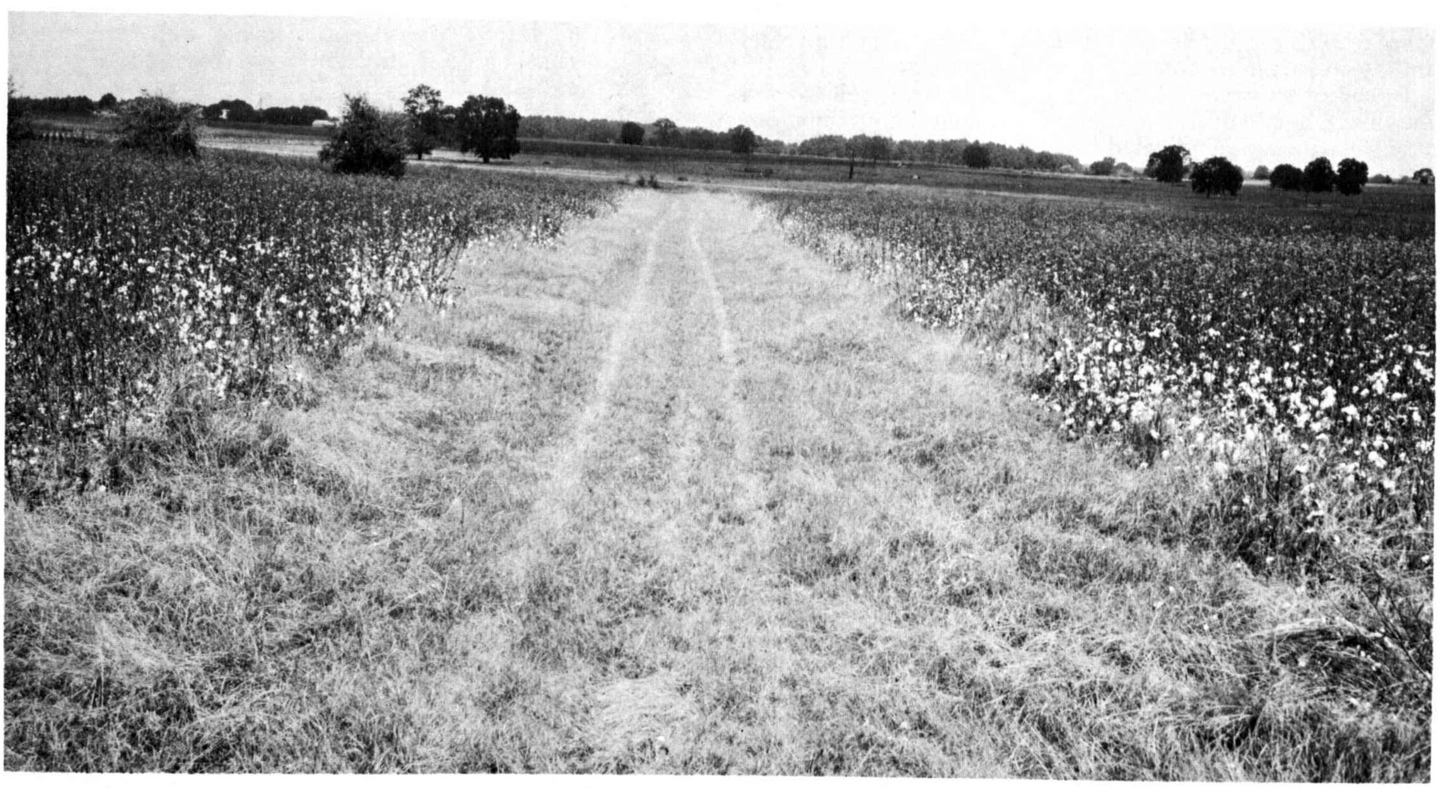

***Figure 11.*—A waterway, sodded in bahiagrass, in an area of Tifton sandy loam, 2 to 5 percent slopes. This soil is in capability unit IIe-2.**

Capability Grouping

Capability grouping shows, in a general way, the suitability of soils for most kinds of field crops. The soils are grouped according to their limitations when used for field crops, the risk of damage when they are so used, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to rice, cranberries, horticultural crops, or other crops requiring special management.

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

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

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

Capability Subclasses are soil groups within one class; they are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in some parts of the United States but not in the survey area, shows that the chief limitation is climate that is too cold or too dry.

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

Capability Units are soil groups within the subclasses. The soils in one capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping for making many statements about management of soils. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe-4 or IIIe-3. Thus, in one symbol, the Roman numeral designates the capability class, or degree of limitation; the small letter indicates the subclass, or kind of limitation, as defined in the foregoing paragraph; and the Arabic numeral specifically identifies the capability unit within each subclass.

In the following paragraphs the eight classes in the capability system and the subclasses and units in Miller and Seminole Counties are described.

Class I soils have few limitations that restrict their use.
- Unit I-1. Nearly level, well-drained soils that have a sandy surface layer and a loamy subsoil.
- Unit I-2. Nearly level, well-drained, pebbly soil that has a loamy surface layer and subsoil.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.
- Subclass IIe. Soils that are subject to moderate erosion if they are protected.
  - Unit IIe-1. Very gently sloping, well-drained soils that have a sandy surface layer and loamy subsoil.
  - Unit IIe-2. Very gently sloping, well-drained, pebbly soil that has a loamy surface layer and subsoil.
- Subclass IIw. Soils that have moderate limitations because of excess water.
  - Unit IIw-1. Nearly level, well-drained, loamy soils throughout; along streams; subject to occasional flooding.
  - Unit IIw-2. Nearly level, moderately well drained, loamy soils throughout.
  - Unit IIw-3. Nearly level, moderately well drained soil that has a loamy surface layer and a clayey subsoil.
- Sublass IIs. Soils that have moderate limitations because of available water capacity.
  - Unit IIs-1. Nearly level to very gently sloping, well-drained soil that has about 21 to 38 inches of sandy material over a loamy subsoil.

Class III soils have severe limitations that reduce the choice of plants, require special conservation practices, or both.
- Subclass IIIe. Soils that are subject to severe erosion if they are cultivated and not protected.
  - Unit IIIe-1. Deep, gently undulating and gently rolling, well-drained soils that have a surface layer of loamy fine sand and somewhat poorly drained soils that have a surface layer of fine sandy loam; on uplands.
  - Unit IIIe-3. Very gently sloping, well-drained soil that has a sandy surface layer and a clayey subsoil.
- Subclass IIIw. Soils that have severe limitations because of excess wetness.
  - Unit IIIw-1. Nearly level, somewhat poorly drained soil that has 24 to 38 inches of sandy material over a loamy subsoil.
- Subclass IIIs. Soils that have severe limitations because of available water capacity.
  - Unit IIIs-1. Nearly level to very gently sloping, well-drained soil that has about 43 to 68 inches of sandy material over a loamy subsoil.

Class IV soils have very severe limitations that restrict the choice of plants, require very careful management, or both.
- Subclass IVs. Soils that have very severe limitations because of available water capacity.
  - Unit IVs-1. Gently sloping, well-drained soil that has about 43 to 68 inches of sandy material over a loamy subsoil.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use largely to pasture, woodland, or wildlife habitat.
- Subclass Vw. Soils that are too wet for cultivation; drainage or protection not feasible.
  - Unit Vw-1. Nearly level, very poorly drained and poorly drained soils that have a sandy or loamy surface layer and mainly a clayey subsoil.
  - Unit Vw-2. Nearly level, poorly drained and very poorly drained soils that have about 24 to 38 inches of sandy material over a loamy subsoil.

Class VI soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture, woodland, or wildlife habitat.

Subclass VIe. Soils that are subject to severe erosion if they are not protected by perennial cover.

Unit VIe-2. Gently sloping to strongly sloping well-drained soil that has a sandy surface layer and a clayey subsoil.

Class VII soils have very severe limitations that make them unsuited to cultivation and that restrict their use largely to pasture, woodland, or wildlife habitat. (No class VII soils in Miller and Seminole Counties.)

Class VIII soils and land types have limitations that preclude their use for commercial plants and restrict their use to recreation, wildlife habitat, water supply, or esthetic purposes. (No class VIII soils in Miller and Seminole Counties.)

Estimated Yields

Table 2 lists estimated yields of the principal crops grown in the two counties. The yields are based on estimates made by farmers, soil scientists, and others who have knowledge of yields in the county and on information taken from research data. The yields are estimated averages per acre that can be expected by farmers at the level of management that tends to produce the largest economic returns.

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

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

1. Rainfall is effectively used and conserved.
2. Surface or subsurface drainage systems, or both, are installed.
3. Crop residue is managed to maintain tilth.
4. Minimum but timely tillage is used.
5. Measures that control insects, plant diseases, and weeds are consistently used.
6. Fertilizer is applied according to soil tests and crop needs.
7. Adapted crop varieties are used at proper seeding rates.

In the following paragraphs are some specific management practices needed to obtain the yields shown in table 2. The rates given for plant nutrients are on a per acre basis.

CORN: Plant enough seed to produce 16,000 to 18,000 plants per acre; apply 100 to 160 pounds of nitrogen (N), 50 to 70 pounds of phosphoric acid (P_2O_5), and 75 to 105 pounds of potash (K_2O); apply 5 pounds of elemental zinc per acre on light sandy soils, on soils that have a pH above 6.5, or on the basis of special soil tests; use lower fertilization rates and split nitrogen applications on deep sandy soils; return all crop residue to the soil.

COTTON: Plant enough seed to produce 40,000 to 60,000 plants per acre; apply 60 to 120 pounds of nitrogen (N), 50 to 80 pounds of phosphoric acid (P_2O_5), and 75 to 120 pounds of potash (K_2O); split nitrogen applications on deep sandy soils; apply 0.5 pound of elemental boron and 2.5 pounds of elemental manganese per acre on soils that have pH above 5.6; apply fertilizer that contains sufficient sulfur to supply minimum of 10 pounds of elemental sulfur per acre; provide adequate control of weeds, plant diseases, and insects.

PEANUTS: Plant 80 to 100 pounds of seed per acre; apply 0 to 20 pounds of nitrogen (N), 40 to 50 pounds of phosphoric acid (P_2O_5), and 60 to 75 pounds of potash (K_2O); do not apply nitrogen if peanuts are planted in soils that have high residual fertility; apply gypsum for Virginia type peanuts and for small podded peanuts if pops are excessive; apply 0.5 pound of elemental boron per acre on deep sandy soils or where "hollowheart" has been observed; provide adequate control of weeds, plant diseases, and insects.

OATS: If oats are to be used for grazing and grain, plant at the rate of 4 bushels per acre; apply 100 to 140 pounds of nitrogen (N), 50 to 70 pounds of phosphoric acid (P_2O_5), and 75 to 120 pounds of potash (K_2O); split nitrogen applications, using one-half in fall and one-half in mid-February; use lower rates for seeding and fertilizing if oats are to be used only for grain; provide adequate control of weeds.

SOYBEANS: Plant approximately 1 bushel of seed per acre; apply 0 to 20 pounds of nitrogen (N), 20 to 50 pounds of phosphoric acid (P_2O_5), and 40 to 100 pounds of potash (K_2O); use nitrogen on deep sandy soils or where soybeans do not follow a fertilized crop; inoculate seed and apply 1 ounce of molybdenum salt per bushel of seed as treatment; use lower fertilizer rates where soybeans follow a heavily fertilized crop; provide adequate control of weeds and insects.

COASTAL BERMUDAGRASS: If Coastal bermudagrass is to be used as hay, apply 200 to 400 pounds of nitrogen (N), 50 to 100 pounds of phosphoric acid (P_2O_5), and 100 to 200 pounds of potash (K_2O); split nitrogen applications, first application early in spring and after each cutting for hay; provide adequate control of weeds and insects.

