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United States Department of Agriculture

Soil Conservation Service

In cooperation with United States Department of Energy; United States Department of Agriculture, Forest Service; South Carolina Agricultural Experiment Station; and South Carolina Land Resources Conservation Commission

Soil Survey of Savannah River Plant Area, Parts of Aiken, Barnwell, and Allendale Counties, South Carolina

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How To Use This Soil Survey

General Soil Map

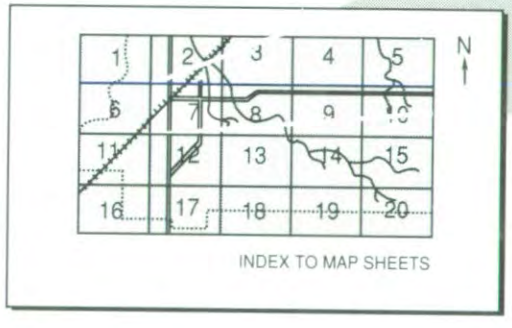
The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.

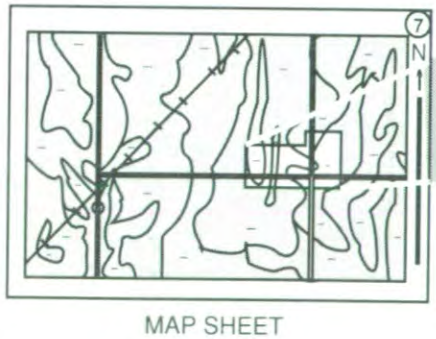
To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



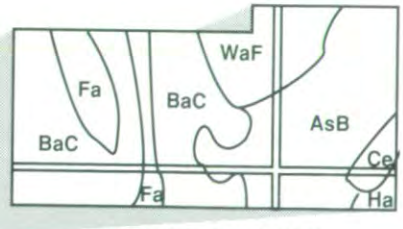
INDEX TO MAP SHEETS

MAP SHEET

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.



MAP SHEET



AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. 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 1987. Soil names and descriptions were approved in 1988. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1987. This soil survey was made cooperatively by the Soil Conservation Service; the United States Department of Energy; the United States Department of Agriculture, Forest Service; the South Carolina Agricultural Experiment Station; and the South Carolina Land Resources Conservation Commission.

All programs and services of the Soil Conservation Service are offered on a nondiscriminatory basis, without regard to race, color, national origin, religion, sex, age, marital status, or handicap.

Cover: A Department of Energy nuclear production reactor surrounded by managed stands of loblolly pine and mixed hardwoods in an area of the Fuquay-Blanton-Dothan association. (Photo courtesy of EG & G/EM, Las Vegas, Nevada, and E.I. DuPont de Nemours, Inc., SRL, Aiken, South Carolina.)

Contents

Issued June 1990

Index to Map Units

Summary of Tables

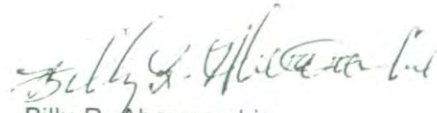
Foreword

This soil survey contains information that can be used in land-planning programs in the Savannah River Plant area. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

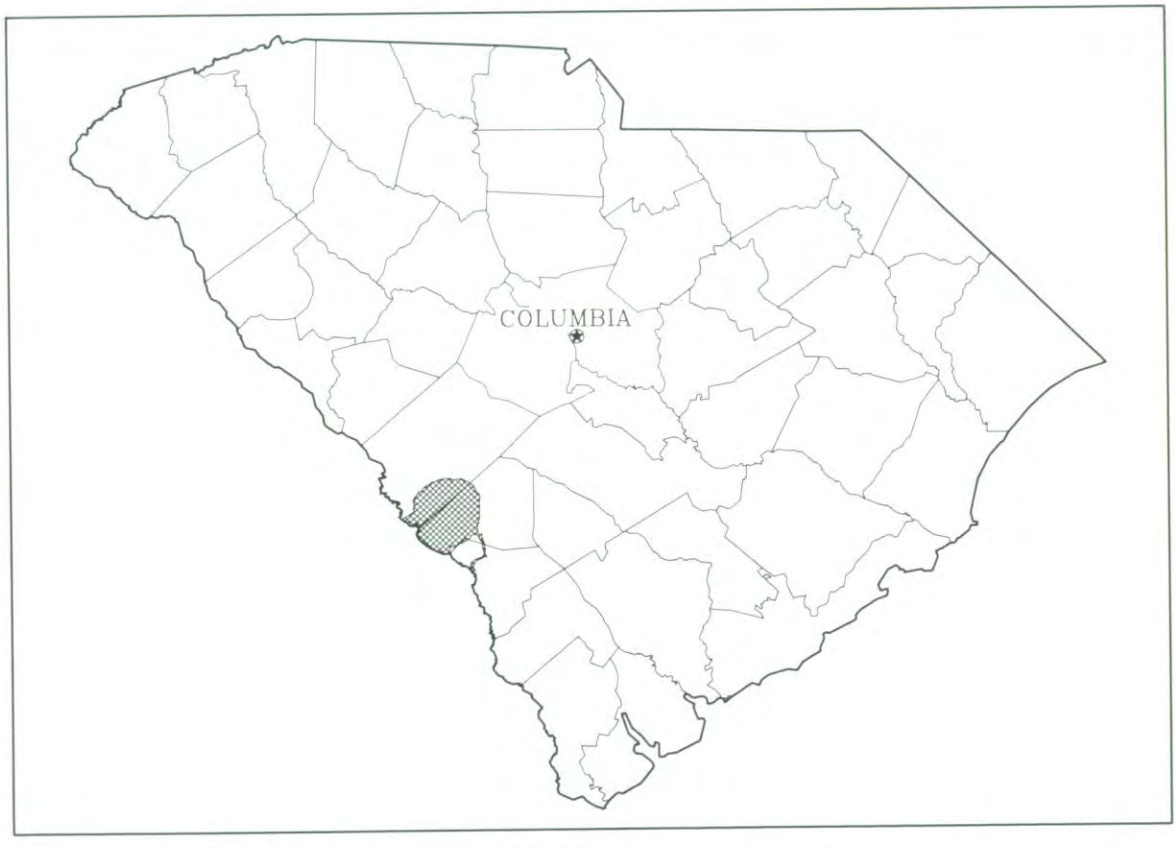
This soil survey is designed for many different users. Foresters and agronomists can use it to evaluate the potential of the soil and the management needed for maximum fiber production and for research. Planners, engineers, developers, and builders can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, environmental specialists, and specialists in wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment in and around the Savannah River Plant.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to excavations or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.



Billy R. Abercrombie
State Conservationist
Soil Conservation Service



Location of the Savannah River Plant area, which is in parts of Aiken, Barnwell, and Allendale Counties, South Carolina.

Soil Survey of Savannah River Plant Area, Parts of Aiken, Barnwell, and Allendale Counties, South Carolina

By Vergil A. Rogers, Soil Conservation Service

Soils surveyed by Vergil A. Rogers and Edward C. Herren, Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service,
in cooperation with
the United States Department of Energy; United States Department of Agriculture, Forest Service; the South Carolina Agricultural Experiment Station; and the South Carolina Land Resources Conservation Commission

The SAVANNAH RIVER PLANT AREA is midway between the mountains and the coast. About a third of the land is in the southwest corner of Aiken County, and nearly two-thirds is in the western part of Barnwell County. A small part is in Allendale County, mainly along Lower Three Runs Creek. The Savannah River, on the west side of the survey area, is the boundary between South Carolina and Georgia.

The survey area makes up about 198,231 acres. Most of the land is owned by the United States Department of Energy. Barnwell Industrial Park is in the survey area.

General Nature of the Survey Area

Most of this survey area is in the Carolina and Georgia Sand Hills Land Resource Area, generally referred to in this soil survey as the Sand Hills. Some broad upland areas are in the Southern Coastal Plain Land Resource Area, referred to as the Coastal Plain *(3)*.

The soils in the survey area generally are gently sloping to moderately steep. Some soils on uplands are nearly level, and those on bottom land along the major streams are level. The soils in small, narrow areas adjacent to drainageways are steep. Most of the soils are well drained to excessively drained. The well drained soils have a sandy surface layer underlain by a loamy subsoil. The somewhat excessively drained soils have a thick, sandy surface layer that extends to a depth of 80 inches or more in some areas. Numerous upland depressions, commonly referred to as "Carolina bays," are less than an acre to many acres in size. Water stands in most of these depressions for long periods in most years. The soils on bottom land range from well drained to very poorly drained. In the Sand Hills area, some soils on the abrupt slope breaks have a dense, brittle subsoil.

History and Development

The Savannah River Plant is the result of a purchase by the Federal Government of 198,231 acres of land along the Savannah River. Before its purchase, this property was owned by 1,500 families that included about 6,000 people. Two major towns and four small communities were in the area. The towns were Ellenton, with a population of about 600, and Dunbarton, with a population of about 230. The communities were Leigh, Hawthorne, Robbins, and Meyers Mill.

Most of the residents were farmers who raised cattle, hogs, chickens, and timber. Cotton and corn were the main row crops. About 60 to 70 percent of the area was woodland, mainly a mixture of hardwoods and pines. Natural longleaf pines grew in a number of areas. Most

of the older longleaf pine stands were used for the collection of turpentine.

In August 1950, E.I. DuPont de Nemours signed a contract with the Federal government, agreeing to create, design, and construct the Savannah River Plant to produce nuclear materials for national defense. The site was chosen because of its relative distance from large populations, relatively smooth topography, large supply of water, and soils that are well drained throughout most of the area.

Construction began in February 1951. The facility was completed in 1956 at a cost of 1.1 billion dollars. During construction, more than 39 million cubic yards of earth was moved, nearly 1.5 million cubic yards of concrete was laid, many buildings were constructed, and 85 million board feet of lumber was used.