If Coastal bermudagrass is to be used as pasture, apply 100 to 200 pounds of nitrogen (N), 40 to 60 pounds of phosphoric acid (P_2O_5), and 80 to 120 pounds of potash (K_2O); adjust fertilizer amounts with stocking rates; provide adequate control of weeds and insects.

BAHIAGRASS: If bahiagrass is to be used as pasture, apply 75 to 140 pounds of nitrogen (N), 40 to 70 pounds of phosphoric acid (P_2O_5), and 60 to 90 pounds of potash (K_2O); adjust fertilizer amounts with stocking rates; provide adequate control of weeds and insects.

Use of the Soils for Woodland[3]

This section contains information about the relationship between soils and trees. This information makes the soil survey more useful to owners and operators of woodlands in developing and carrying out plans for establishing and harvesting forest resources. It is based on data gathered by teams of foresters and soil scientists, representatives of Federal and State agencies, representatives of the wood-using industry, and others.

Originally, Miller and Seminole Counties were mainly wooded. Now, trees cover about 41 percent of the survey area (fig. 12).

Good stands of commercial trees are produced in the woodlands of the two counties. Needleleaf forest types occur most commonly on the hills, and broadleaf types generally are dominant on the bottoms along the rivers and creeks. The value of the wood products is substantial, but it is below the potential. Among other values are those that result from the

[3] W. P. THOMPSON, forester, Soil Conservation Service, helped prepare this section.

TABLE 2.—*Estimated acre yields of the principal crops grown under a high level of management*

[Yields listed are average yields expected under a high level of management that does not include irrigation. Absence of data indicates that the crop is not suited to the particular soil or generally is not grown]

Soil	Corn	Cotton lint	Peanuts	Oats	Soybeans	Coastal bermuda grass for—		Bahiagrass for pasture
						Hay	Pasture	
	Bushels	*Pounds*	*Pounds*	*Bushels*	*Bushels*	*Tons*	*A.U.M.*[1]	*A.U.M.*[1]
Angie fine sandy loam	50	400		40	20	4.5	7.0	7.0
Esto loamy sand, 2 to 5 percent slopes	45	450	1,500	45	25	4.5	6.5	5.7
Esto loamy sand, 5 to 17 percent slopes							5.5	5.0
Goldsboro sandy loam, 0 to 2 percent slopes	115		3,100	90	42	6.0	10.0	9.0
Grady soils								5.5
Irvington sandy loam	90	750	2,600	80	40	6.2	10.5	9.0
Lucy loamy sand, 0 to 5 percent slopes	63	600	2,400	50	25	5.0	7.5	7.5
Meggett soils								6.0
Norfolk loamy sand, 0 to 2 percent slopes	110	750	3,500	100	40	6.2	10.0	8.8
Norfolk loamy sand, 2 to 5 percent slopes	100	750	3,300	90	35	6.2	10.0	8.5
Ocilla loamy sand	70		2,000	55	35	4.5	8.0	7.5
Orangeburg loamy sand, 0 to 2 percent slopes	100	750	3,200	95	45	6.2	10.5	8.5
Orangeburg loamy sand, 2 to 5 percent slopes	95	750	3,000	90	45	6.2	10.5	8.5
Orangeburg loamy sand, 5 to 8 percent slopes, eroded	85	700	2,800	75	35	6.0	10.0	8.0
Pelham sand								5.5
Riverview and Congaree soils	100			80	40	6.2	10.5	8.5
Tifton sandy loam, 0 to 2 percent slopes	100	850	3,200	95	45	6.2	10.5	8.5
Tifton sandy loam, 2 to 5 percent slopes	90	850	3,100	90	45	6.2	10.5	8.5
Troup sand, 0 to 5 percent slopes	53	400	2,200	45	23	4.0	6.7	6.5
Troup sand, 5 to 8 percent slopes	48		1,800	40	18	3.5	6.5	6.2
Wagram loamy sand, 0 to 5 percent slopes	70	575	2,550	55	25	5.0	8.0	7.0

[1] A.U.M. is animal-unit-month, a term to express the carrying capacity of pasture. It is the number of animal units per acre a pasture can carry each month without injury to the sod. An acre of pasture that provides 1 month of grazing for 1 cow, 1 horse, 7 sheep, or 5 hogs has a carrying capacity of 1 animal-unit-month.

use of woodland for grazing, wildlife habitat, recreation, natural beauty, and conservation of soil and water.

This section is provided to explain how soils affect the growth and management of trees in the survey area. Table 3 gives potential productivity and management problems by woodland suitability groups for the soils in the two counties.

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

Each woodland suitability group is identified by a three-part symbol. The first part of the symbol is an Arabic

TABLE 3.—*Woodland groups and factors affecting management*

Woodland suitability groups and map symbols	Potential productivity		Management problems			Species suitable for planting
	Tree species	Site class	Erosion hazard	Equipment limitations	Seedling mortality	
Group 1o7: Riv. Well-drained soils that have a loamy surface layer and subsoil or underlying layers; in some places the lower layers are sandy; on flood plains of streams; suited to broadleaf trees or southern pines or both.	Loblolly pine Slash pine Sweetgum Water oak Yellow-poplar Sycamore	100 100 110 80 120 -----------	Slight	Slight	Slight	Slash pine, loblolly pine, yellow-poplar, sycamore, cottonwood, cherrybark oak, and water oak.
Group 1w9: Myt. Poorly drained soils that have a sandy or loamy surface layer and a clayey subsoil; on flood plains of streams; suited to broadleaf trees or southern pines or both.	Slash pine[1] Loblolly pine[1] Water oak[1] Tupelos Pond pine	100 100 90–100 ----------- 80	Slight	Severe[2]	Severe[2]	Loblolly pine[3], slash pine[3], sweetgum, sycamore[3], water tupelo, and water oak.
Group 2o1: NhA, NhB, OeA, OeB, OeC2, TuA, TuB. Well-drained soils that have a sandy or loamy surface layer and a loamy subsoil; on uplands; better suited to southern pines than to other trees.	Loblolly pine Slash pine Longleaf pine	90 90 70	Slight	Slight	Slight	Slash pine and loblolly pine.
Group 2o7: Ig. Moderately well drained soils that have a loamy surface layer and subsoil; on uplands; suited to broadleaf trees or southern pines or both.	Loblolly pine Slash pine Yellow-poplar Red oak White oak	90 90 90 ----------- -----------	Slight	Slight	Slight	Slash pine, loblolly pine, yellow-poplar, cherrybark oak, sycamore, and black walnut.
Group 2w3: Pa. Poorly drained soils that have 24 to 38 inches of sandy material over a loamy subsoil; on broad flats and in depressions and drainageways; better suited to southern pines than to other trees.	Loblolly pine Slash pine Longleaf pine	90 90 70	Slight	Severe[2]	Severe[2]	Slash pine and loblolly pine.
Group 2w8: Av, GmA. Moderately well drained soils that have a loamy surface layer and a loamy or clayey subsoil; on uplands and stream terraces; suited to broadleaf trees or southern pines or both.	Loblolly pine Slash pine Sweetgum Yellow-poplar Water oak Blackgum Red oak White oak	90 90 90 100 ----------- ----------- ----------- -----------	Slight	Moderate	Slight to moderate.	Loblolly pine, slash pine, yellow-poplar, sycamore, sweetgum, cherrybark oak, and water oak.
Group 2w9: Grd. Very poorly drained soils that have a loamy surface layer and a clayey subsoil; in upland depressions; suited to broadleaf trees and southern pines.	Loblolly pine[1] Slash pine[1] Tupelos Cypress Sweetgum[1] Green ash	90 90 ----------- ----------- 90 -----------	Slight	Severe[2]	Severe[2]	Loblolly pine[3], slash pine[3], sweetgum[3], sycamore[3], water tupelo[3], and water oak[3].
Group 3o1: EuB, EuE. Well-drained soils that have a sandy or loamy surface layer and a clayey subsoil; on uplands; better suited to southern pines than to other trees.	Loblolly pine Slash pine Longleaf pine	80 80 60–70	Slight	Slight	Slight	Loblolly pine, slash pine, and longleaf pine.
Group 3s2: LMB, TzB, TzC, WeB. Well-drained soils that have about 11 to 68 inches of sandy material over a loamy subsoil; on uplands; better suited to southern pines than to other trees.	Slash pine Loblolly pine Longleaf pine	80 80 60–70	Slight	Moderate	Moderate	Slash pine and longleaf pine.
Group 3w2: Oh. Somewhat poorly drained soils that have 24 to 38 inches of sandy material over a loamy subsoil; better suited to southern pines than to other trees.	Loblolly pine Slash pine Longleaf pine	80 80 60–70	Slight	Moderate	Moderate	Slash pine and loblolly pine.

[1] Potential productivity for this species is attainable only in areas that have adequate surface drainage.
[2] Rating is moderate in areas that have adequate drainage.
[3] Planting of this species is feasible only in areas that have adequate drainage.

Figure 12.—**A natural stand of longleaf pine growing on Norfolk loamy sand, 0 to 2 percent slopes. This soil is in woodland suitability group 2o1.**

number that indicates the relative potential productivity of the soils; the numeral 1 means very high; 2 means high, and 3 means moderately high.

The second part of the symbol is a small letter that indicates the important soil property that imposes a moderate or severe hazard or limitation in managing the soils for wood production. The letter *w* shows that excessive water in or on the soil is the chief limitation; *s* shows that the soils are sandy; and *o* shows that the soils have no significant restrictions or limitations for woodland use or management.

The third element in the symbol is an Arabic numeral that indicates the degree of limitation and the suitability of the soils for certain kinds of trees.

The numeral 1 indicates that the soils have no significant limitations and are well suited to needleleaf trees.

The numeral 2 indicates that the soils have one or more moderate limitations and are well suited to needleleaf trees.

The numeral 3 indicates that the soils have one or more severe limitations and are well suited to needleleaf trees.

The numeral 7 means that the soils have no significant limitations and are well suited to both needleleaf and broadleaf trees.

The numeral 8 means that the soils have one or more moderate limitations but are well suited to needleleaf and broadleaf trees.

The numeral 9 means that the soils have one or more severe limitations but are suited to needleleaf and broadleaf trees.

In the column headed "Tree species" is a list of some of the commercially important trees that are adapted to the soil. These are the trees that woodland managers will generally favor in intermediate or improvement cuttings. Also given is the potential productivity of these trees in terms of site class. The site class is the average height of dominant trees, in feet, at age 30 for cottonwood; at age 35 for sycamore; at age 25 for planted pines; and at age 50 for all other species or types.

The management problems evaluated are erosion hazard, equipment limitations, and seedling mortality. The ratings for erosion hazard measure the risk of soil losses in well-managed woodland. Erosion hazard is slight if expected soil loss is small, moderate if some measures are needed to control erosion in logging and construction, and severe if intensive treatment or special equipment and methods are needed to check excessive soil losses.

The ratings for equipment limitation reflect the soil conditions that restrict the use of equipment normally used in woodland management or harvesting. Slight indicates that there are no restrictions on the kind of equipment or the time of year. Moderate indicates that there are seasonal limitations or the need for modification in methods or kinds of equipment. Severe indicates the need for specialized equipment or operations.

The ratings for seedling mortality indicate the probable losses of planted seedlings when plant competition is not a limiting factor. Normal rainfall, good planting stock, and proper planting are assumed. Slight indicates that probable losses are less than 25 percent, moderate indicates losses of 25 to 50 percent; and severe indicates losses of more than 50 percent of the seedlings.

In the column headed "Species suitable for planting" are trees that are suited to the soils in each woodland group and that can be used in plantings for commercial wood production.

Use of the Soils for Wildlife Habitat[4]

Soils directly influence kinds and amounts of vegetation and the kinds of water available, and in this way they indirectly influence the kinds of wildlife that can live in an area. Soil properties that affect the productivity of wildlife habitat are—(1) thickness of soil useful to crops, (2) texture of the surface layer, (3) available water capacity to a 40-inch depth, (4) wetness, (5) surface stoniness or rockiness, (6) hazard of flooding, (7) slope, and (8) permeability of the soil to air and water.

In table 4 the soils of this survey area are rated according to their relative suitability for seven elements of wildlife habitat and three kinds of wildlife. The ratings for elements of wildlife habitat are related to the three kinds of wildlife. For example, soils that are unsuited to shallow water developments are also unsuited to wetland wildlife. The ratings for elements of habitat take into account mainly the characteristics of the soil and closely related natural factors of the environment. They do not take into account the climate, the present use of the soils, or the present distribution of wildlife and of people. Consequently, onsite inspection is required before a soil can be selected as a site for wildlife habitat development.

[4] JESSE MERCER, JR., biologist, Soil Conservation Service, helped prepare this section.

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

Soil series and map symbol	Elements of wildlife habitat							Kinds of wildlife		
	Grain and seed crops	Grasses and legumes	Wild herbaceous upland plants	Hardwood trees, shrubs, and vines	Coniferous woody plants	Wetland food and cover plants	Shallow water developments	Openland	Woodland	Wetland
Angie: Av	Good	Good	Good	Good	Fair	Poor	Poor	Good	Good	Poor.
Esto:										
EuB	Fair	Good	Good	Fair	Fair	Poor	Very poor	Good	Fair	Very poor.
EuE	Poor	Good	Good	Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor.
Goldsboro: GmA	Good	Good	Good	Good	Good	Poor	Fair	Good	Good	Fair.
Grady: Grd	Very poor	Poor	Fair	Fair	Poor	Fair	Good	Poor	Fair	Fair.
Irvington: Ig	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Lucy: LMB	Fair	Good	Good	Fair	Fair	Very poor	Very poor	Good	Fair	Very poor.
Meggett: Myt	Poor	Fair	Fair	Fair	Poor	Fair	Fair	Fair	Fair	Fair.
Norfolk: NhA, NhB	Good	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
Ocilla: Oh	Fair	Fair	Good	Fair	Good	Fair	Fair	Fair	Good	Fair.
Orangeburg:										
OeA, OeB	Good	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
OeC2	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
Pelham: Pa	Poor	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair.
Riverview and Congaree: Riv	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Tifton: TuA, TuB	Good	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
Troup: TzB, TzC	Poor	Fair	Fair	Fair	Good	Very poor	Very poor	Fair	Fair	Very poor.
Wagram: WeB	Fair	Good	Good	Fair	Fair	Very poor	Very poor	Good	Fair	Very poor.

A rating of good means that the element of wildlife habitat or the habitat for the specified kind of wildlife is easily created, improved, and maintained, that few or no limitations affect management, and that satisfactory results can be expected.

Fair means the element of wildlife habitat and the kind of habitat can be created, improved, or maintained in most places. Moderate intensity of management and fairly frequent attention, however, may be required for satisfactory results.

Poor means that the limitations for the designated use are rather severe. Habitats can be created, improved, or maintained in most places, but management is difficult and requires intensive effort.

Very poor means that limitations are very severe, that unsatisfactory results are to be expected, and that it is either impossible or impractical to create, improve, or maintain the habitat.

The column headings in table 4 under "Elements of wildlife habitat" and "Kinds of wildlife" are discussed briefly in the following paragraphs.

GRAIN AND SEED CROPS: These crops are annual grain-producing plants. Among them are corn, sorghum, millet, soybeans, proso, benne, and peas.

GRASSES AND LEGUMES: Making up this group are domestic grasses and legumes that are established by planting. These crops provide food and cover for wildlife. Among the grasses are bahiagrass, ryegrass, and panicgrass, and among the legumes are annual lespedeza, shrub lespedeza, and clovers and vetches.

WILD HERBACEOUS UPLAND PLANTS: This group consists of native or introduced perennial grasses, forbs, and weeds that provide food and cover for upland wildlife. Beggarweed, perennial lespedeza, wild bean, pokeweed, partridgepea, and cheatgrass are typical examples. On rangeland, typical plants are bluestem, grama, perennial forbs, and legumes.

HARDWOOD TREES, SHRUBS, AND VINES: These plants are nonconiferous trees, shrubs, and woody vines that produce food for wildlife in the form of fruits, nuts, buds, catkins, or browse. Such plants commonly grow in their natural environment, but they may be planted and developed through wildlife management programs. Among the typical plants, in this category are oak, beech, cherry, dogwood, maple, viburnum, grape, honeysuckle, greenbrier, silverberry, and hawthorn.

CONIFEROUS WOODY PLANTS: These are cone-bearing trees and shrubs that provide cover and commonly furnish food in the form of browse, seeds, or fruitlike cones. They commonly grow in their natural environment, but they may be planted and managed. Typical plants in this category are pines, cedars, and ornamental trees and shrubs.

Wetland Food and Cover Plants: In this group are annual and perennial herbaceous plants that are generally native to moist and wet sites. These plants furnish food and cover mostly for wetland wildlife. Typical examples are smartweed, wild millet, spikerush and also rushes, sedges, and burreed. Submerged and floating aquatics are not included.

Shallow Water Developments: These are impoundments or excavations for controlling water, generally not more than 3 feet deep, so that a suitable habitat can be created for waterfowl. Some developments are designed to be drained, planted, and then flooded; others are permanent impoundments that grow submerged aquatics.

Openland Wildlife: This group consists of birds and mammals that normally live in meadows, pastures, and open areas where grasses, herbs, and shrubby plants grow. Quail, doves, meadowlarks, field sparrows, cottontail rabbits, and foxes are typical examples.

Woodland Wildlife: This group consists of birds and mammals that normally live in wooded areas of hardwood trees, coniferous trees, and shrubs. Woodcocks, thrushes, wild turkeys, deer, squirrels, opossum, and raccoons are typical examples.

Wetland Wildlife: Among these are birds and mammals that normally live in wet areas, marshes, and swamps. Ducks, geese, rails, shore birds, herons, minks, beaver, and muskrats are typical examples.

Engineering Uses of the Soils[5]

This section is useful to those who need information about soils used as structural material or as foundation upon which structures are built. Among those who can benefit from this section are planning commissions, town and city managers, land developers, engineers, contractors, and farmers.

Among properties of soils highly important in engineering are permeability, strength, compaction characteristics, soil drainage condition, shrink-swell potential, grain size, plasticity, and soil reaction. Also important are depth to the water table, depth to bedrock, and slope. These properties, in various degrees and combinations, affect construction and maintenance of roads, airports, pipelines, foundations for small buildings, irrigation systems, ponds and small dams, and systems for disposal of sewage and refuse.

Information in this section of the soil survey can be helpful to those who—

1. Select potential residential, industrial, commercial, and recreational areas.
2. Evaluate alternate routes for roads, highways, pipelines, and underground cables.
3. Seek sources of gravel, sand, or clay.
4. Plan farm drainage systems, irrigation systems, ponds, terraces, and other structures for controlling water and conserving soil.
5. Correlate performance of structures already built with properties of the kinds of soil on which they are built, for the purpose of predicting performance of structures on the same or similar kinds of soil in other locations.
6. Predict the trafficability of soils for cross-country movement of vehicles and construction equipment.
7. Develop preliminary estimates pertinent to construction in a particular area.

Most of the information in this section is presented in tables 5, 6, 7, and 8. Table 5 shows the results of engineering laboratory tests on soil samples; table 6 gives estimates for soil properties significant to engineering; table 7 gives interpretations for various engineering uses; and table 8 gives degree and kind of limitations for recreational development.

This information, along with the soil map and other parts of this publication, can be used to make interpretations in addition to those given in tables 6, 7, and 8, and it also can be used to make other useful maps.

This information, however, does not eliminate the need for further investigations at sites selected for engineering works, especially works that involve heavy loads or that require excavations to depths greater than those shown in the tables, generally depths of more than 6 feet. Also, inspection of sites, especially the small ones, is needed because many delineated areas of a given soil mapping unit may contain small areas of other kinds of soil that have strongly contrasting properties and different suitabilities or limitations for soil engineering.

Some of the terms used in this soil survey have special meaning to soil scientists. The Glossary defines many of these terms.

Engineering Soil Classification Systems

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

In the Unified system (*8*) soils are classified according to particle-size distribution, plasticity, liquid limit, and organic matter. Soils are grouped in 15 classes. There are eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt. Soils on the borderline between two classes are designated by symbols for both classes; for example SC-SM.

The AASHO system (*2*) is used to classify soils according to properties that affect their use in highway construction and maintenance. In this system, a soil is placed in one of seven basic groups ranging from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. In group A-1 are gravelly soils of high bearing strength, or the best soils for subgrade (foundation). At the other extreme, in group A-7, are clay soils that have low strength when wet and that are the poorest soils for subgrade. Where laboratory data are available to justify a further breakdown, the A-1, A-2, and A-7 groups are divided as follows: A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, and A-7-6. As additional refinement, the engineering value of a soil material can be indicated by a group index number. Group indexes range from 0 for the best material to 20 or more for the poorest. The AASHO classification for tested soils, with group index numbers in parentheses, is shown in table 5; the estimated classification, without group index numbers, is given in table 6 for all soils mapped in the survey area.

Soil Test Data

Table 5 contains engineering test data for some of the major soil series in the survey area. These tests were made to

[5] Shelby R. Lastinger, civil engineer, Soil Conservation Service, helped prepare this section.

help evaluate the soils for engineering purposes. The engineering classifications given are based on data obtained by mechanical analyses and by tests to determine liquid limits and plastic limits. The mechanical analyses were made by combined sieve and hydrometer methods.

Moisture-density (or compaction) data are important in earthwork. If a soil material is compacted at a successively higher moisture content, assuming that the compactive effort remains constant, the density of the compacted material increases until the *optimum moisture content* is reached. The highest dry density obtained in the compactive test is termed *maximum dry density.*

The data on volume change indicate the amount of shrinkage and swelling that is obtained from samples prepared at optimum moisture content and then subjected to drying and wetting. The total change that can occur in a specified soil is the sum of the values given for shrinkage and for swelling.

Liquid limit and plasticity index indicate the effect of water on the strength and consistence of soil material. As the moisture content of a clayey soil is increased, the material changes from a semisolid to a plastic state. If the moisture content is further increased, the material changes from a plastic to a liquid. The plastic limit is the moisture content at which the soil material changes from a semisolid to a plastic; and the liquid limit, from a plastic to a liquid. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content within which a soil material is plastic.

Soil Properties Significant to Engineering

Several estimated soil properties significant to engineering are given in table 6. These estimates are made for typical soil profiles, by layers sufficiently different to have different significance for soil engineering. The estimates are based on field observations made in the course of mapping, on test data for these and similar soils, and on experience with the same kinds of soil in other counties. Depth to bedrock is not given in the table, because it is great enough that it does not affect the use of soils in this survey area. Following are explanations of some of the columns in table 6.

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

Soil texture is described in table 6 in the standard terms used by the Department of Agriculture. These terms take into account relative percentages of sand, silt, and clay in soil material that is less than 2 millimeters in diameter. "Loam," for example, is soil material that contains 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the soil contains gravel or other particles coarser than sand, an appropriate modifier is added, as for example, "gravelly loamy sand." "Sand," "silt," "clay," and some of the other terms used in USDA textural classification are defined in the Glossary of this soil survey.