The Savannah River Plant continues to produce nuclear materials for the nation's defense. A waste plant under construction will be the largest in the world. It will mix the high-level radioactive waste with borosilicate glass to harden in canisters for storage underground in a Federal repository.

In 1972, the Savannah River Plant became the nation's first National Environmental Research Park, a large controlled area for environmental research. Because of the wide variety of soils, natural habitat, and areas influenced by industrial activities, the area is an ideal outdoor laboratory.

Climate

Prepared by the South Carolina Water Resources Commission.

Table 1 gives data on temperature and precipitation for the survey area as recorded at the Savannah River Plant in the period 1964 to 1985. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 47.5 degrees F and the average daily minimum temperature is 36.7 degrees. The lowest temperature on record, which occurred on January 21, 1985, is -3 degrees. In summer, the average temperature is 79.7 degrees and the average daily maximum temperature is 90.1 degrees. The highest recorded temperature, which occurred on August 23, 1983, is 107 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 47.78 inches. Of this, 25.66 inches, or 54 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 21.61 inches. The heaviest 1-day rainfall during the period of record was 9.68 inches at Aiken on April 16, 1969. Thunderstorms occur on about 55 days each year.

The average seasonal snowfall is 1.1 inches. The greatest snow depth at any one time during the period of record was 13.7 inches. Days with at least 1 inch of snow on the ground are rare. In some winters, no snow accumulates on the ground.

The average relative humidity in midafternoon is about 51 percent. Humidity is higher at night, and the average at dawn is about 83 percent. The sun shines 65 percent of the time possible in summer and 55 percent in winter. The prevailing wind is from the southwest. Average windspeed is highest, 8 miles per hour, in spring.

Relief, Drainage, and Water Resources

Relief in the survey area ranges from the long, narrow, steep areas on slopes on the east side of Upper Three Runs Creek and Tinker Creek to the nearly level areas on stream terraces west of road 125. Elevation ranges from about 420 feet near the Aiken Gate House on road 2 to about 70 feet where Lower Three Runs Creek enters the Savannah River in Allendale County. It is about 80 feet where Steel Creek enters the Savannah River in Barnwell County. Most of the soils have slopes that range from about 1 to 8 percent. Some long, narrow breaks near streams have slopes that range to 40 percent.

All drainage in the survey area is into the Savannah River. The bottom land along the Savannah River is not flooded so extensively as it was about 30 years ago because of the regulation of runoff from the watershed by numerous hydroelectric dams upstream. Since streamflow is regulated somewhat by locks and the release of water through the dams, however, the frequency of flooding is greater.

The survey area has a number of ponds. Par Pond and L Cooling Pond are the larger ones used to cool water from the reactors. Wildlife use this wetland habitat.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of native plants growing on the soils; and the kinds of substrata. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material from which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, the landforms, relief, climate, and the natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, soil reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area are generally collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

This soil survey updates part of the survey of Barnwell County that was published in 1914 *(7)*.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by several kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in

their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. In the detailed soil map units, these latter soils are called inclusions or included soils. In the general soil map units, they are called soils of minor extent.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they have a small effect on use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use significantly or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soils on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas. Onsite evaluation is needed in research areas 5 acres or less in size.

General Soil Map Units

The general soil map at the back of this publication shows the soil associations in this survey area. Each association has a distinctive pattern of soils, relief, and drainage. Each is a unique natural landscape. Typically, an association consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one association can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or a building or other structure. The soils in any one association differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Soil Descriptions

Dominantly Nearly Level Soils on Flood Plains

These soils are on the flood plains along the larger streams. Slopes generally are 0 to 1 percent. There are many depressions and sloughs, which are the remains of old stream channels. Gum and water oak trees are the dominant vegetation.

1. Chastain-Tawcaw-Shellbluff Association

Poorly drained, somewhat poorly drained, and well drained soils that are clayey or loamy throughout and are subject to flooding

This association consists of nearly level soils on the flood plains along the major streams, mainly along the Savannah River. Only a few roads are in areas of the association.

This association makes up about 6 percent of the survey area. It is about 60 percent Chastain soils, 20 percent Tawcaw soils, 15 percent Shellbluff soils, and 5 percent soils of minor extent.

Chastain soils are poorly drained and are clayey to a depth of about 40 inches. Tawcaw soils are somewhat poorly drained and are clayey in the upper part and loamy in the lower part. Shellbluff soils are well drained and are loamy to a depth of about 40 inches.

Minor in this association are Toccoa and Pickney soils. Toccoa soils are loamy in the upper part. They are on slight ridges near the edges of flood plains and adjacent to the stream channels. Pickney soils are black or very dark gray in the upper part. They are on flood plains that have no well defined channels.

All of the acreage in this association is wooded, mainly with American sycamore, gum, cypress, and water oak. The soils are suited to timber production. American sycamore, sweetgum, eastern cottonwood, yellow poplar, green ash, and cherrybark oak are among the better suited species.

These soils are not suited to sanitary facilities or building site development because of flooding and wetness. Control of flooding and wetness is needed.

Dominantly Nearly Level Soils on Stream Terraces

These soils are on stream terraces adjacent to the flood plains along the Savannah River. Slopes range from 0 to about 2 percent. The dominant vegetation at the higher elevations is loblolly pine. A mixture of pine, oak, and gum trees is in the lower areas.

2. Rembert-Hornsville Association

Poorly drained and moderately well drained soils that have a clayey subsoil

This association consists of nearly level soils on stream terraces. Rembert soils are poorly drained, and Hornsville soils are moderately well drained. A few dirt roads and a railroad cross areas of the association.

This association makes up about 7 percent of the survey area. It is about 30 percent Rembert soils, 18 percent Hornsville soils, and 52 percent soils of minor extent.

Minor in this association are Smithboro, Troup, and Wagram soils. Smithboro soils are in intermediate

positions on the landscape, and Troup and Wagram soils are on low, sandy ridges.

Most of the acreage in this association is woodland. Loblolly pine is the dominant species; however, hardwood and gum trees are common on the more poorly drained soils. The soils are well suited to timber production. Excess water is a management concern. Shallow ditches can remove the excess water in most areas, but some depressions do not have drainage outlets. Old ditches are in some areas that were previously farmed.

These soils generally are poorly suited to sanitary facilities and building site development because of wetness and slow permeability. Removing excess water from the slowly permeable soils is the major management concern.

Dominantly Nearly Level to Sloping Upland Soils on the Coastal Plain and Sand Hills

These soils are on broad stream divides in the uplands. Slopes range from 0 to 10 percent. Large stands of pine trees are dissected by roads and fire lanes. Hardwood trees and wetland grasses grow in the center of bays or small upland depressions.

3. Blanton-Lakeland Association

Somewhat excessively drained and excessively drained soils that have a loamy subsoil or that are sandy throughout

This association consists of nearly level to sloping soils on uplands. Many highways and secondary dirt roads are throughout areas of this association. Stands of longleaf pine and loblolly pine with an understory of turkey oak and blackjack oak are on broad, sandy ridges.

This association makes up about 18 percent of the survey area. It is about 40 percent Blanton soils, 20 percent Lakeland soils, and 40 percent soils of minor extent.

Blanton soils are somewhat excessively drained. They have a thick, sandy surface layer and subsurface layer and a loamy subsoil that is 40 to 80 inches below the surface. These soils commonly are adjacent to more poorly drained soils, such as Albany and Williman soils.

Lakeland soils are excessively drained and are sandy throughout. They generally are higher on the landscape than Blanton soils.

Minor in this association are Albany, Troup, Fuquay, Lucy, Wagram, Dothan, Ogeechee, and Williman soils. Albany soils are on toe slopes and have a high water table within 1.0 to 2.5 feet of the surface. Troup soils are on narrow to broad ridgetops and side slopes. They have a loamy subsoil 40 to 80 inches below the surface. Fuquay, Lucy, Wagram, and Dothan soils are on narrow to broad ridgetops and side slopes. They have a loamy subsoil less than 40 inches below the surface. Ogeechee and Williman soils are in upland depressions in some Carolina bays. They have a loamy subsoil.

Most of the acreage in this association is woodland. Longleaf pine and loblolly pine are the dominant species. Blackjack oak and turkey oak grow in the more sandy areas. They range from sprouts to trees that are about 20 feet tall. Hardwoods, gum trees, and grasses grow in wet areas of the minor soils.

The soils in this association are poorly suited to cultivated crops. The main limitations are droughtiness, a low content of organic matter, rapid leaching, and low fertility.

These soils are suited to timber production. The equipment limitation and seedling mortality are management concerns. These problems are caused by the thick, sandy surface layer. Wide-tread or tracked vehicles can minimize the equipment limitation. Reducing the seedling mortality rate is difficult, but planting hardy plants early in winter can reduce the rate.

Because of the thick sandy surface layer and subsurface layer, these soils are only fairly well suited to sanitary facilities. In most areas the soils are suited to building site development. The more sloping areas, however, are not so well suited.

4. Fuquay-Blanton-Dothan Association

Well drained and somewhat excessively drained soils that have a loamy subsoil

This association consists of nearly level to sloping, well drained soils on all of the broad upland ridges in the survey area, except for those in the northeastern part. Many buildings, highways, and secondary dirt roads are throughout the association. Planted loblolly pine is the dominant vegetation.

This association makes up about 47 percent of the survey area. It is about 20 percent Fuquay soils, 20 percent Blanton soils, 12 percent Dothan soils, and 48 percent soils of minor extent.

Fuquay soils are well drained. They have a moderately thick, sandy surface layer and subsurface layer and a loamy subsoil that contains iron-rich, brittle nodules of plinthite. Blanton soils are somewhat excessively drained. They have a thick, sandy surface layer and subsurface layer and a loamy subsoil. Dothan

soils are well drained. They have a loamy subsoil that contains iron-rich nodules of plinthite.