Permeability is that quality of a soil that enables it to transmit water or air. It is estimated on the basis of those soil characteristics observed in the field, particularly structure and texture. The estimates in table 6 do not take into account lateral seepage or such transient soil features as plowpans and surface crusts. The numerical rating should not be confused with the coefficient (K) used by engineers.

Available water capacity is the ability of soils to hold water for use by most plants. It is commonly defined as the difference between the amount of water in the soil at field capacity and the amount at the wilting point of most crop plants.

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

Shrink-swell potential is the relative change in volume to be expected of soil material with changes in moisture content, that is, the extent to which the soil shrinks as it dries out or swells when it gets wet. Extent of shrinking and swelling is influenced by the amount and kind of clay in the soil. Shrinking and swelling of soils causes much damage to building foundations, roads, and other structures. A high shrink-swell potential indicates a hazard to maintenance of structures built in, on, or with material having this rating.

Flood hazard is not in this table, but the Angie, Congaree, Goldsboro, Grady, Irvington, Meggett, Pelham, and Riverview soils are subject to flooding. More information about the flood hazard of an individual soil can be learned by referring to the description of that soil in the section "Descriptions of the Soils."

Engineering Interpretations of Soils

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

Soil limitations are indicated by the ratings slight, moderate, and severe. Slight means that soil properties are generally favorable for the rated use, or in other words, limitations are minor and easily overcome. Moderate means that some soil properties are unfavorable but can be overcome or modified by special planning and design. Severe means that soil properties are so unfavorable and so difficult to correct or overcome as to require major soil reclamation and special designs.

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

Following are explanations of the columns in table 7.

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

Sewage lagoons are shallow ponds constructed to hold sewage within a depth of 2 to 5 feet long enough for bacteria to decompose the solids. A lagoon has a nearly level floor, and sides, or embankments, of compacted soil material. The assumption is made that the embankment is compacted to medium density and the pond is protected from flooding. Properties are considered that affect the pond floor and the embankment. Those that affect the pond floor are perme-

TABLE 5.—*Engineering*

[Tests made by Georgia State Highway Department according to standard

Soil name and location	Parent material	Report number S68-Ga-	Depth	Moisture-density[1]		Volume change[2]		
				Maximum dry density	Optimum moisture	Shrinkage	Swell	Total volume change
			Inches	*Pounds per cubic foot*	*Percent*	*Percent*	*Percent*	*Percent*
Grady soils:								
Miller County: 1 3/5 miles west of Baker County Line, south side of Georgia Highway No. 91. (Modal.)	Clayey marine sediment.	100–4–1	0–5	113	11	1.0	10.2	11.2
		100–4–3	11–28	104	19	12.3	5.5	17.8
		100–4–4	28–62	99	23	8.7	7.0	15.7
Miller County: 3/4 mile west of Baker County line, 4 miles north of Decatur County line. (More clay in the 11- to 22-inch layer than in the modal.)	Clayey marine sediment.	100–6–1	0–5	108	13	2.2	6.9	9.1
		100–6–3	8–42	95	23	7.6	4.3	11.9
		100–6–4	42–64	100	21	10.3	5.6	15.9
Norfolk loamy sand:								
Seminole County: 5/8 mile west of Georgia Highway No. 39, 1/3 mile north of Georgia Highway No. 91. (Modal.)	Medium-textured marine sediment of sandy clay loam and sandy loam.	125–1–1	0–6	116	9	.4	1.1	1.5
		125–1–3	13–41	114	13	6.0	3.7	9.7
		125–1–5	51–64	115	13	2.8	.1	2.9
Seminole County: 5/8 mile west of Georgia Highway No. 39, 3/4 mile south of Georgia Highway No. 91. (More fine material in the 10- to 51-inch layer than in the modal.)	Medium-textured marine sediment of sandy clay loam and sandy loam.	125–2–1	0–6	115	9	.8	4.7	5.5
		125–2–3	10–51	113	13	5.5	4.7	10.2
		125–2–5	55–71	106	16	5.8	4.2	10.0
Seminole County: 3/8 mile east of Georgia Highway No. 39, 1½ miles south of Georgia Highway No. 285. (Less fine material in the 56- to 72-inch layer than in the modal.)	Medium-textured marine sediment of sandy clay loam and sandy loam.	125–3–1	0–8	116	10	.5	.8	1.3
		125–3–3	19–56	122	10	3.0	2.4	5.4
		125–3–4	56–72	123	10	1.3	1.8	3.1
Troup sand:								
Seminole County: 3 3/4 miles east of Georgia Highway No. 39, 6 1/3 miles south of Georgia Highway No. 285. (Modal.)	Marine sediment; 40 to 72 inches of sand over sandy clay loam or sandy loam.	125–4–1	0–5	112	12	.6	1.9	2.5
		125–4–2	5–54	114	10	1.2	3.1	4.3
		125–4–4	58–68	122	10	1.0	.6	1.6
Seminole County: 5/8 mile east of Georgia Highway No. 39, 3/4 mile south of Georgia Highway No. 253. (Thicker A horizon than in the modal.)	Marine sediment; 40 to 72 inches of sand over sandy clay loam or sandy loam.	125–6–1	0–6	111	11	.1	5.2	5.3
		125–6–2	6–68	119	9	0	.6	.6
		125–6–4	72–80	111	14	3.2	1.2	4.4
Wagram loamy sand:								
Miller County: 3½ miles west of Baker County line, 2 1/16 miles south of Georgia Highway No. 91. (Modal.)	Marine sediment; loamy sand and sandy loam over sandy clay loam.	100–1–2	0–5	114	11	1.8	5.9	7.7
		100–1–2	5–23	122	9	1.4	5.0	6.4
		100–1–4	32–56	117	12	2.6	6.9	9.5
Miller County: 7/8 mile north of Decatur County line, 1/8 mile west of Baker County line. (Thicker A horizon than in the modal.)	Marine sediment; loamy sand and sandy loam over sandy clay loam.	100–2–1	0–8	115	9	.8	7.1	7.9
		100–2–2	8–35	120	8	3.3	10.2	10.5
		100–2–4	39–62	116	12	2.7	6.3	9.0

[1] Based on "A System of Soil Classification" by W. F. Abercrombie (*1*). Density change was not corrected for total sample.
[2] Based on AASHO Designation T 99, Method A (*2*). Volume change was not corrected for total sample.
[3] Mechanical analyses according to the AASHO Designation T 88-57. 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

test data

procedures of the American Association of State Highway Officials (AASHO)]

Mechanical analysis[3]										Liquid limit	Plasticity index	Classification	
Percentage passing sieve—						Percentage smaller than—							
¾ inch	⅜ inch	No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)	0.05 mm	0.02 mm	0.005 mm	0.002 mm			AASHO[4]	Unified[5]
										Percent			
--------	--------	--------	100	84	42	37	31	16	9	--------	[6]NP	A-4(0)	SM
--------	--------	--------	100	93	66	62	57	49	44	32	17	A-6(9)	CL
--------	--------	--------	100	94	71	69	66	62	60	39	17	A-6(11)	CL
--------	--------	--------	100	91	54	51	42	23	17	--------	NP	A-4(0)	ML
--------	--------	--------	100	94	70	68	64	56	54	40	20	A-7-6(13)	CL
--------	--------	--------	100	97	73	72	69	60	55	42	24	A-7-6(16)	CL
--------	--------	100	99	85	22	19	14	8	6	--------	NP	A-2-4(0)	SM
--------	--------	100	99	81	38	36	34	29	26	29	13	A-6(2)	SC
--------	--------	--------	100	88	44	41	38	32	31	30	10	A-4(1)	SC
--------	--------	--------	100	84	21	16	13	8	5	--------	NP	A-2-4(0)	SM
--------	--------	100	98	91	46	42	40	36	34	30	16	A-6(4)	SC
100	98	94	91	82	45	43	42	38	36	36	13	A-6(3)	SC
--------	--------	--------	100	82	16	12	10	7	5	--------	NP	A-2-4(0)	SM
--------	--------	100	98	86	32	28	27	22	20	--------	NP	A-2-4(0)	SM
--------	--------	100	99	86	27	24	22	19	17	--------	NP	A-2-4(0)	SM
--------	--------	100	99	78	18	14	10	6	5	--------	NP	A-2-4(0)	SM
--------	--------	100	99	77	15	12	10	6	5	--------	NP	A-2-4(0)	SM
--------	--------	100	96	73	27	25	22	18	16	--------	NP	A-2-4(0)	SM
--------	--------	--------	100	72	16	14	11	7	4	--------	NP	A-2-4(0)	SM
--------	--------	--------	100	75	14	11	10	6	5	--------	NP	A-2-4(0)	SM
--------	--------	100	99	79	37	37	35	34	32	36	12	A-6(1)	SM
--------	--------	--------	100	81	23	19	12	8	6	--------	NP	A-2-4(0)	SM
--------	--------	--------	100	80	22	17	14	11	8	--------	NP	A-2-4(0)	SM
--------	--------	--------	100	82	33	28	27	23	22	25	8	A-2-4(0)	SC
--------	--------	--------	100	78	19	14	10	6	5	--------	NP	A-2-4(0)	SM
--------	--------	--------	100	80	24	18	14	8	6	--------	NP	A-2-4(0)	SM
--------	--------	100	98	77	33	28	25	22	20	23	7	A-2-4(0)	SC-SM

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

[4] Based on AASHO Designation M 145-49 (*2*).

[5] Based on MIL-STD-619B (*8*).

[6] NP = Nonplastic.

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TABLE 6.—*Estimated soil properties*

[An asterisk in the first column indicates that the mapping unit in this series is made up of two or more kinds of soil. The soils in such a mapping series that appear in the first column of this table. These soils

Soil series and map symbols	Depth to seasonal high water table	Depth from surface	Dominant USDA texture	Classification	
				Unified	AASHO
Angie: Av	15 to 30 inches for 1 to 6 months each year.	0–7	Fine sandy loam	SM	A-2
		7–65	Silty clay and silty clay loam.	CL or CH	A-6, A-7
Congaree. Mapped only with Riverview soils.	30 to 60 inches for 1 to 2 months each year.	0–38	Loam	ML or SM	A-2, A-4
		38–52	Very fine sandy loam	SM	A-2, A-4
		52–64	Fine sandy loam	SM	A-2, A-4
Esto: EuB, EuE	60 to 120 inches; perched water table during wet periods.	0–8	Loamy sand and sandy loam.	SM	A-2
		8–12	Sandy clay loam	SC	A-6
		12–65	Sandy clay	SC or CL	A-6, A-7
Goldsboro: GmA	24 to 60 inches for 1 to 4 months each year.	0–14	Sandy loam	SM	A-2
		14–65	Sandy clay loam	SC or SM	A-4, A-6
Grady: Grd	0 to 15 inches for 4 to 8 months each year.	0–5	Sandy loam	SM or ML	A-4
		5–11	Sandy clay loam	CL	A-6
		11–62	Clay	CL	A-6, A-7
Irvington: Ig	22 to 30 inches for 1 to 2 months each year.	0–7	Sandy loam	SM	A-2
		7–29	Sandy clay loam	SC	A-4, A-6
		29–44	Sandy clay loam	SC	A-2, A-6
		44–62	Sandy clay loam	SC	A-2, A-6
Lucy: LMB	More than 120 inches	0–31	Loamy sand	SM	A-2
		31–36	Sandy loam	SM	A-2
		36–65	Sandy clay loam	SC or SM	A-2, A-6
Meggett: Myt	0 to 15 inches for 6 months each year.	0–7	Loam	ML	A-4
		7–46	Clay	CH	A-7
		46–62	Sandy clay	CH or CL	A-7, A-6
Norfolk: NhA, NhB	More than 120 inches	0–7	Loamy sand	SM	A-2
		7–12	Sandy loam	SC or SM	A-2
		12–62	Sandy clay loam	SC or SM	A-2, A-4, A-6
Ocilla: Oh	15 to 30 inches for 6 months each year.	0–34	Loamy sand	SM	A-2
		34–48	Sandy loam	SM	A-2
		48–65	Sandy clay loam	SC	A-2, A-6
Orangeburg: OeA, OeB, OeC2	More than 120 inches	0–5	Loamy sand	SM	A-2
		5–9	Sandy loam	SM	A-2
		9–63	Sandy clay loam	SC	A-6
Pelham: Pa	0 to 15 inches for 1 to 2 months each year.	0–34	Sand	SM	A-2
		34–61	Sandy clay loam	SC	A-2, A-6
* Riverview: Riv. For Congaree part of Riv, see Congaree series.	30 to 60 inches for 1 to 2 months each year.	0–6	Loam	ML	A-4
		6–46	Silty clay loam	CL	A-6, A-4
		46–62	Sandy clay loam	SC	A-6
Tifton: TuA, TuB	More than 120 inches	0–7	Sandy loam	SM	A-2
		7–52	Sandy clay loam	SC	A-2, A-6
		52–62	Sandy clay loam	SC	A-6, A-7
Troup: TzB, TzC	More than 120 inches	0–57	Sand	SM	A-2
		57–65	Sandy loam	SM	A-2
		65–78	Sandy clay loam	SM	A-2, A-6
Wagram: WeB	More than 120 inches	0–23	Loamy sand	SM	A-2
		23–32	Sandy loam	SM	A-2
		32–62	Sandy clay loam	SC, SM	A-2, A-6