Minor in this association are Vaucluse, Ailey, Norfolk, Troup, Orangeburg, Wagram, Ogeechee, and Rembert soils. Vaucluse and Ailey soils are on the more abrupt, narrow slope breaks and ridges. They have dense, brittle layers in the subsoil. Norfolk and Orangeburg soils are similar to Dothan soils and are on similar landscapes. They do not have iron-rich, brittle nodules of plinthite in the subsoil. Wagram soils have a moderately thick, sandy surface layer and subsurface layer. Ogeechee and Rembert soils are in depressions.

About 80 percent of the acreage in this association is wooded, mainly with loblolly pine. The rest is used for roads, facilities, and buildings.

These soils are suited to cultivated crops. The crops respond well to moderate applications of fertilizer and lime. Close-growing and green manure crops help to maintain the content of organic matter and control erosion.

These soils are well suited to timber production. In some areas the equipment limitation and seedling mortality are moderate because of the thickness of the sandy surface layer and subsurface layer. Wide-tread or tracked vehicles can minimize the equipment limitation. The seedling mortality rate can be reduced by early planting of hardy seedlings.

Most of these soils are suited to sanitary facilities. The sandy soils have moderate or severe limitations affecting some sanitary facilities. Most of the soils are suited to building site development. The more sloping soils, however, are not so well suited.

5. Orangeburg Association

Well drained soils that have a loamy subsoil

This association consists mainly of soils on broad upland ridges and in nearly level to sloping areas, northwest of Upper Three Run Creek. Slopes generally are smooth. Many buildings, highways, and secondary dirt roads are throughout this association. Planted loblolly pine is the dominant vegetation.

This association makes up about 2 percent of the survey area. It is about 70 percent Orangeburg soils and 30 percent soils of minor extent.

The Orangeburg soils have a friable, red, loamy subsoil.

Minor in this association are Lucy, Fuquay, Troup, and Ailey soils, which are in positions on the landscape similar to those of the Orangeburg soils. Fuquay, Lucy, and Ailey soils have a moderately thick, sandy surface layer and subsurface layer. Fuquay soils have a loamy subsoil that contains iron-rich, brittle nodules of plinthite. Ailey soils have a loamy subsoil that has cemented and brittle layers. Troup soils have a thick, sandy surface layer and subsurface layer.

About 85 percent of the acreage in this association is wooded, mainly with loblolly pine. The rest is used for roads, facilities, and buildings.

The soils in this association are well suited to woodland, sanitary facilities, building site development, wildlife habitat, and other uses. They are suited to cultivated crops. The crops respond moderately well to applications of fertilizer and lime. Close-growing crops and green manure crops help to maintain the organic matter and control erosion.

Dominantly Nearly Level to Steep Upland Soils and Closely Associated Flood Plain Soils on the Coastal Plain and Sand Hills

These soils are on broad stream divides, mainly on rolling uplands. Slopes range from 0 to 15 percent. Large stands of pines dissected by roads, fire lanes, and hardwood drainageways are typical.

6. Vaucluse-Ailey Association

Well drained soils that have a loamy subsoil with dense, brittle layers

This association consists of sloping and strongly sloping soils in scattered areas around the head and sides of small drainageways in the uplands. The areas are long and narrow. Many roads and trails cross areas of this association. The vegetation is mixed pine and hardwoods.

This association makes up about 10 percent of the survey area. It is about 25 percent Vaucluse soils, 15 percent Ailey soils, and 60 percent soils of minor extent.

Vaucluse soils have a loamy surface layer and subsurface layer that have a combined thickness of less than 20 inches. Ailey soils have a moderately thick, sandy surface layer and subsurface layer. Both soils have a loamy subsoil that has a brittle layer.

Minor in this association are Pickney, Troup, Lucy, Dorovan, Fuquay, Lakeland, Blanton, and Wagram soils and Fluvaquents. Pickney and Dorovan soils and Fluvaquents are in the lower areas along drainageways. Troup, Lucy, Fuquay, Blanton, Lakeland, and Wagram soils generally are in smoother areas. They do not have a dense, brittle layer in the subsoil. Also, Lakeland soils are sandy throughout.

About 98 percent of the acreage in this association is woodland. The rest is used for roads or other purposes. The soils are fairly well suited to timber production. A

slight or moderate erosion hazard, the equipment limitation, seedling mortality, and windthrow are management concerns. They are caused by the slope, the thickness of the sandy surface layer and subsurface layer, and the dense, brittle layers in the subsoil. All fire lanes and roads should be established on the contour. Also, the trees should be planted on the contour. When the soils are dry, wide-tread or tracked vehicles can minimize the equipment limitation in the more sandy areas. Planting hardy seedlings in early winter can reduce the seedling mortality rate. Because of the windthrow hazard, the woodland should be managed for pulpwood rather than for sawtimber.

Because of slow permeability, these soils are poorly suited to sanitary facilities. Reducing the effects of the slow permeability is difficult. The soils are poorly suited to building site development because of the slope. Extensive grading and land shaping are needed.

7. Troup-Pickney-Lucy Association

Well drained and very poorly drained soils; some have a sandy surface layer and a loamy subsoil and some are sandy throughout and are subject to flooding

This association consists of moderately steep and steep soils on uplands and nearly level soils on the flood plains along streams. The steeper areas are on the southeast bank of Upper Three Runs Creek and along both sides of Tinker Creek. Areas of this association are long and narrow. A few roads cross these areas. The association has the most sloping soils in the survey areas. The soils on the flood plains have a higher content of organic matter than the other soils. The vegetation is mostly hardwoods mixed with some loblolly pine.

This association makes up about 10 percent of the survey area. It is about 45 percent Troup soils, 40 percent Pickney soils, 10 percent Lucy soils, and 5 percent soils of minor extent.

Troup soils are well drained. They have a thick, sandy surface layer and subsurface layer and a loamy subsoil at a depth of 40 to 80 inches.

Pickney soils are very poorly drained. They have a thick, black surface soil and are sandy throughout. Lucy soils are well drained. They have a moderately thick, sandy surface layer and subsurface layer and a loamy subsoil at a depth of 20 to 40 inches.

Minor in this association are Vaucluse, Ailey, Blanton, Fuquay, and Orangeburg soils and some sandy, wet soils. Vaucluse and Ailey soils are on abrupt, strongly rolling or hilly breaks. They have dense, brittle layers in the subsoil. Blanton soils are on the rolling and smoother slopes. They have a thick, sandy surface layer and subsurface layer and a mottled yellow and brown, loamy subsoil. Fuquay soils are in the less sloping, higher areas. They have a moderately thick, sandy surface layer and subsurface layer and iron-rich, brittle nodules of plinthite in the subsoil. Orangeburg soils are in the higher areas that are transitional to less sloping soils in smooth areas. They have a red, loamy, friable subsoil that does not have plinthite. The sandy, wet soils are along drainageways adjacent to areas of Pickney soils.

About 99 percent of the acreage in this association is woodland and the rest is used for roads. The soils are fairly well suited to woodland. In the more sloping areas, the hazard of erosion and the equipment limitation are moderate and seedling mortality is slight or moderate. Planting trees and establishing trails and fire lanes on the contour can help to control erosion. Wide-tread or tracked vehicles minimize the equipment limitation. The seedling mortality rate can be reduced by early planting of hardy seedlings. The soils on flood plains are poorly suited to timber because of wetness and flooding. The better suited species include sweetgum, American sycamore, and green ash.

These soils are poorly suited to sanitary facilities and building site development because of the slope and the flooding. Some areas of less sloping soils are available for use as sites for sanitary facilities or buildings. Extensive grading and land shaping are needed on the steep slopes. The soils on flood plains are not suited to building site development.

Broad Land Use Considerations

About 85 percent of the survey area is woodland, and the other 15 percent is water, buildings, roads, parking areas, or open areas. The woodland produces lumber, pulp, and pine straw, which are sold to private contractors. Loblolly pine is the dominant species; however, other trees are planted for research information. The survey area has no cropland, but a few research plots of row crops have been planted in the past few years. Most facilities are on soils in associations 4 and 5 because of favorable slope, drainage, and permeability.

The soils in association 1 are subject to flooding, and some of the soils are poorly drained. These soils are poorly suited to construction sites. Although productive, they are poorly suited to mechanized timber management. Association 2 consists of some poorly

drained soils that are slowly permeable. These soils are suited to timber. Association 3 has broad areas of excessively drained soils that are rapidly permeable.

Association 4 has the lowest number of droughty soils. Most of the soils are well drained and have a loamy subsoil. The slopes are generally nearly level to sloping. A few small, poorly drained bays and narrow drainageways are in the association. Association 5 consists mainly of well drained soils that have a loamy subsoil. These soils are similar to those in association 4, but they are more friable and generally have a red subsoil. The soils in both associations generally are well suited to timber management, the construction of facilities, and other uses.

The soils in associations 6 and 7 are only fairly well suited or poorly suited to the construction of facilities and timber management because of the slope and flooding.

Most of the soils in the survey area are suited to use as habitat for wildlife. Small game, such as quail and rabbit, are in open areas where timber is clearcut. Mast-producing vegetation improves the habitat for deer, turkey, wild hogs, and other wildlife.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the substratum, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the substratum. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Lucy sand, 0 to 2 percent slopes, is a phase of the Lucy series.

Some map units are made up of two or more major soils. These map units are called soil complexes or undifferentiated groups.

A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Vaucluse-Ailey complex, 6 to 10 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils in a mapped area are not uniform. An area can be made up of only one of the major soils, or it can be made up of all of them. Troup and Lucy sands, 15 to 25 percent slopes, is an undifferentiated group in this survey area.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Urban land is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

AeB—Ailey sand, 2 to 6 percent slopes, wet substratum. This well drained soil is on long, narrow ridgetops and short, undulating side slopes of the Sand Hills. Most areas of this soil are about 10 to 40 acres in size.

Typically, the surface layer is brown sand about 6 inches thick. The subsurface layer from a depth of about 6 to 26 inches is light yellowish brown sand. The subsoil from 26 to 55 inches is yellowish brown sandy clay loam. It has coarse mottles in shades of brown and red from 40 to 55 inches. The substratum from 55 to 65

inches is coarsely mottled red, strong brown, and light gray sandy loam.

Included with this soil in mapping are small areas of Vaucluse and Neeses soils. These soils are in the same landscape positions as the Ailey soil. Neeses soils have a clayey subsoil. Also included are small areas of Blanton and Troup soils on the smoother parts of the landscape. The included soils make up about 10 percent of the map unit.

The Ailey soil has a low content of organic matter and a low available water capacity. It is strongly acid or very strongly acid throughout. Permeability is slow in the subsoil. A perched water table is 4 to 6 feet below the surface during wet periods. Dense, brittle layers in the subsoil partly restrict the root zone.

Because of the low available water capacity and a low nutrient-holding capacity, this soil is poorly suited to row crops.

This soil is suited to timber production. Loblolly pine is the preferred tree to plant. Vehicle traffic does not damage this soil during wet periods. The thick, sandy surface soil moderately restricts the use of equipment. Tracked or wide-tread vehicles are needed when the soil is dry. Seedling mortality is moderate because of the low content of available nutrients and the low available water capacity. Planting seedlings in a furrow improves the survival rate. Seedlings survive and grow moderately well if competing vegetation is controlled by proper site preparation, which may include burning, spraying, cutting, or girdling. Burning and chopping are the preferred means of site preparation.

This soil is poorly suited to most sanitary waste facilities. The slow permeability is a severe limitation affecting septic tank absorption fields, but this limitation can be minimized by enlarging the filter field area. Seepage is a severe hazard in sewage lagoon areas. The sides of the lagoon should be backfilled with less permeable material.

The slope is a moderate limitation affecting sites for small commercial buildings. Grading and landscaping can reduce the effects of this limitation. The limitations affecting local roads and streets are insignificant.

This soil is fairly suited to openland wildlife habitat, poorly suited to woodland wildlife habitat, and very poorly suited to wetland wildlife habitat.

AnB—Albany loamy sand, 0 to 6 percent slopes. This somewhat poorly drained soil is on low toe slopes and in nearly level areas adjacent to more poorly drained soils of the Coastal Plains. Slopes generally are 1 to 3 percent but range from 0 to 6 percent. The areas of this soil are generally somewhat rounded in the middle and pointed on either end. They are 5 to 10 acres in size.

Typically, the surface layer is dark grayish brown loamy sand about 10 inches thick. The subsurface layer from a depth of about 10 to 32 inches is dark yellowish brown sand and from 32 to 78 inches is light gray, mottled sand. The subsoil from 78 to 82 inches is strong brown, mottled sandy loam.

Included with this soil in mapping are areas, 3 to 5 acres in size, of wet, sandy soils that do not have a subsoil within 80 inches of the surface. Also included are some areas, about an acre or two in size, of Pickney and Williman soils on the lower part of the landscape. The included soils make up about 15 percent of the map unit.

The Albany soil has a low content of organic matter and a very low available water capacity. It is moderately acid to very strongly acid throughout. Permeability is moderately rapid in the subsoil. The water table is 1.0 to 2.5 feet below the surface during wet periods.

Because of the very low available water capacity, the low organic matter content, rapid leaching, and low fertility, this soil is poorly suited to row crops.

This soil is well suited to timber production. Loblolly pine is a preferred tree to plant. Vehicle traffic does not damage this soil during wet periods. The main concerns in producing and harvesting timber are the equipment limitation and seedling mortality. The thick, sandy surface soil moderately restricts the use of equipment and causes moderate seedling mortality. Tracked or wide-tire vehicles are needed when the soil is dry. Planting high-quality seedlings early in winter increases the survival rate. Proper site preparation, which may include burning, roller-drum chopping, cutting or girdling, and shearing and raking can also improve seedling survival. Stockpiling of the surface layer during raking should be avoided because nutrients would be depleted in some areas.

This soil is poorly suited to most sanitary waste facilities. The seasonal high water table is a severe limitation affecting septic tank absorption fields, sewage lagoon areas, and trench type sanitary landfills. Attempting to minimize this limitation generally is not practical.

The wetness is a severe limitation affecting sites for small commercial buildings and a moderate limitation affecting local roads and streets. Commercial buildings generally are not built on this soil. Additions of suitable fill material, land shaping, and a drainage system are needed where roads and streets are constructed on this soil.

This soil is fairly suited to habitat for openland and

woodland wildlife and poorly suited to wetiand wildlife habitat.

BaB—Blanton sand, 0 to 6 percent slopes. This somewhat excessively drained soil is in broad upland swales and on low-lying ridges and side slopes of the Coastal Plain and Sand Hills. The areas of this soil are oblong or irregularly shaped and are commonly 10 to 200 acres in size.

Typically, the surface layer is dark grayish brown sand about 7 inches thick. The subsurface layer from a depth of about 7 to 48 inches is sand. The upper part is yellow, and the lower part is very pale brown. The subsoil extends to a depth of 80 inches or more. The upper part is strong brown sandy loam, and the lower part is fine sandy loam that is mottled in shades of brown, yellow, red, and gray.

Included with this soil in mapping are small areas of Albany, Ocilla, Fuquay, Lakeland, and Troup soils. Albany and Ocilla soils are at the lower elevations or on toe slopes. Fuquay, Lakeland, and Troup soils are on the higher parts of the landscape. The included soils make up about 10 percent of the map unit.

The Blanton soil has a low content of organic matter and a very low available water capacity. It is moderately acid to very strongly acid in the surface layer and subsurface layer and strongly acid or very strongly acid in the subsoil. Permeability is moderate in the subsoil. The water table is 4 to 6 feet below the surface during wet periods.

Because of the very low available water capacity, the low organic matter content, rapid leaching, and low fertility, this soil is poorly suited to crops.

This soil is suited to timber production. Loblolly pine and longleaf pine are the preferred trees to plant. Vehicle traffic does not damage this soil during wet periods. The main concerns in producing and harvesting timber are the equipment limitation and seedling mortality. The sandy surface layer moderately restricts the use of equipment. Tracked or wide-tire vehicles are needed when the soil is dry. Seedling mortality is moderate because nutrients are leached through the thick, sandy surface layer, and the available water capacity is very low. Planting high-quality seedlings in a shallow furrow early in winter improves the survival rate. Site preparation prior to planting can include burning and chopping.

The wetness is a moderate limitation affecting septic tank absorption fields. Adding fill material to the absorption field can help to minimize this limitation. Seepage is a severe hazard in sewage lagoon areas. The sides of the lagoon should be backfilled with less permeable soil material. The thick, sandy surface layer is a severe limitation affecting trench type sanitary landfills. This limitation can be minimized by covering the top 2 feet of the trench with loamy soil material.

The slope is a moderate limitation affecting sites for small commercial buildings. Selecting the less sloping areas for building sites or shaping and grading can reduce the effects of this limitation. The limitations affecting local roads and streets are insignificant.

This soil is fairly suited to habitat for openland and woodland wildlife. It is very poorly suited to wetland wildlife habitat.

BaC—Blanton sand, 6 to 10 percent slopes. This somewhat excessively drained soil is in narrow upland swales and on low-lying ridges and side slopes. The areas of this soil are oblong or irregularly shaped and are commonly 20 to 30 acres in size.

Typically, the surface layer is dark grayish brown sand about 7 inches thick. The subsurface layer from a depth of about 7 to 48 inches is sand. The upper part is yellow, and the lower part is very pale brown. The subsoil extends to a depth of 80 inches or more. The upper part is strong brown and light yellowish brown fine sandy loam, and the lower part is fine sandy loam that is mottled in shades of brown, yellow, red, and gray.

Included with this soil in mapping are small areas of Albany, Ocilla, Fuquay, Lakeland, and Troup soils. Albany and Ocilla soils are at the lower elevations or on toe slopes. Fuquay, Lakeland, and Troup soils are on the higher parts of the landscape. The included soils make up about 10 percent of the map unit.

The Blanton soil has a low content of organic matter and a very low available water capacity. It is moderately acid to very strongly acid in the surface layer and subsurface layer and strongly acid or very strongly acid in the subsoil. Permeability is moderate in the subsoil. The water table is 4 to 6 feet below the surface during wet periods.

Because of the very low available water capacity, the low organic matter content, rapid leaching, and low fertility, this soil is poorly suited to row crops.

This soil is suited to timber production. Loblolly pine and longleaf pine are the preferred trees to plant. Vehicle traffic does not damage this soil during wet periods. The main concerns in producing and harvesting timber are the equipment limitation and seedling mortality. The thick, sandy surface soil moderately restricts the use of equipment. Tracked or wide-tire vehicles are needed when the soil is dry. Seedling mortality is moderate because nutrients are leached

through the thick, sandy surface layers and the available water capacity is very low. Planting high-quality seedlings in a shallow furrow early in winter improves the survival rate. Site preparation prior to planting can include burning, roller-drum chopping, spraying, girdling, and shear-raking. The surface layer should not be raked into windrows with the debris.

The wetness and the slope are moderate limitations affecting septic tank absorption fields. The septic system should be constructed on the contour. Seepage is a severe hazard in sewage lagoon areas. The sides of the lagoon should be backfilled with less permeable soil material. The sandy surface layer is a severe limitation affecting trench type sanitary landfills. This limitation can be minimized by covering the top 2 feet of the trench with loamy soil material.

The slope is a severe limitation affecting sites for small commercial buildings and a moderate limitation affecting local roads and streets. Selecting the less sloping areas for building sites, shaping and grading, adding suitable fill material, and constructing roads and streets on the contour can reduce the effects of this limitation.

This soil is fairly suited to habitat for openland and woodland wildlife and very poorly suited to wetland wildlife habitat.

Ch—Chastain clay, frequently flooded. This poorly drained soil is on flood plains along the major streams, mainly on the lower part of the flood plains. Slopes are 0 to 1 percent. The areas of this soil are 20 to 150 acres in size.