[1] Iron concretions are retained in the sieve.

significant to engineering

unit may have different properties and limitations, and for this reason it is necessary to follow carefully the instructions for referring to the other contain no material that is coarser than 3 inches in diameter]

Percentage passing sieve—				Permeability	Available water capacity	Reaction	Shrink-swell potential
No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)				
				Inches per hour	*Inches per inch of soil*	*pH*	
---	100	80–100	20–35	0.6–2.0	0.13–0.15	4.5–5.5	Low.
---	100	90–100	80–90	0.06–2.0	0.18–0.20	4.5–5.5	Moderate.
---	100	85–95	30–60	0.6–2.0	0.12–0.15	5.1–6.5	Low.
---	100	85–95	30–50	0.6–2.0	0.11–0.13	5.1–6.5	Low.
---	100	70–85	30–45	0.6–2.0	0.11–0.13	5.1–6.5	Low.
---	100	75–85	13–25	2.0–6.0	0.08–0.12	4.5–5.5	Low.
---	100	80–95	36–50	0.6–2.0	0.12–0.14	4.5–5.5	Moderate.
---	100	80–95	45–55	0.06–0.2	0.13–0.15	4.5–5.5	Moderate.
---	100	80–90	20–35	2.0–6.0	0.10–0.12	4.5–5.5	Low.
---	100	85–95	36–45	0.6–2.0	0.12–0.14	4.5–5.5	Low.
---	100	80–91	36–55	0.6–2.0	0.12–0.14	4.5–5.0	Low.
---	100	85–95	51–75	0.6–2.0	0.10–0.13	4.5–5.0	Low.
---	100	90–98	65–75	0.06–0.2	0.10–0.12	4.5–5.0	Moderate.
[1]85–95	[1]75–90	60–75	20–35	2.0–6.0	0.10–0.12	4.5–5.5	Low.
[1]80–95	[1]75–90	70–85	36–45	0.6–2.0	0.13–0.15	4.5–5.5	Low.
[1]80–95	[1]75–90	70–85	33–45	0.06–0.2	0.06–0.10	4.5–5.5	Low.
80–95	75–90	70–85	30–45	0.2–0.6	0.06–0.10	4.5–5.5	Low.
---	100	75–85	13–20	6.0–20.0	0.06–0.08	4.5–5.5	Low.
---	100	70–80	20–35	2.0–6.0	0.10–0.12	4.5–5.5	Low.
---	100	70–85	30–40	0.6–2.0	0.12–0.14	4.5–5.5	Low.
---	100	90–100	51–60	2.0–6.0	0.12–0.15	6.6–7.8	Low.
---	100	90–100	51–65	0.06–0.2	0.12–0.15	6.6–7.8	High.
---	100	85–90	51–65	0.2–0.6	0.13–0.15	6.6–7.8	Moderate.
100	95–100	75–90	15–25	2.0–6.0	0.06–0.08	4.5–5.5	Low.
100	90–100	75–95	25–35	2.0–6.0	0.10–0.12	4.5–5.5	Low.
100	90–100	80–90	25–45	0.6–2.0	0.12–0.14	4.5–5.5	Low.
---	100	75–85	13–25	6.0–10.0	0.05–0.08	4.5–5.0	Low.
---	100	75–85	20–35	0.6–2.0	0.09–0.11	4.5–5.0	Low.
---	100	80–90	25–45	0.6–2.0	0.10–0.12	4.5–5.0	Low.
---	100	75–85	15–25	2.0–6.0	0.06–0.09	4.5–5.5	Low.
---	100	75–85	20–35	2.0–6.0	0.10–0.12	4.5–5.5	Low.
---	100	80–90	36–45	0.6–2.0	0.12–0.14	4.5–5.5	Low.
---	100	75–85	13–20	6.0–10.0	0.06–0.09	4.5–5.0	Low.
---	100	75–85	25–40	0.6–2.0	0.10–0.13	4.5–5.0	Low.
---	100	70–100	51–60	0.6–2.0	0.12–0.15	4.5–5.5	Low.
---	100	80–95	60–80	0.6–2.0	0.13–0.15	4.5–5.5	Low.
---	100	80–90	36–45	0.6–2.0	0.12–0.14	4.5–5.5	Low.
[1]80–95	[1]75–90	60–75	25–35	2.0–6.0	0.08–0.10	4.5–5.5	Low.
[1]80–95	[1]75–90	70–85	30–40	0.6–2.0	0.13–0.15	4.5–5.5	Low.
80–95	80–95	75–85	36–50	0.6–2.0	0.08–0.10	4.5–5.5	Low to moderate.
100	95–100	70–80	15–20	6.0–20.0	0.04–0.06	4.5–5.5	Low.
100	95–100	70–80	13–25	2.0–6.0	0.10–0.12	4.5–5.5	Low.
100	95–100	70–85	27–40	0.6–6.0	0.10–0.14	4.5–5.5	Low.
---	100	75–85	15–25	6.0–20.0	0.06–0.08	4.5–5.5	Low.
---	100	75–85	20–30	2.0–6.0	0.10–0.12	4.5–5.5	Low.
100	95–100	75–85	30–45	2.0–6.0	0.12–0.14	4.5–5.5	Low.

TABLE 7.—*Interpretations of*

[An asterisk in the first column indicates that the mapping unit in this series is made up of two or more kinds of soil. The soils in such a mapping other series that appear in

Soil series and map symbols	Degree and kind of limitation for—						
	Septic tank absorption fields	Sewage lagoons	Shallow excavations	Dwellings without basements	Sanitary landfill (trench type)[1]	Local roads and streets	Light industries
Angie: Av	Severe: slow permeability; seasonal high water table.	Slight	Moderate: seasonal high water table; high content of clay in subsoil.	Moderate: seasonal high water table; moderate shrink-swell potential.	Severe: seasonal high water table; high content of clay in subsoil.	Moderate: high content of clay in subsoil.	Moderate: seasonal high water table; moderate shrink-swell potential.
Congaree. Mapped only with Riverview soils.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.	Moderate: seasonal high water table.	Severe: flooding.	Severe: seasonal high water table; flooding.	Severe: flooding.	Severe: flooding.
Esto: EuB	Severe: slow permeability.	Moderate: slope.	Moderate: high content of clay in subsoil.	Moderate: moderate shrink-swell potential.	Severe: high content of clay in subsoil.	Moderate: high content of clay in subsoil.	Moderate: moderate shrink-swell potential.
EuE	Severe: slow permeability.	Severe: slope	Severe: slope	Moderate to severe: moderate shrink-swell potential; slope.	Severe: high content of clay in subsoil; slope.	Moderate: high content of clay in subsoil; slope.	Severe: slope
Goldsboro: GmA	Severe: seasonal high water table.	Severe: seasonal high water table.	Moderate: seasonal high water table.	Moderate: seasonal high water table.	Severe: seasonal high water table.	Slight to moderate: seasonal high water table.	Moderate: seasonal high water table.
Grady: Grd	Severe: slow permeability; seasonal high water table; flooding.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; high content of clay in subsoil.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.
Irvington: Ig	Severe: slow permeability; seasonal high water table.	Moderate: seasonal high water table.	Moderate: seasonal high water table.	Moderate: seasonal high water table.	Severe: seasonal high water table.	Slight to moderate; seasonal high water table.	Moderate: seasonal high water table.
Lucy: LMB	Slight	Severe: rapid permeability in the thick sandy surface layer.	Slight	Slight	Slight	Slight	Slight
Meggett: Myt	Severe: slow permeability; seasonal high water table; flooding.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; high in content of clay in subsoil.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.
Norfolk: NhA, NhB.	Slight	Moderate: moderate permeability.	Slight	Slight	Slight	Slight	Slight
Ocilla: Oh	Severe: seasonal high water table.	Severe: seasonal high water table.	Severe: seasonal high water table.	Moderate: seasonal high water table.	Severe: seasonal high water table.	Moderate: seasonal high water table.	Moderate: seasonal high water table.

engineering properties of the soils

unit may have different properties and limitations, and for this reason it is necessary to follow carefully the instructions for referring to the the first column of this table]

Suitability as source of—		Soil features affecting—				
Topsoil	Road fill	Pond reservoir areas	Embankments, dikes, and levees	Drainage for crops and pasture	Irrigation	Terraces and diversions
Poor to fair: silty clay loam at a depth of 7 inches.	Fair: high content of clay in subsoil.	Variable substratum.	Fair stability; medium to high compressibility.	Slow permeability	Slow intake rate; seasonal high water table.	Nearly level.
Good	Fair: fair traffic-supporting capacity.	Moderate permeability; variable substratum.	Medium compressibility; poor resistance to piping.	Flooding; otherwise, drainage not needed.	Features generally favorable.	Nearly level.
Fair: sandy clay at a depth of 12 inches.	Fair: high content of clay in subsoil.	Variable substratum.	Fair to good compaction characteristics.	Well drained	Slow intake rate	Slow permeability in lower part of profile.
Fair to poor: slope.	Fair: high content of clay in subsoil.	Variable substratum.	Fair to good compaction characteristics.	Well drained	Slope	Short, steep slopes.
Fair: 14 inches of suitable material.	Fair to good: seasonal high water table.	Moderate permeability.	Features generally favorable.	Moderate permeability; scarcity of outlets.	Features generally favorable.	Nearly level.
Poor: wetness	Poor: wetness	Variable substratum.	Moderate shrink-swell potential.	Slow permeability; scarcity of outlets.	Slow intake rate; seasonal high water table.	Nearly level.
Fair if surface layer and subsoil are mixed.	Fair: fair traffic-supporting capacity.	Features generally favorable.	Features generally favorable.	Seasonal high water table; scarcity of outlets.	Features generally favorable.	Nearly level.
Poor: sandy to a depth of about 31 inches.	Good	Moderate permeability.	Moderate permeability when compacted.	Well drained	Low available water capacity.	Features generally favorable.
Poor: wetness	Poor: wetness	Features generally favorable.	Fair stability; medium to high compressibility.	Seasonal high water table; flooding.	Seasonal high water table; flooding.	Nearly level.
Poor to a depth of 7 inches; good if mixed with subsoil.	Good	Moderate permeability.	Features generally favorable.	Well drained	Features generally favorable.	Features generally favorable.
Poor: sandy to a depth of about 34 inches.	Fair: seasonal high water table.	Moderate permeability.	Fair stability; moderate permeability when compacted.	Scarcity of outlets	Seasonal high water table; low available water capacity.	Nearly level.