Typically, the surface layer is dark grayish brown clay about 2 inches thick. The subsoil from a depth of 2 to 45 inches is grayish brown, mottled clay. The substratum from 45 to 60 inches is light gray clay.

Included with this soil in mapping are areas of Pickney, Shellbluff, and Tawcaw soils. Pickney soils are on the flood plains adjacent to the uplands. Shellbluff and Tawcaw soils are on the slightly higher flood plains. The included soils make up about 20 percent of the map unit.

The Chastain soil has a moderate organic matter content and a moderate available water capacity. It is strongly acid to extremely acid throughout. Permeability is slow. The water table is within 1 foot of the surface during winter and spring. This soil is subject to frequent flooding for very long periods throughout the year.

Because of the frequent flooding, this soil is not suited to row crops.

This soil is suited to timber production. Sweetgum and American sycamore are the preferred trees to plant. Eastern cottonwood, yellow poplar, and green ash also grow well on this soil. Vehicle traffic does heavy damage to this soil during wet periods. The wetness severely restricts the use of equipment and causes severe seedling mortality. Because of the present land use, reducing the wetness is difficult. Large hydroelectric dams upstream from this soil have reduced the intensity of flooding, but the frequency is increased at times by the release of water through floodgates. Water-tolerant trees should be selected for planting. The equipment used during site preparation is limited much of the year to hand-operated equipment. During wet periods this soil cannot support most kinds of equipment, including shear and rake or roller-drum chopping equipment.

Because of the frequent flooding and the high water table, this soil is not suited to sanitary facilities. The wetness and the frequent flooding are severe limitations affecting sites for small commercial buildings and local roads and streets. Minimizing these limitations generally is not feasible.

This soil is poorly suited to habitat for openland wildlife, fairly suited to woodland wildlife habitat, and well suited to wetland wildlife habitat.

Da—Dorovan muck, frequently flooded. This very poorly drained soil is in drainageways along perennial streams. It is on the flood plains, commonly next to hills and distant from the streams. Slopes are 0 to 1 percent. The areas of this soil generally are long and narrow or irregularly shaped. They commonly are 5 to 50 acres in size.

Typically, the surface soil is black muck about 53 inches thick. The substratum from a depth of 53 to 60 inches is black sandy loam.

Included with this soil in mapping are areas, 5 to 10 acres in size, of Pickney soils and wet, sandy soils that do not have a thick, dark brown or black surface layer that is high in content of organic matter. Pickney soils are in the same landscape positions as the Dorovan soil. They have less organic matter than the Dorovan soil. The wet, sandy soils are along the slightly deeper stream channels or in areas on the flood plains that receive very recent alluvial deposits. The included soils make up about 25 percent of the map unit.

The Dorovan soil has a very high content of organic matter and a very high available water capacity. It is extremely acid in the organic layers and strongly acid to extremely acid in the substratum. Permeability is moderate. The water table is 1.0 foot above the surface to 0.5 foot below the surface most of the time. This soil

is subject to frequent flooding for very long periods following heavy rainfall.

Because of the wetness and the frequent flooding, this soil is not suited to row crops. A major management concern is the control of excess water.

This soil is fairly suited to timber production. Baldcypress, swamp tupelo, gum, and green ash are the preferred trees to plant. Vehicles do heavy damage to this soil. The main concerns in producing and harvesting timber are the equipment limitation and seedling mortality caused by wetness and flooding. Because of low strength, conventional harvesting equipment should not be used. High lead cables or helicopters can be used to harvest the timber. The trees should be planted and harvested during the drier months. The equipment used during site preparation is limited to hand-operated equipment because of the low strength.

Because of the wetness and the flooding, this soil is not suited to sanitary facilities. The wetness and the flooding are severe limitations affecting sites for small commercial buildings and local roads and streets. Minimizing these limitations is very difficult. A better drained soil that is not subject to flooding should be selected.

This soil is very poorly suited to habitat for openland and woodland wildlife and well suited to wetland wildlife habitat.

DoA—Dothan sand, 0 to 2 percent slopes. This well drained soil is on broad ridgetops on uplands of the Coastal Plain and in areas intermingled with the Sand Hills. Slopes are smooth and generally convex. The areas of this soil are about 20 to 50 acres in size.

Typically, the surface layer is brown sand about 7 inches thick. The subsoil from a depth of about 7 to 12 inches is yellowish brown sandy loam. From 12 to 38 inches it is yellowish brown sandy clay loam that has a few red and brown mottles, and from 38 to 65 inches it is strong brown and yellowish brown sandy clay loam that has red, brown, and gray mottles and more than 5 percent nodules of plinthite.

Included with this soil in mapping are areas of Orangeburg, Norfolk, Fuquay, and Wagram soils. These soils have a sandy surface layer more than 20 inches thick. Also included are some areas, 1 to 5 acres in size, of soils that have 5 to 15 percent quartz pebbles in the surface layer. The included soils make up about 10 percent of the map unit.

The Dothan soil has a low organic matter content and a moderate available water capacity. It is moderately acid to very strongly acid in the layers above the plinthite and ranges to extremely acid below those layers. Permeability is moderately slow in the subsoil. A perched water table is 3 to 5 feet below the surface for brief periods in winter and early in spring.

This soil is well suited to row crops. No major problems affect row cropping.

This soil is well suited to timber production. No major hazards or limitations affect harvesting or the production of timber. Loblolly pine is a preferred tree to plant. Vehicle traffic does moderate damage to this soil during wet periods. Burning, cutting, girdling, roller-drum chopping, and shearing and raking are suitable methods of site preparation.

This soil is suited to some sanitary facilities, but it is severely limited as a site for septic tank absorption fields because of the wetness and the moderately slow permeability. Enlarging the absorption field and breaking up the compact part of the subsoil can help to reduce the effects of the restricted permeability. Seepage is a moderate hazard in sewage lagoon areas. The sides of the lagoon can be backfilled with less permeable material. The limitations affecting trench type sanitary landfills, small commercial buildings, and local roads or streets are slight.

This soil is well suited to habitat for openland and woodland wildlife and very poorly suited to wetland wildlife habitat.

DoB—Dothan sand, 2 to 6 percent slopes. This well drained soil is on broad ridgetops and smooth side slopes of the Coastal Plain and in areas intermingled with the Sand Hills. Slopes are smooth and generally convex. The areas of this soil are 15 to 80 acres in size.

Typically, the surface layer is brown sand about 7 inches thick. The subsoil from a depth of about 7 to 12 inches is yellowish brown sandy loam. From 12 to 38 inches it is yellowish brown sandy clay loam that has a few red and brown mottles, and from 38 to 65 inches it is strong brown and yellowish brown sandy clay loam that has red, brown, and gray mottles and more than 5 percent nodules of plinthite.

Included with this soil in mapping are areas of Fuquay, Wagram, and Blanton soils. Fuquay and Wagram soils have a sandy surface layer that is more than 20 inches thick. Blanton soils have a sandy surface layer that is more than 40 inches thick. The included soils make up about 10 percent of the map unit.

The Dothan soil has a low organic matter content and a moderate available water capacity. It is moderately acid to very strongly acid in the layers

above the plinthite and ranges to extremely acid below those layers. Permeability is moderately slow in the subsoil. A perched water table is 3 to 5 feet below the surface for brief periods in winter and early in spring.

This soil is well suited to row crops. Erosion is the main management concern.

This soil is well suited to timber production. The limitations affecting harvesting and the production of timber are insignificant. Loblolly pine is a preferred tree to plant. Vehicle traffic does moderate damage to this soil during wet periods. Burning, cutting, girdling, roller-drum chopping, and shearing and raking are suitable methods of site preparation.Building logging roads and fire lanes on the contour reduces the risk of erosion.

This soil is suited to some sanitary facilities, but it is severely limited as a site for septic tank absorption fields because of the wetness and the moderately slow permeability. Enlarging the absorption field and breaking up the compact part of the subsoil can help to reduce the effects of the restricted permeability. Seepage is a moderate limitation for lagoon areas. The sides of the lagoon should be backfilled with less permeable material. The limitations affecting trench type sanitary landfills are slight.

The slope is a moderate limitation affecting sites for small commercial buildings. Shaping and grading the land and selecting the least sloping area can help to minimize this limitation. The limitations affecting local roads and streets are slight.

This soil is well suited to habitat for openland and woodland wildlife and very poorly suited to wetland wildlife habitat.

EnA—Eunola fine sandy loam, 0 to 2 percent slopes. This moderately well drained soil is on stream terraces in slight depressions and on toe slopes. Slopes are dominantly 0 to 1 percent but range from 0 to 2 percent. The areas of this soil generally are oblong and commonly are 5 to 20 acres in size.

Typically, the surface layer is very dark grayish brown fine sandy loam about 4 inches thick. The subsoil from a depth of about 4 to 42 inches is yellowish brown and strong brown sandy loam that has mottles in shades of red, brown, and gray below a depth of 13 inches. The substratum from a depth of 42 to 65 inches is white sand.

Included with this soil in mapping are small areas of Albany, Ocilla, and Williman soils. These soils are on the lower parts of the landscape. Also included are some areas adjacent to drainageways where the soil is subject to rare, very brief flooding during wet periods, generally from December to April, and small areas of the well drained Norfolk soils on the higher parts of the landscape. The included soils make up about 20 percent of the map unit.

The Eunola soil has a low content of organic matter and a moderate available water capacity. It is strongly acid or very strongly acid throughout. Permeability is moderate in the subsoil. The water table is 1.5 to 2.5 feet below the surface during wet periods.

This soil is suited to row crops. The seasonal high water table is the major management concern.

This soil is well suited to timber production. Loblolly pine, yellow poplar, American sycamore, and sweetgum are the preferred trees to plant. Vehicle traffic does moderate damage to this soil during wet periods. The equipment limitation is moderate because of the wetness. This limitation can be minimized by planting and harvesting only during periods of low rainfall. Burning, roller-drum chopping, cutting, girdling, and shearing and raking are preferred methods of site preparation.