TABLE 7.—*Interpretations of engineer*

Soil series and map symbols	Degree and kind of limitation for—						
	Septic tank absorption fields	Sewage lagoons	Shallow excavations	Dwellings without basements	Sanitary landfill (trench type)[1]	Local roads and streets	Light industries
Orangeburg: OeA, OeB, OeC2.	Slight	Moderate: moderate permeability.	Slight	Slight	Slight	Slight	Slight for OeA and OeB. Moderate for OeC2: slope.
Pelham: Pa	Severe: seasonal high water table; flooding.	Severe: flooding.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.
* Riverview: Riv. For Congaree part of Riv, see Congaree series.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.	Moderate: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.
Tifton: TuA, TuB.	Moderate: permeability in lower part of subsoil is at the lower end of moderate.	Moderate: moderate permeability.	Slight	Slight	Slight	Slight	Slight
Troup: TzB, TzC.	Slight	Severe: moderate to moderately rapid permeability.	Severe: sandy to a depth of about 57 inches.	Slight	Moderate: moderate to moderately rapid permeability.	Slight	Slight for TzB. Moderate for TzC: slope.
Wagram: WeB	Slight	Severe: moderately rapid permeability.	Slight	Slight	Moderate: moderately rapid permeability.	Slight	Slight

[1] Onsite deep studies of the underlying strata, water tables, and hazards of aquifer pollution and drainage into ground water need to be made

ability, organic matter, and slope. If the floor needs to be leveled, depth to bedrock also becomes important. The soil properties that affect the embankment are the engineering properties of the embankment material as interpreted from the Unified Soil Classification and the amounts of stones, if any, that influence the ease of excavation and compaction of the embankment material.

Shallow excavations are those that require digging or trenching to a depth of less than 6 feet, as for example, excavations for pipelines, sewer lines, telephone and power transmission lines, basements, open ditches, and cemeteries. Desirable soil properties are good workability, moderate resistance to sloughing, gentle slopes, absence of rock outcrops or big stones, and freedom from flooding or a high water table.

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

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

Local roads and streets have an all-weather surface expected to carry automobile traffic all year. They have a subgrade of underlying soil material; a base consisting of gravel, crushed rock, or soil material stabilized with lime or cement; and a flexible or rigid surface, commonly asphalt or concrete. These roads are graded to shed water and have ordinary provisions for drainage. They are built mainly *ing properties of the soils*—Continued

Suitability as source of—		Soil features affecting—				
Topsoil	Road fill	Pond reservoir areas	Embankments, dikes, and levees	Drainage for crops and pasture	Irrigation	Terraces and diversions
Fair where mixed with upper part of subsoil.	Good	Moderate permeability.	Features generally favorable.	Well drained	Features generally favorable; slope.	Features generally favorable.
Poor: wetness	Poor: wetness	Variable substratum.	Fair stability; moderate permeability when compacted.	Seasonal high water table; flooding.	Wetness: low available water capacity.	Nearly level.
Good	Fair: fair traffic-supporting capacity.	Moderate permeability; variable substratum.	Medium compressibility.	Flooding	Features generally favorable.	Nearly level.
Fair where surface layer is mixed with subsoil.	Good	Moderate permeability.	Features generally favorable.	Well drained	Features generally favorable.	Features generally favorable.
Poor: sandy to a depth of about 57 inches.	Good	Moderate to moderately rapid permeability.	Moderate permeability when compacted.	Well drained	Low available water capacity.	Features generally favorable.
Poor: sandy to a depth of about 23 inches.	Good	Moderately rapid permeability.	Moderate permeability when compacted.	Well drained	Low available water capacity.	Features generally favorable.

for landfills deeper than 5 or 6 feet.

from soil at hand, and most cuts and fills are less than 6 feet deep.

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

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

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

Road fill is soil material used in embankments for roads. The suitability ratings reflect (1) the predicted performance of soil after it has been placed in an embankment that has been properly compacted and provided with adequate drainage and (2) the relative ease of excavating the material at borrow areas.

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

Embankments, dikes, and levees require soil material resistant to seepage and piping and of favorable stability,

TABLE 8.—*Degree and kinds of limitations of soils for recreational development*

Soil series and map symbols	Camp areas	Playgrounds	Picnic areas	Paths and trails
Angie: Av	Moderate: seasonal high water table; slow permeability.	Moderate: seasonal high water table; slow permeability.	Moderate: seasonal high water table.	Slight.
Congaree. Mapped only with Riverview soils.	Moderate: flooding	Moderate: flooding	Moderate: flooding	Moderate: flooding.
Esto:				
EuB	Moderate: slow permeability.	Moderate: slow permeability; slope.	Slight	Slight.
EuE	Moderate: slow permeability; slope.	Severe: slope	Moderate: slope	Slight.
Goldsboro: GmA	Slight	Slight	Slight	Slight.
Grady: Grd	Severe: seasonal high water table; flooding; slow permeability.	Severe: seasonal high water table; flooding; slow permeability.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.
Irvington: Ig	Slight	Slight	Slight	Slight.
Lucy: LMB	Moderate: loamy sand to depth of 22 to 38 inches.	Moderate: loamy sand to depth of 22 to 38 inches.	Moderate: loamy sand to depth of 22 to 38 inches.	Moderate: sandy surface layer.
Meggett: Myt	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.
Norfolk:				
NhA	Slight	Slight	Slight	Slight.
NhB	Slight	Moderate: slope	Slight	Slight.
Ocilla: Oh	Moderate: seasonal high water table.	Moderate: seasonal high water table.	Moderate: seasonal high water table.	Moderate: seasonal high water table.
Orangeburg:				
OeA	Slight	Slight	Slight	Slight.
OeB	Slight	Moderate: slope	Slight	Slight.
OeC2	Slight	Severe: slope	Slight	Slight.
Pelham: Pa	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.
Riverview: Riv. For Congaree part of Riv, see Congaree series.	Moderate: flooding	Moderate: flooding	Moderate: flooding	Moderate: flooding.
Tifton:				
TuA	Slight	Slight	Slight	Slight.
TuB	Slight	Moderate: slope	Slight	Slight.
Troup: TzB, TzC	Moderate: sand to depth of 43 to 68 inches.	Severe: sand to depth of 43 to 68 inches.	Moderate: sand to depth of 43 to 68 inches.	Severe: sand to depth of 43 to 68 inches.
Wagram: WeB	Moderate: loamy sand to depth of 21 to 37 inches.	Moderate: loamy sand to depth of 21 to 37 inches.	Moderate: loamy sand to depth of 21 to 37 inches.	Moderate: loamy sand to depth of 21 to 37 inches.

shrink-swell potential, shear strength, and compactibility. Presence of stones or organic material in a soil are among factors that are unfavorable.

Drainage for crops and pasture is affected by such soil properties as permeability, texture, and structure; depth to claypan, rock, or other layers that influence rate of water movement; depth to the water table; slope; stability in ditchbanks; susceptibility to stream overflow; alkalinity; and availability of outlets for drainage.

Irrigation of a soil is affected by such features as slope; susceptibility to stream overflow, water erosion, or soil blowing; soil texture; content of stones; depth of rooting zone; rate of water intake at the surface; permeability of soil layers below the surface layer and in fragipans or other layers that restrict movement of water; amount of water held available to plants; and need for drainage, or depth to water table or bedrock.

Terraces and diversions are embankments, or ridges, constructed across the slope to intercept runoff so that it soaks into the soil or flows slowly to a prepared outlet. Features that affect suitability of a soil for terraces are uniformity and steepness of slope; depth to bedrock or other unfavorable material; presence of stones; permeability; and resistance to water erosion, soil slipping, and soil blowing. A soil suitable for these structures provides outlets for runoff and is not difficult to vegetate.

Soils for Recreational Development

Knowledge of soils is necessary in planning, developing, and maintaining areas used for recreation. In table 8 limitations are given that affect the suitability of the soils of Miller and Seminole Counties for camp areas, playgrounds, picnic areas, and paths and trails.

The limitations are slight, moderate, or severe for the specified uses. For all of the specified uses, it is assumed that a good cover of vegetation can be established and maintained. A limitation of slight means that soil properties are generally favorable and limitations are so minor that they easily can be overcome. Moderate means that the limitation can be overcome or modified by planning, by design, or by special maintenance. Severe means that costly soil reclamation, special design, intense maintenance, or a combination of these is required.

Camp areas are used intensively for tents and small camp trailers and the accompanying activities of outdoor living. Little preparation of the site is required, other than shaping and leveling for tent and parking areas. Camp areas are subject to heavy foot traffic and limited vehicular traffic. The best soils have mild slopes, good drainage, a surface free of rocks and coarse fragments, freedom from flooding during periods of heavy use, and a surface that is firm after rains but not dusty when dry.

Playgrounds are areas used intensively for baseball, football, badminton, and similar organized games. Soils suitable for this use need to withstand intensive foot traffic. The best soils have a nearly level surface free of coarse fragments and rock outcrops, good drainage, freedom from flooding during periods of heavy use, and a surface that is firm after rains but not dusty when dry. If grading and leveling are required, depth to rock is important.

Picnic areas are attractive natural or landscaped tracts used mainly for preparing meals and eating outdoors. These areas are subject to heavy foot traffic. Most of the vehicular traffic, however, is confined to access roads. The best soils are firm when wet but not dusty when dry; are free of flooding during the season of use; and do not have slopes or stoniness that greatly increase the cost of leveling sites or building access roads.

Paths and trails are used for local and cross-country travel by foot or horseback. Design and layout should require little or no cutting and filling. The best soils are at least moderately well drained, are firm when wet but not dusty when dry, are flooded not more than once during the season of use, have slopes of less than 15 percent, and have few or no rocks or stones on the surface.

Formation and Classification of the Soils

This section describes the major factors of soil formation and tells how they have affected the soils of Miller and Seminole Counties. It also defines the current system for classifying soils, and table 9 shows the classification by series and some of the higher categories.

Formation of Soils

Soil forms through the interaction of major soil-forming factors, which are parent material, climate, relief, plants and animals, and time. All of these factors affect the formation of each soil, but the relative importance of each factor differs from place to place. In some areas, one factor may dominate in the formation of a soil and determine most of its properties, whereas, in other areas, other factors dominate.

The five factors of soil formation are described in the following paragraphs.

Parent material

Parent material is the unconsolidated mass in which a soil develops. It is largely responsible for the chemical and mineralogical composition of a soil. Most of the soils in Miller and Seminole Counties formed in sedimentary material or in unconsolidated material that was derived from rock and was deposited by water. The material ranges from coarse sand to clay in texture.

According to the geologic map of Georgia (*3*), Miller and

TABLE 9.—*Classification of soil series*[1]

Series	Family	Subgroup	Order
Angie	Clayey, mixed, thermic.	Aquic Paleudults	Ultisols.
Congaree	Fine-loamy, mixed, nonacid, thermic.	Typic Udifluvents	Entisols.
Esto	Clayey, kaolinitic, thermic.	Typic Paleudults	Ultisols.
Goldsboro	Fine-loamy, siliceous, thermic.	Aquic Paleudults	Ultisols.
Grady	Clayey, kaolinitic, thermic.	Typic Paleaquults	Ultisols.
Irvington	Fine-loamy, siliceous, thermic.	Plinthic Fragiudults.	Ultisols.
Lucy	Loamy, siliceous, thermic.	Arenic Paleudults	Ultisols.
Meggett	Fine, mixed, thermic.	Typic Albaqualfs	Alfisols.
Norfolk	Fine-loamy, siliceous, thermic.	Typic Paleudults	Ultisols.
Ocilla	Loamy, siliceous, thermic.	Aquic Arenic Paleudults.	Ultisols.
Orangeburg	Fine-loamy, siliceous, thermic.	Typic Paleudults	Ultisols.
Pelham	Loamy, siliceous, thermic.	Arenic Paleaquults	Ultisols.
Riverview	Fine-loamy, mixed, thermic.	Fluventic Dystrochrepts.	Inceptisols.
Tifton	Fine-loamy, siliceous, thermic.	Plinthic Paleudults	Ultisols.
Troup	Loamy, siliceous, thermic.	Grossarenic Paleudults.	Ultisols.
Wagram	Loamy, siliceous, thermic.	Arenic Paleudults	Ultisols.