This soil is poorly suited to sanitary waste facilities. The seasonal wetness is a severe limitation affecting septic tank absorption fields, sewage lagoon areas, and trench type sanitary landfills. On sites for septic tank absorption fields, these limitations can be minimized by adding suitable fill material and modifying the design of the absorption field. Seepage and wetness are severe limitations in sewage lagoon areas and sanitary landfills. Minimizing these limitations is difficult.

The wetness is a moderate limitation affecting sites for small commercial buildings and local roads and streets. Land shaping, installing drainage tile, providing outlets for excess water, and adding fill material can reduce the wetness.

This soil is well suited to habitat for openland and woodland wildlife and very poorly suited to wetland wildlife habitat.

Fa—Fluvaquents, frequently flooded. These poorly drained soils are along small, narrow drainageways of the Coastal Plain and Sand Hills. Slopes are 0 to 1 percent. The areas of these soils are 5 to 30 acres in size. They generally are a few hundred feet wide and 500 feet to more than a mile long.

Typically, the surface layer is dark grayish brown loamy sand about 4 inches thick. The substratum from a depth of about 4 to 38 inches is gray sand. A buried layer extends from a depth of 38 to 45 inches. It is dark gray sandy loam. Below this from 45 to 60 inches is gray sand.

Included with the Fluvaquents in mapping are areas of wet soils, such as Dorovan and Pickney soils. These

soils generally are in the same landscape position as the Fluvaquents. They have more organic matter in the upper part than the Fluvaquents. They make up about 25 percent of the map unit.

The Fluvaquents have a moderate or low content of organic matter and a low available water capacity. They are strongly acid to extremely acid throughout. Permeability is moderate. The water table is within 1 foot of the surface during winter and early in spring.

Because of the high water table, the frequent flooding, and a low supply of available nutrients, these soils are not suited to row crops. These soils are suited to timber production, mainly loblolly pine, sweetgum, American sycamore, yellow poplar, eastern cottonwood, and green ash. Vehicle traffic creates large ruts and damages the soils during wet periods. The wetness severely restricts the use of equipment and causes severe seedling mortality. Minimizing these limitations is difficult. Water-tolerant trees can be planted during dry periods, generally late in fall. Site preparation can include cutting, girdling, and burning.

These soils are not suited to sanitary facilities. The wetness and the flooding are severe limitations affecting septic tank absorption fields, sewage lagoon areas, and trench type sanitary landfills. Minimizing these limitations is very difficult.

The wetness and the flooding are severe limitations affecting sites for small commercial buildings and local roads and streets. Minimizing these limitations is difficult. Fill material and pipe or bridges can be used to protect roads from flooding.

These soils are very poorly suited to habitat for openland wildlife, fairly suited to woodland wildlife habitat, and well suited to wetland wildlife habitat.

FuA—Fuquay sand, 0 to 2 percent slopes. This well drained soil is on very broad ridges of the Upper Coastal Plain. Slopes are smooth and convex. The areas of this soil are mostly 5 to 50 acres in size.

Typically, the surface layer is grayish brown sand about 8 inches thick. The subsurface layer from a depth of about 8 to 22 inches is yellowish brown sand. The subsoil from 22 to 35 inches is yellowish brown sandy clay loam, and from 35 to 60 inches it is yellowish brown and mottled red, strong brown, and light gray sandy clay loam that has more than 5 percent nodules of plinthite.

Included with this soil in mapping are areas of soils that have slopes of more than 2 percent. Also included are areas of Troup soils, which have a sandy surface layer that is more than 40 inches thick. These soils generally are in the same landscape position as the Fuquay soils. The included soils make up about 10 percent of the map unit.

The Fuquay soil has a low organic matter content and a low available water capacity. It is moderately acid to very strongly acid throughout. Permeability is slow in the lower part of the subsoil. The water table is at a depth of 4 to 6 feet for brief periods in winter and early in spring and following periods of heavy rainfall.

This soil is suited to row crops. Droughtiness and a low nutrient-holding capacity are the major management concerns.

This soil is suited to timber production. Loblolly pine is a preferred tree to plant. Vehicle traffic does not damage this soil during wet periods. The sandy surface soil moderately restricts the use of equipment and causes moderate seedling mortality. Planting seedlings in a shallow furrow increases the survival rate by making more moisture available and minimizing plant competition. Wide-tire or tracked vehicles are needed to minimize the equipment limitation. Site preparation can include cutting, girdling, burning, roller-drum chopping, and shearing and raking. These measures do not damage the soil.

This soil is fairly well suited to sanitary waste facilities. The slow permeability is a moderate limitation affecting septic tank absorption fields. Widening and deepening the trench can help to break up the slowly permeable layer. Seepage is a severe hazard in sewage lagoon areas. The sides of the lagoon should be backfilled with more slowly permeable material. The limitations affecting trench type sanitary landfills and sites for small commercial buildings and local roads and streets are insignificant.

This soil is well suited to habitat for openland wildlife, fairly suited to woodland wildlife habitat, and very poorly suited to wetland wildlife habitat.

FuB—Fuquay sand, 2 to 6 percent slopes. This well drained soil is on broad ridges and side slopes of the Coastal Plain. Slopes are smooth and convex. The areas of this soil generally are 10 to 150 acres in size.

Typically, the surface layer is grayish brown sand about 8 inches thick. The subsurface layer from a depth of about 8 to 22 inches is yellowish brown sand. The subsoil from 22 to 35 inches is yellowish brown sandy clay loam, and from 35 to 60 inches it is yellowish brown and mottled red, strong brown, and light gray sandy clay loam that has more than 5 percent nodules of plinthite.

Included with this soil in mapping are areas of soils that have slopes of slightly more than 6 percent and areas of Troup soils. Troup soils have a sandy surface

layer that is more than 40 inches thick. They generally are in the same landscape position as the Fuquay soil. The included soils make up about 12 percent of the map unit.

The Fuquay soil has a low organic matter content and a low available water capacity. It is moderately acid to very strongly acid throughout. Permeability is slow in the lower part of the subsoil. The water table is at a depth of 4 to 6 feet for brief periods in winter and early in spring and following periods of heavy rainfall.

This soil is suited to row crops. A low nutrient-holding capacity, droughtiness, and the hazard of erosion are the major management concerns.

This soil is suited to timber production. Loblolly pine is a preferred tree to plant. Vehicle traffic does not damage this soil during wet periods. The sandy surface soil moderately restricts the use of equipment. Tracked or wide-tire vehicles are needed when the soil is dry. The seedling mortality rate is moderate because nutrients are leached through the soil and the available water capacity is low. Planting high-quality seedlings in a shallow furrow early in winter increases the survival rate. Site preparation can include cutting, girdling, burning, roller-drum chopping, and shearing and raking. These measures do not damage the soil.

This soil is fairly well suited to sanitary waste facilities. The slow permeability is a moderate limitation affecting septic tank absorption fields. Widening and deepening the trench can help to break up the slowly permeable layer. Seepage is a severe hazard in sewage lagoon areas. The sides of the lagoon should be backfilled with more slowly permeable material. The limitations affecting trench type sanitary landfills are insignificant.

The slope is a moderate limitation affecting sites for small commercial buildings. This limitation can be minimized by grading and shaping the land. The limitations affecting local roads and streets are insignificant.

This soil is well suited to habitat for openland wildlife, fairly suited to woodland habitat, and very poorly suited to wetland wildlife habitat.

FuC—Fuquay sand, 6 to 10 percent slopes. This well drained soil is on narrow ridges and long, narrow side slopes of the Coastal Plain. Slopes are smooth to slightly irregular and convex. The areas of this soil are 5 to 25 acres in size.

Typically, the surface layer is brown sand about 8 inches thick. The subsurface layer from a depth of about 8 to 22 inches is brown sand. The subsoil from 22 to 35 inches is yellowish brown sandy clay loam, and from 35 to 60 inches it is brown or mottled red, brown, and gray sandy clay loam that has more than 5 percent nodules of plinthite.

Included with this soil in mapping are areas of soils that have slopes of less than 6 percent or more than 10 percent. Also included are areas of Troup and Vaucluse soils. Troup soils are on the smooth part of the landscape. They have a sandy surface layer that is more than 40 inches thick. Vaucluse soils are on the rolling part of the landscape. They have a sandy surface layer that is less than 20 inches thick. The included soils make up about 15 percent of the map unit.

The Fuquay soil has a low organic matter content and a low available water capacity. It is moderately acid to very strongly acid throughout. Permeability is slow in the lower part of the subsoil. Runoff is medium. The water table is at a depth of 4 to 6 feet for brief periods in winter and early in spring and following periods of heavy rainfall.

This soil is fairly suited to row crops. A low nutrient-holding capacity, droughtiness, and the hazard of erosion are the major management concerns.

This soil is suited to timber production. Loblolly pine is a preferred tree to plant. Vehicle traffic does not damage this soil during wet periods. The sandy surface layer moderately restricts the use of equipment. Tracked or wide-tire vehicles are needed when the soil is dry. Seedling mortality is moderate because nutrients are leached through the sandy layers and the available water capacity is low. Planting high-quality seedlings in a shallow furrow early in winter increases the survival rate. Site preparation can include cutting, girdling, burning, roller-drum chopping, and shearing and raking. These measures do not damage the soil.

This soil is fairly well suited to sanitary waste facilities. The slow permeability is a moderate limitation affecting septic tank absorption fields. Widening and deepening the trench can help to break up the slowly permeable layer. The absorption lines should be installed on the contour. The slope is a severe limitation affecting sewage lagoon areas, and seepage is a hazard. The sides of the lagoon should be backfilled with more slowly permeable material. The slope is a moderate limitation affecting trench type sanitary landfills, but land grading can minimize this limitation.

This soil is fairly well suited to building site development. The slope is a severe limitation affecting sites for small commercial buildings. Land shaping and grading are needed. Also, the design of the building can compensate for the slope. The slope is a moderate limitation on sites for local roads and streets. Building

the roads and streets on the contour and cutting and filling minimize this limitation.