[1] Soil series names and classification were approved in November 1971.

Seminole Counties have three geologic formations at or near the surface. These formations are Ocala Limestone, which is of Eocene age and occurs in all of Miller County and the northern part of Seminole County; Flint River Formation, which is of Oligocene age and occurs in the southern part of Seminole County; and alluvium and undifferentiated terrace deposits, which are along the Chattahoochee River in Seminole County. The most extensive soils that formed in material weathered from the Ocala Limestone are the Tifton, Norfolk, and Grady soils; in material weathered from the Flint River Formation are the Wagram, Lucy, and Troup soils; and in the alluvium are the Angie, Riverview, and Congaree soils.

Climate

Climate affects the formation of soils through its influence on the rate of weathering of rocks and on the decomposition of minerals and organic matter. It also affects biological activities in the soils and the leaching and movement of weathered materials.

In Miller and Seminole Counties the winters are mild, and there is little freezing and thawing of the soil material. The warm climate and moist soils promote rapid chemical and biological action. The large amount of rainfall causes the soils to be highly leached and low in organic-matter content. The soils tend to be acid because such basic elements as calcium, magnesium, and sodium have been leached and replaced by hydrogen. The translocation of solid material as bases and of less soluble material as colloidal substance causes the soils to be less fertile than when they were first formed.

Relief

Relief influences soil formation through its effect on drainage, erosion, soil temperature, and plant cover. Most soils in Miller and Seminole Counties are level, nearly level, or very gently sloping.

Soil formation in this survey area has been affected by three general kinds of relief—depressions, low flats, and broad ridges. In the depressions and on the low flats, the water table is near the surface and the soils are mainly somewhat poorly drained to very poorly drained. They have a grayish or mottled subsoil. On the low flats along the streams, the soils are flooded each year. On the broad ridges, except in the rounded depressions, the water table is several feet below the surface and the soils are well drained and are mainly yellowish brown to yellowish red.

Plants and animals

Plants, animals, bacteria, and other living organisms are active in the soil-forming process. Small animals, earthworms, insects, and micro-organisms influence the formation of soils by mixing organic matter into the soil by helping to break down the remains of plants. Small animals burrow into the soil and thus mix the layers. Earthworms and other small invertebrates feed on the organic matter in the upper few inches. In this way, they slowly but continuously mix the soil material and may alter it chemically. Bacteria, fungi, and other micro-organisms hasten the weathering of rocks and the decomposition of organic matter.

Most of the soils in this survey area formed under a forest cover consisting of many kinds of hardwoods and of such softwoods as pines. These plants supply most of the organic matter available to the soils; the hardwoods contribute more than softwoods. The organic-matter content in most of the soils is low to medium.

The growing plants provide a cover that helps to reduce erosion and stabilize the surface so that the soil-forming processes can continue. Leaves, twigs, roots, and entire plants accumulate on the surface of forest soils and then decompose as the result of the action of percolating water and of micro-organisms, earthworms, and other forms of life. The uprooting of trees by wind influences soil formation through mixing of soil layers and loosening of underlying material.

Time

Generally, a long time is required for a soil to form (*5*). Most of the soils on uplands in this survey area have been in place long enough for distinct horizons to form, but some soils that formed in alluvium have been in place too short a time.

Most soils in this area have distinct horizons. Their surface layer has an accumulation of organic matter, and silicate clay minerals have moved downward and accumulated in horizons that, consequently, have a high content of clay. Oxidation or reduction of iron has had an effect, depending on natural drainage. Many well-drained soils have a reddish or yellow subsoil and are high in content of oxidized iron. A few poorly drained soils have a gray subsoil and are low in content of oxidized iron. In addition, leaching of soluble calcium, magnesium, potassium, and other weatherable elements has increased the amount of exchangeable hydrogen. Examples of mature soils in this area are the Tifton and Norfolk soils.

Two soils that formed in essentially the same kind of parent material and have essentially the same drainage may differ in degree of profile development, chiefly because one soil has been in place longer than the other.

Classification of the Soils

Soils are classified so that we can more easily remember their significant characteristics. Classification enables us to assemble knowledge about the soils, to see their relationship to one another and to the whole environment, and to develop principles that help us to understand their behavior and their response to manipulation. First through classification, and then through use of soil maps, we can apply our knowledge of soils to specific fields and other tracts of land.

The narrow categories of classification, such as those used in detailed soil surveys, allow us to organize and apply knowledge about soils in managing farms, fields, and woodlands; in developing rural areas; in engineering work; and in many other ways. Soils are placed in broad classes to facilitate study and comparison in large areas such as countries and continents.

The system of soil classification currently used was adopted by the National Cooperative Soil Survey in 1965 (*7*). Because this system is under continual study, readers interested in developments of the current system should search the latest literature available (*4*).

The current system of classification has six categories. Beginning with the broadest, these categories are order, suborder, great group, subgroup, family, and series. In this system the criteria used as a basis for classification are soil properties that are observable and measurable. The properties are chosen, however, so that the soils of similar genesis, or mode of origin, are grouped. In table 9, the soil series of Miller and Seminole Counties are placed in some categories of the current system. Classes of the current system are briefly defined in the following paragraphs.

Order.—Ten soil orders are recognized. The properties used to differentiate among soil orders are those that tend to give broad climatic groupings of soils. The three exceptions to this, the Entisols, Inceptisols, and Histosols, occur in many different climates. Each order is named with a word of three or four syllables ending in *sol.*

Suborder.—Each order is subdivided into suborders that are based primarily on those soil characteristics that seem to produce classes with the greatest genetic similarity. The suborders narrow the broad climatic range permitted in the orders. The soil properties used to separate suborders are mainly those that reflect either the presence or absence of waterlogging, or soil differences resulting from the climate or vegetation. The names of suborders have two syllables. The last syllable indicates the order.

Great group.—Soil suborders are separated into great groups on the basis of uniformity in the kinds and sequence of major soil horizons and features. The horizons used to make separations are those in which clay, iron, or humus have accumulated; those that have pans that interfere with growth of roots, movement of water, or both; and thick, dark-colored surface horizons. The features used are the self-mulching properties of clay, soil temperature, major differences in chemical composition (mainly calcium, magnesium, sodium, and potassium), dark-red and dark-brown colors associated with basic rocks, and the like. The names of great groups have three or four syllables and are made by adding a prefix to the name of the suborder.

Subgroup.—Great groups are subdivided into subgroups, one representing the central (typic) segment of the group and others called intergrades that have properties of the group and also one or more properties of another great group, suborder, or order. Subgroups may also be made in those instances where soil properties intergrade outside of the range of any other great group, suborder, or order. The names of subgroups are derived by placing one or more adjectives before the name of the great group.

Family.—Soil families are separated within a subgroup primarily on the basis of properties important to the growth of plants or on the behavior of soils when used for engineering. Among the properties considered are texture, mineralogy, reactions, soil temperature, permeability, thickness of horizons, and consistence. A family name consists of a series of adjectives preceding the subgroup name. The adjectives are the class names for texture, mineralogy, and so on, that are used to differentiate families, as shown in table 9.

Series.—The series is a narrower category within the family. All the soils of a given series formed in a particular kind of parent material and have genetic horizons that, except for the texture of the surface layer, are similar in differentiating characteristics and in arrangement in the soil profile. Among the differentiating characteristics are color, structure, reaction, consistence, and mineralogical and chemical composition.

Additional Facts About the Counties

Settlement of the area that is now Miller and Seminole Counties began in the early part of the 19th century. Miller County was created in 1856 from part of Early County, and Seminole County in 1870 from part of Decatur County. These counties have been predominantly agricultural since their settlement began.

During the last 30 years, there has been a drastic decrease in the number of farms but a considerable increase in the size of farms. Farming methods have improved to the extent that yields per acre are higher, and, consequently, overall production of many of the common crops is greater even though the acreage is smaller. Among improved farming methods are rotation of crops, selection of better crop varieties, more effective use of crop residue, and more liberal use of fertilizer. Also, greater effort has been made to control plant diseases and insects, use of irrigation has increased each year, and some of the less productive soils, once used for row crops, are now used for improved pasture or for pines. At present, major farm income is derived from peanuts, corn, watermelons, truck crops, small grain, poultry and poultry products, livestock, and forest products.

In 1970, the population of Miller County was 6,397, a decrease from 9,023 in 1950. The population of Colquitt, the county seat, was 2,026 in 1970. In the same year, the population of Seminole County was 7,959, little changed from 7,904 in 1950, and that of Donalsonville, the county seat, was 2,907.

Physiography, Relief, and Drainage

All of the survey area is in the Southern Coastal Plain Major Resource Area. The elevation ranges from 77 feet in the southern part of Seminole County to 235 feet in the west-central part of Miller County.

Most of the survey area has level to very gently sloping relief and prominently developed sinks or depressions ranging from less than an acre to several hundred acres in size. Most of the depressions lack natural outlets and are drained mainly through underground channels. After heavy rains, they are covered with water for periods of a few weeks to several months.

There are few sizable streams in the two counties. Spring Creek enters Miller County from the north and flows through the central part of the county. It then flows through Decatur County, enters Seminole County at the southeast, and flows into the Flint River. The Chattahoochee River flows along the western part of Seminole County and into Lake Seminole, which forms the southern boundary and part of the western boundary of Seminole County.

The drainage provided by the small branches and creeks is sluggish. Generally, there is no definite channel in the upper reaches of these streams, but the channel farther downstream is better defined. The channels of the larger streams tend to meander over the lowlands. The streams overflow their banks during periods of heavy rainfall.

Water Supply

Water for municipal, industrial, and farm needs is supplied by artesian wells that extend into the Ocala Limestone. On most farms, the wells are between 75 and 250 feet deep. In the western part of Seminole County, on the divide between the Flint and Chattahoochee Rivers, some wells are as much as 435 feet deep. In recent years many large wells have been drilled to supply water for irrigation.

Spring Creek, which flows through the central part of Miller County, and the Chattahoochee River, which forms part of the western boundary of Seminole County, are the

TABLE 10.—*Temperature and precipitation data*

Month	Temperature: Average daily maximum	Temperature: Average daily minimum	Two years in 10 will have at least 4 days with— Maximum temperature equal to or higher than—	Two years in 10 will have at least 4 days with— Minimum temperature equal to or lower than—	Precipitation: Average total	One year in 10 will have— Less than—	One year in 10 will have— More than—
	°F	°F	°F	°F	*Inches*	*Inches*	*Inches*
January	63.0	39.6	77	24	4.15	1.2	7.4
February	65.8	41.8	80	25	4.30	1.3	7.4
March	71.8	47.1	84	32	5.82	2.2	9.2
April	80.3	54.7	88	40	4.74	1.5	8.8
May	87.2	61.6	95	50	3.91	1.3	7.6
June	91.3	68.3	98	60	4.46	1.8	7.0
July	91.6	70.5	98	67	6.80	4.6	10.2
August	91.9	70.0	98	65	4.91	2.5	7.7
September	88.2	66.3	96	58	4.58	1.4	7.8
October	80.8	55.5	89	40	2.30	.2	4.8
November	70.7	44.9	82	29	2.68	.6	6.2
December	64.0	39.8	78	25	4.55	1.8	8.6
Year	78.9	55.0	[1]100	[1]20	53.20	38.5	68.5

[1] The extreme in temperature that will be equaled or exceeded on at least 4 days in 2 years out of 10.

only permanent streams in the two counties. In recent years many small ponds have been built, but wells are the chief source of water.