This soil is suited to habitat for openland wildlife, fairly suited to woodland wildlife habitat, and very poorly suited to wetland wildlife habitat.

HoA—Hornsville fine sandy loam, 0 to 2 percent slopes. This moderately well drained soil is on low-lying upland flats and low, nearly level ridges on stream terraces and near toe slopes. The areas of this soil are 5 to 50 acres in size.

Typically, the surface layer is brown fine sandy loam about 5 inches thick. The subsoil from a depth of about 5 to 7 inches is very pale brown loam, from 7 to 28 inches is light yellowish brown clay, and from 28 to 65 inches is gray and light gray clay that has mottles in shades of red and yellow.

Included with this soil in mapping are areas of Smithboro and Rembert soils. These soils are on the lower part of the landscape. Also included are areas of the well drained Norfolk soils on the upper part of the landscape. The included soils make up about 15 percent of the map unit.

The Hornsville soil has a low organic matter content and a moderate available water capacity. It is strongly acid or very strongly acid throughout. Permeability is moderately slow in the subsoil. The water table is at a depth of 2.5 to 3.5 feet in winter and early in spring.

This soil is suited to row crops. The seasonal high water table and the moderately slowly permeable subsoil are the major management concerns.

This soil is well suited to timber production. Loblolly pine and American sycamore are the preferred trees to plant. Black walnut grows well on this soil. Vehicle traffic moderately damages this soil during wet periods. The wetness moderately restricts the use of equipment. A surface drainage system is needed, and the trees should be planted and harvested during dry periods. Competing vegetation can be controlled by proper site preparation, which may include burning, cutting, girdling, or a combination of these.

This soil is poorly suited to most sanitary waste facilities. The slow permeability and the seasonal high water table are severe limitations affecting septic tank absorption fields. These limitations can be minimized by adding suitable fill material, land shaping that results in the removal of surface water, and enlarging the absorption area. The limitations affecting sewage lagoon areas are insignificant. The wetness and the clayey subsoil are severe limitations affecting trench type sanitary landfills. Minimizing these limitations is difficult.

This soil is suited to building site development but is only fairly suited to local roads and streets. The limitations affecting sites for small commercial buildings are insignificant. Low strength is a moderate limitation affecting local roads and streets. Using suitable subgrade material can help to overcome this limitation.

This soil is well suited to habitat for openland and woodland wildlife and poorly suited to wetland wildlife habitat.

Kn—Kinston loam, frequently flooded. This poorly drained soil is on the flood plains where Four Mile, Steel, and Pen Creeks enter the Savannah River. Slopes are less than 1 percent. The areas of this soil generally are oblong or fan shaped and commonly are 50 to 100 acres in size.

Typically, the surface layer is dark grayish brown loam about 4 inches thick. The substratum from a depth of about 4 to 40 inches is dark gray sandy loam, loam, and silt loam, and from 40 to 60 inches it is grayish brown sandy loam that has strata of white sand.

Included with this soil in mapping are small areas of Chastain, Tawcaw, and Pickney soils. Chastain soils are on the flood plain side of the mapped areas and nearer the Savannah River than the Kinston soil. Tawcaw soils are slightly higher on the landscape than the Kinston soil and occur as dissected, low-lying ridges. Pickney soils are in depressions 1 to 2 acres in size and in small areas adjacent to the uplands. They generally have about 1 foot of sandy or loamy overburden. The included soils make up about 20 percent of the map unit.

The Kinston soil has a moderate content of organic matter and a moderate available water capacity. It is strongly acid or very strongly acid throughout. Permeability is moderate. The water table is within 1 foot of the surface. This soil is subject to frequent flooding by cooling water from the reactors.

Because of the flooding and the wetness, this soil is not suited to row crops.

This soil is not suited to the production of timber because the flooding is so frequent that seedlings cannot survive and grow well. Most of the established trees have died because of excess water and the deposition of sediment.

Because of the frequent flooding and the excess water, this soil is not suited to septic tank absorption fields, sewage lagoon areas, or trench type sanitary landfills. Controlling the flooding or draining the excess water is not practical.

The frequent flooding is a severe hazard on sites for small commercial buildings and local roads and streets.

Reducing this hazard is very difficult.

This soil is poorly suited to habitat for openland wildlife, fairly suited to woodland wildlife habitat, and very poorly suited to wetland wildlife habitat. The wildlife population is limited in most areas because of thermal effluent.

LaB—Lakeland sand, 0 to 6 percent slopes. This excessively drained soil is on broad ridges of the Coastal Plain and in areas intermingled with the Sand Hills. Slopes are irregular in shape and are convex. The areas of this soil are about 25 to 200 acres in size.

Typically, this soil is yellowish brown, light yellowish brown, and very pale brown sand to a depth of 80 inches or more.

Included with this soil in mapping are areas of soils that have a subsoil of loamy sand. Also included are a few areas of Blanton, Fuquay, and Troup soils, which are not so sandy as the Lakeland soil. The included soils make up about 15 percent of the map unit.

The Lakeland soil has a very low content of organic matter and a very low available water capacity. It is moderately acid to very strongly acid throughout. Permeability is rapid. The water table is more than 6 feet below the surface.

Because of the very low available water capacity, a low nutrient-holding capacity, the rapid permeability, and the very low content of organic matter, this soil is poorly suited to row crops.

This soil is poorly suited to timber production. Longleaf pine is a preferred tree to plant. Vehicle traffic does not damage this soil during wet periods. The sandy surface layer moderately restricts the use of equipment. Tracked or wide-tire vehicles are needed when the soil is dry. Seedling mortality is severe because of droughtiness. Reducing the mortality rate is difficult, but special management, such as root pruning and the selection of high-quality seedlings (fig. 1), can increase the survival rate. Site preparation that includes burning, applications of pesticide, cutting, or girdling helps to control competing vegetation. Shearing and raking or roller-drum chopping can also be included in site preparation. The thin surface layer should not be raked into windrows along with the plant debris.

This soil is suited to some sanitary facilities. The limitations affecting septic tank absorption fields are insignificant, but seepage and the sandy surface layer are severe limitations affecting sewage lagoon areas and trench type sanitary landfills. Minimizing these limitations is difficult.

This soil is well suited to building site development and to local roads and streets. The limitations affecting these uses are insignificant.

This soil is poorly suited to habitat for openland and woodland wildlife and is not suited to wetland wildlife habitat. It is very droughty and does not produce much legume or grass seed. The natural vegetation is scrub oak and longleaf pine.

LaC—Lakeland sand, 6 to 10 percent slopes. This excessively drained soil is on ridges and side slopes of the Coastal Plain and in areas intermingled with the Sand Hills. The areas of this soil generally are broad and smooth. They are about 5 to 60 acres in size.

Typically, this soil is brown sand to a depth of 80 inches or more.

Included with this soil in mapping are areas of soils that have a subsoil of loamy sand and areas of soils that have slopes of less than 6 percent or more than 10 percent. Also included are a few areas of Blanton, Fuquay, Lucy, and Troup soils, which are not so sandy as the Lakeland soil. The included soils make up about 10 percent of the map unit.

The Lakeland soil has a very low content of organic matter and a very low available water capacity. It is moderately acid to very strongly acid. Permeability is rapid. The water table is more than 6 feet below the surface.

Because of the very low available water capacity, a very low nutrient-holding capacity, rapid leaching, and the very low content of organic matter, this soil is not suited to row crops.

This soil is fairly well suited to timber production. Longleaf pine is a preferred tree to plant. Vehicle traffic does not damage this soil during wet periods. The sandy surface layer moderately restricts the use of equipment. Tracked or wide-tire vehicles are needed when the soil is dry. Seedling mortality is severe because nutrients are leached through this sandy soil and the available water capacity is very low. The mortality rate can be reduced by planting high-quality seedlings early in winter, applying special management, and controlling plant competition. The special management can include root pruning and other methods of site preparation and planting. Cutting, girdling, shearing and raking, or roller-drum chopping can be included in site preparation. The thin surface layer should not be raked into windrows along with the plant debris.

Because of the slope and a hazard of seepage, this soil is poorly suited to most sanitary facilities. The slope is a moderate limitation affecting septic tank absorption fields. The absorption lines should be installed on the contour. Seepage is a severe hazard in sewage lagoon