Lake Seminole, the southern boundary and part of the western boundary of Seminole County, has a surface area of 37,500 acres. It has become a tremendous sporting attraction for fishing, boating, water sports, bathing, and camping.

Climate[6]

Miller and Seminole Counties, which are in extreme southwest Georgia, have a humid, subtropical climate. Summers are long and rather hot, and winters are usually short and mild. The normally generous rainfall has a marked summer maximum and a secondary maximum early in spring. Fall is the driest season and brings some of the area's most pleasant weather. Long periods with warm, sunny days and mild to cool nights are common at this time of year. Spring weather is quite changeable. The sharp contrast between rapidly warming air from the south and late-arriving cool air from the north results in several periods of unsettled and potentially stormy weather. Lake Seminole, which covers a large area in southern Seminole County, has a slight moderating effect on near-shore temperature both in summer and winter.

In table 10, temperature and precipitation data for Miller and Seminole Counties are given. Table 11 shows the probabilities of freezing temperatures.

Summer arrives by mid-May, and from then until mid-September most days have maximum temperatures near or above 90° F. All summer months have several days with readings in the upper 90's and about two summers out of 10 have at least 4 days with a maximum of 100° or higher. Normally, summer nights are pleasant. The temperature drops steadily after sunset and reaches the low 70's or high 60's by early morning. Average maximum temperatures in autumn range from the 80's in September to the low 70's in November and the minimum temperatures from the 60's to the 40's.

The first freezing temperature usually comes around mid-November, and periods of cold weather occur at fairly regular intervals from then until mid-March. The cold spells are usually short and alternate with longer periods of mild weather throughout the winter. Freezing occurs on about 30 days in an average winter, but it is unusual for more than three or four successive days to have a minimum temperature under 32°. Only about 2 winters in 10 have as many as 4 days with a low under 20°. The average date of the last

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TABLE 11.—*Probabilities of low temperatures in spring and fall*

Probability	Dates for given probability at a temperature of— 24° F or lower	28° F or lower	32° F or lower
Spring:			
1 year in 10 later than	March 3	March 16	April 3
2 years in 10 later than	February 22	March 8	March 25
5 years in 10 later than	January 23	February 25	March 14
Fall:			
1 year in 10 earlier than	November 22	November 10	October 29
2 years in 10 earlier than	November 28	November 14	November 2
5 years in 10 earlier than	December 17	November 26	November 14

spring freeze is around mid-March, and mean temperatures increase by 15° from March to May.

Rainfall is at a maximum in midsummer when demands are greatest. Just over 30 percent of the annual total falls during June, July, and August. July, the wettest month, normally has almost 7 inches. Most summer rains occur as showers and thundershowers, and amounts generally show large variations from place to place. On the average, 8 days in June and August and 11 in July get 0.10 of an inch or more of rain. Most summer months have 1 or 2 days with an inch or more of rain. A thunderstorm occurs on about 1 out of 3 days in summer. Rainfall decreases in both frequency and amount after mid-September and reaches a minimum in October, which normally has slightly more than 2 inches. Only 18 percent of the annual total falls in the fall.

Shower activity decreases through autumn, and by November most rainfall is associated with cyclonic storms and weather fronts. An occasional tropical cyclone brings heavy rains and gale force winds to the area in autumn. Winter rainfall is fairly uniform in amount and distribution. On the average, from 4 to 4.5 inches falls in each winter month. Most winter rains come from cyclonic storms and fronts and are usually widespread. March is the area's second wettest month; rainfall averages nearly 6 inches. The average decreases about an inch per month from March through May. An increase toward the midsummer maximum begins in early June. The threat of tornadoes is greatest in spring.

The humidity is fairly high, averaging near 90 percent in early morning and from 50 to 60 percent in early afternoon. Average windspeed ranges from 6 to 10 miles per hour. Directions are quite variable.

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Glossary

Alluvium. Soil material, such as sand, silt, or clay, that has been deposited on land by streams.

Available water capacity (also termed available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil.

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. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrations of compounds, or of soil grains cemented together. The composition of some concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are examples of material commonly found in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material, and tends to stretch somewhat and pull apart, rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard and brittle; little affected by moistening.

Erosion. The wearing away of the land surface by wind (sandblast), running water, and other geological agents.

Flood plain. Nearly level land, consisting of stream sediments, that borders a stream and is subject to flooding unless protected artificially.

Fragipan. A loamy, brittle, subsurface horizon that is very low in organic-matter content and clay but is rich in silt or very fine sand. The layer is seemingly cemented. When dry, it is hard or very hard and has a high bulk density in comparison with the horizon or horizons above it. When moist, the fragipan tends to rupture suddenly if pressure is applied, rather than to deform slowly. The layer is generally mottled, is slowly or very slowly permeable to water, and has few or many bleached fracture planes that form polygons. Fragipans are a few inches to several feet thick; they generally occur below the B horizon, 15 to 40 inches below the surface.

Horizon, soil. A layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil-forming processes. These are the major horizons:

O horizon.—The layer of organic matter on the surface of a mineral soil. This layer consists of decaying plant residues.

A horizon.—The mineral horizon at the surface or just below an O horizon. This horizon is the one in which living organisms are most active and therefore is marked by the accumulation of humus. The horizon may have lost one or more of soluble salts, clay, and sesquioxides (iron and aluminum oxides).

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or some combination of these; (2) by prismatic or blocky structure; (3) by redder or stronger colors than the A horizon; or (4) by some combination of these. Combined A and B horizons are usually called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The weathered rock material immediately beneath the solum. In most soils this material is presumed to be like that from which the overlying horizons were formed. If the material is known to be different from that in the solum, a Roman numeral precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock usually underlies a C horizon but may be immediately beneath an A or B horizon.

Humus. The well-decomposed, more or less stable part of the organic matter in mineral soils.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Leaching. The removal of soluble materials from soils or other material by percolating water.

Mottling, soil. Irregularly marked with spots of different colors that vary in number and size. Mottling in soils usually indicates poor aeration and lack of drainage. Descriptive terms are as follows: Abundance—*few*, *common*, and *many*; size—*fine*, *medium*, and *coarse*; and contrast—*faint*, *distinct*, and *prominent*. The size measurements are these: *fine*, less than 5 millimeters (about 0.2

inch) in diameter along the greatest dimension; *medium*, ranging from 5 millimeters to 15 millimeters (about 0.2 to 0.6 inch) in diameter along the greatest dimension; and *coarse*, more than 15 millimeters (about 0.6 inch) in diameter along the greatest dimension.

Mulch. A natural or artificially applied layer of plant residue or other material on the surface of the soil. Mulches are generally used to help conserve moisture, control temperature, prevent surface compaction or crusting, reduce runoff and erosion, improve soil structure, or control weeds. Common mulching materials are wood chips, plant residue, sawdust, and compost.

Munsell notation. A system for designating color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with a hue of 10YR, a value of 6, and a chroma of 4.

Organic matter. A general term for plant and animal material, in or on the soil, in all stages of decomposition. Readily decomposed organic matter is often distinguished from the more stable forms that are past the stage of rapid decomposition.

Permeability. The quality that enables the soil to transmit water or air. Terms used to describe permeability are as follows: *very slow, slow, moderately slow, moderate, moderately rapid, rapid,* and *very rapid*.

Profile, soil. A vertical section of the soil through all its horizons and extending into the parent material.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is precisely neutral in reaction because it is neither acid nor alkaline. An acid, or "sour," soil is one that gives an acid reaction; an alkaline soil is one that is alkaline in reaction. In words, the degrees of acidity or alkalinity are expressed thus:

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Sand. Individual rock or mineral fragments in soils having diameters ranging from 0.05 to 2.0 millimeters. Most sand grains consist of quartz, but they may be of any mineral composition. The textural class name of any soil that contains 85 percent or more sand and not more than 10 percent clay.

Silt. Individual mineral particles in a soil that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). Soil of the silt textural class is 80 percent or more silt and less than 12 percent clay.

Solum. The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum in mature soil includes the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristic of the soil are largely confined to the solum.

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.

Stripcropping. Growing crops in a systematic arrangement of strips, or bands, to serve as vegetative barriers to wind and water erosion.

Structure soil. The arrangement of primary soil particles into compound particles or clusters that are separated from adjoining aggregates and have properties unlike those of an equal mass of unaggregated primary soil particles. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering together without any regular cleavage, as in many claypans and hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, about 5 to 8 inches in thickness. The plowed layer.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Topsoil. A presumed fertile soil or soil material, or one that responds to fertilization, ordinarily rich in organic matter, used to topdress roadbanks, lawns, and gardens.

Water table. The highest part of the soil or underlying rock material that is wholly saturated with water. In some places an upper, or perched, water table may be separated from a lower one by a dry zone.

Weathering. All physical and chemical changes produced in rocks at or near the earth's surface by atmospheric agents. These changes result in more or less complete disintegration and decomposition of the rock.

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GUIDE TO MAPPING UNITS

For a full description of a mapping unit and for general information about its management, read both the description of the mapping unit and that of the soil series to which the mapping unit belongs. Other information is given in tables as follows:

Acreage and extent, table 1, page 6.
Estimated yields, table 2, page 24.
Woodland groups, table 3, page 25.
Suitability of soils for wildlife, table 4, page 27.
Engineering uses of the soils, tables 5, 6, 7, and 8, pages 30 through 38.

Map symbol	Mapping unit	Described on page	Capability unit	Woodland suitability group
Av	Angie fine sandy loam	7	IIw-3	2w8
EuB	Esto loamy sand, 2 to 5 percent slopes	8	IIIe-3	3o1
EuE	Esto loamy sand, 5 to 17 percent slopes	8	VIe-2	3o1
GmA	Goldsboro sandy loam, 0 to 2 percent slopes	9	IIw-2	2w8
Grd	Grady soils	9	Vw-1	2w9
Ig	Irvington sandy loam	10	IIw-2	2o7
LMB	Lucy loamy sand, 0 to 5 percent slopes	11	IIs-1	3s2
Myt	Meggett soils	12	Vw-1	1w9
NhA	Norfolk loamy sand, 0 to 2 percent slopes	12	I-1	2o1
NhB	Norfolk loamy sand, 2 to 5 percent slopes	13	IIe-1	2o1
Oh	Ocilla loamy sand	13	IIIw-1	3w2
OeA	Orangeburg loamy sand, 0 to 2 percent slopes	14	I-1	2o1
OeB	Orangeburg loamy sand, 2 to 5 percent slopes	14	IIe-1	2o1
OeC2	Orangeburg loamy sand, 5 to 8 percent slopes, eroded	14	IIIe-1	2o1
Pa	Pelham sand	16	Vw-2	2w3
Riv	Riverview and Congaree soils	16	IIw-1	1o7
TuA	Tifton sandy loam, 0 to 2 percent slopes	17	I-2	2o1
TuB	Tifton sandy loam, 2 to 5 percent slopes	17	IIe-2	2o1
TzB	Troup sand, 0 to 5 percent slopes	19	IIIs-1	3s2
TzC	Troup sand, 5 to 8 percent slopes	19	IVs-1	3s2
WeB	Wagram loamy sand, 0 to 5 percent slopes	20	IIs-1	3s2

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