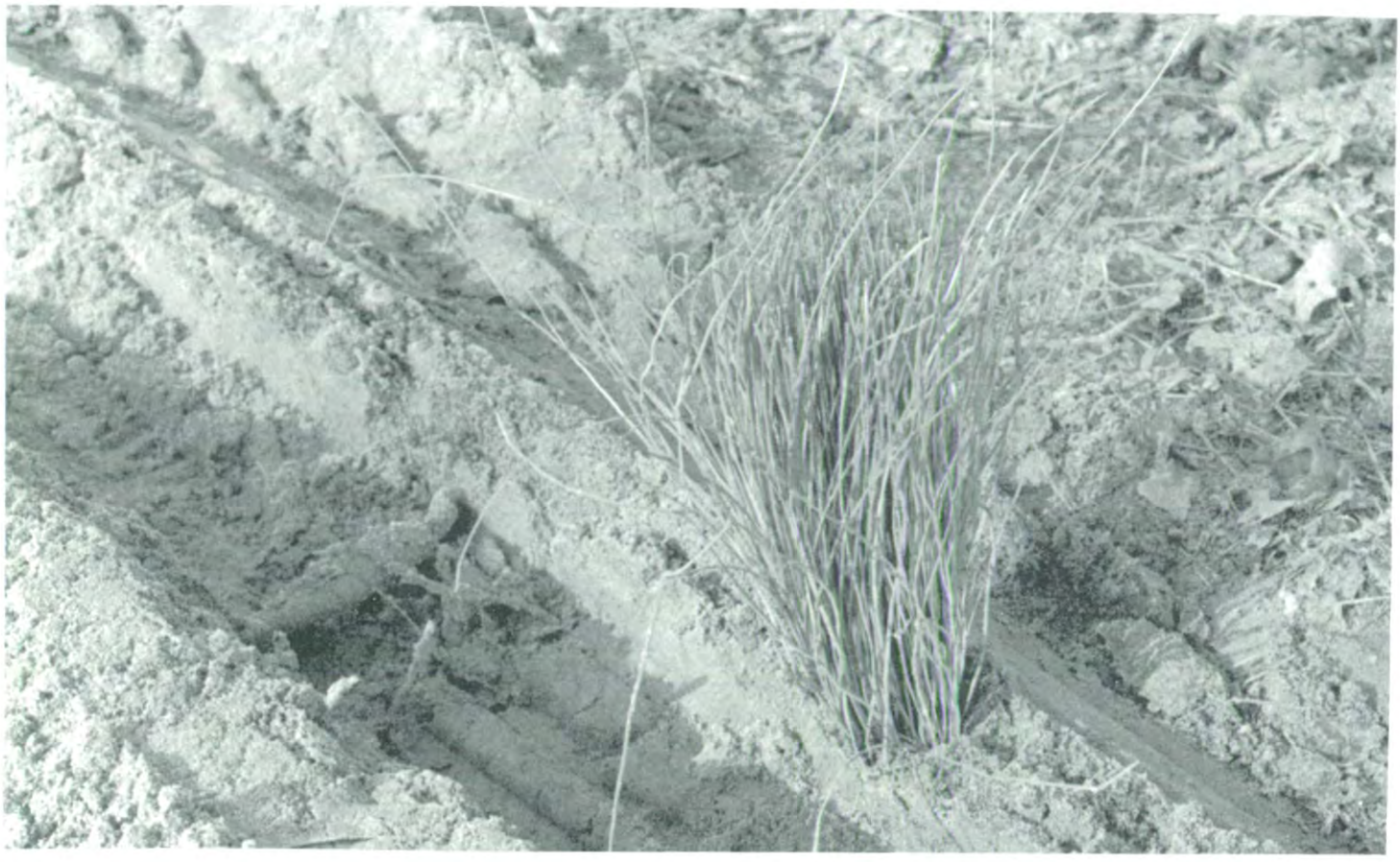


Figure 1.—A seedling planted on Lakeland sand, 0 to 6 percent slopes.

areas and trench type sanitary landfills. Reducing this hazard is difficult.

The slope is a severe limitation affecting sites for small commercial buildings and a moderate limitation affecting local roads and streets. This limitation can be minimized by land shaping and grading, by adapting the design of the buildings to the slope, and by constructing roads on the contour.

This soil is fairly suited to habitat for openland and woodland wildlife and very poorly suited to wetland wildlife habitat.

LuA—Lucy sand, 0 to 2 percent slopes. This well drained soil is on fairly broad ridgetops, generally at a higher elevation than the surrounding soils of the Coastal Plain. The areas of this soil are about 10 to 40 acres in size.

Typically, the surface layer is brown sand about 7 inches thick. The subsurface layer from a depth of about 7 to 25 inches is yellowish red loamy sand. The subsoil from 25 to 30 inches is red sandy loam, and from 30 to 62 inches it is red sandy clay loam.

Included with this soil in mapping are areas of soils that have slopes of more than 2 percent. Areas of Orangeburg and Troup soils are also included. Orangeburg soils are not so sandy as the Lucy soil, and Troup soils are more sandy. The included soils make up about 10 percent of the map unit.

The Lucy soil has a low content of organic matter and a low available water capacity. It is moderately acid to very strongly acid in the surface layer and subsurface layer and strongly acid or very strongly acid in the subsoil. Permeability is moderate in the subsoil. The water table is more than 6 feet below the surface.

This soil is suited to row crops. A low nutrient-holding capacity and droughtiness are the major management concerns.

This soil is suited to timber production. Loblolly pine is a preferred tree to plant. Vehicle traffic does not damage this soil during wet periods. The sandy surface

layer moderately restricts the use of equipment. Tracked or wide-tire vehicles are needed during dry periods. Because of the droughtiness, seedling mortality is moderate. The mortality rate can be reduced by planting seedlings in a shallow furrow and by removing competing vegetation through site preparation, which may include burning, applications of pesticide, cutting, or girdling. Shearing and raking or roller-drum chopping can also be included in site preparation. The top few inches of the surface layer should not be raked into windrows along with the plant debris.

This soil is suited to some sanitary facilities. The limitations affecting septic tank absorption fields and trench type sanitary landfills are insignificant, but seepage is a severe hazard in sewage lagoon areas. The sides of the lagoon should be backfilled with less permeable material. The limitations affecting sites for small commercial buildings and local roads or streets are insignificant.

This soil is fairly suited to habitat for openland wildlife, well suited to woodland wildlife habitat, and very poorly suited to wetland wildlife habitat.

LuB—Lucy sand, 2 to 6 percent slopes. This well drained soil is on ridges and side slopes. It is generally at a higher elevation than the surrounding soils of the Coastal Plain. The areas of this soil are about 10 to 50 acres in size.

Typically, the surface layer is brown sand about 7 inches thick. The subsurface layer from a depth of about 7 to 25 inches is yellowish red loamy sand. The subsoil from 25 to 30 inches is red sandy loam, and from 30 to 62 inches it is red sandy clay loam.

Included with this soil in mapping are areas of soils that have slopes of less than 2 percent or more than 6 percent. Areas of Orangeburg and Troup soils are also included. Orangeburg soils are not so sandy as the Lucy soil, and Troup soils are more sandy. The included soils make up about 10 percent of the map unit.

The Lucy soil has a low content of organic matter and a low available water capacity. It is moderately acid to very strongly acid in the surface layer and subsurface layer and strongly acid or very strongly acid in the subsoil. Permeability is moderate in the subsoil. The water table is more than 6 feet below the surface.

This soil is suited to row crops. A low nutrient-holding capacity and droughtiness are management concerns.

This soil is suited to timber production. Loblolly pine is a preferred tree to plant. Vehicle traffic does not damage this soil during wet periods. The sandy surface layer moderately restricts the use of equipment. Tracked or wide-tire vehicles are needed during dry periods. The droughtiness of this soil causes moderate seedling mortality. The mortality rate can be reduced by planting seedlings in a shallow furrow and by removing competing vegetation through proper site preparation, which may include burning, pesticides, cutting, shearing and raking, or roller-drum chopping. The top few inches of the surface layer should not be raked into windrows with the plant debris.

This soil is suited to some sanitary facilities. The limitations affecting septic tank absorption fields and trench type sanitary landfills are insignificant, but seepage is a severe hazard in sewage lagoon areas. The sides of the lagoon should be backfilled with less permeable material.

The slope is a moderate limitation affecting sites for small commercial buildings. Land shaping and grading or adapting the design of the building to the slope can help to minimize this limitation. The limitations affecting local roads and streets are insignificant.

This soil is fairly suited to habitat for openland widlife, well suited to woodland wildlife habitat, and very poorly suited to wetland wildlife habitat.

LuC—Lucy sand, 6 to 10 percent slopes. This well drained soil is on narrow ridges and long, narrow side slopes of the Coastal Plain. Slopes are smooth to slightly irregular in shape and are convex. The areas of this soil are 5 to 25 acres in size.

Typically, the surface layer is brown sand about 7 inches thick. The subsurface layer from a depth of about 7 to 25 inches is yellowish red loamy sand. The subsoil from 25 to 30 inches is red sandy loam, and from 30 to 62 inches it is red sandy clay loam.

Included with this soil in mapping are areas of soils that have a surface layer of loamy sand and areas of soils that have slopes of less than 6 percent or more than 10 percent. Also included are areas of Ailey, Dothan, Troup, and Vaucluse soils. Ailey and Vaucluse soils are on rolling slope breaks. They have dense, brittle layers in the subsoil. Dothan and Troup soils are in positions on the landscape similar to those of the Lucy soil. Dothan soils do not have a moderately thick, sandy surface layer, and Troup soils have a sandy surface layer that is at least 40 inches thick. The included soils make up about 15 percent of the map unit.

The Lucy soil has a low content of organic matter and a low available water capacity. It is moderately acid or very strongly acid in the surface layer and subsurface layer and strongly acid or very strongly acid in the subsoil. Permeability is moderate in the subsoil.

This soil is suited to row crops. A low nutrient-holding

capacity and droughtiness are management concerns.

This soil is suited to timber production. Loblolly pine is a preferred tree to plant. Vehicle traffic does not damage this soil during wet periods. The sandy surface layer moderately restricts the use of equipment. Tracked or wide-tire vehicles are needed during dry periods. The droughtiness of this soil causes moderate seedling mortality. The mortality rate can be reduced by planting high-quality seedlings early in winter. The seedlings should be planted in a shallow furrow on the contour. Site preparation can include cutting, girdling, shearing and raking, or roller-drum chopping.

Because of the slope and the risk of seepage, this soil is poorly suited to most sanitary facilities. The distribution lines in septic tank absorption fields should be installed on the contour. Land grading is needed in sewage lagoon areas. The sides of the lagoon should be backfilled with less permeable material. Land grading and shaping are needed in trench type sanitary landfills.

The slope is a severe limitation affecting sites for small commercial buildings and a moderate limitation affecting local roads and streets. Land shaping, grading with cut and fill material, and constructing roads on the contour help to minimize this limitation.

This soil is fairly suited to habitat for openland wildlife, well suited to woodland wildlife habitat, and very poorly suited to wetland wildlife habitat.

NeB—Neeses loamy sand, 2 to 6 percent slopes. This well drained soil is on narrow ridgetops and short, undulating side slopes of the Coastal Plain and Sand Hills. The areas of this soil are about 5 to 20 acres in size.

Typically, the surface layer is dark grayish brown loamy sand about 6 inches thick. The subsoil from a depth of about 6 to 10 inches is reddish brown fine sandy loam, from 10 to 40 inches is yellowish red clay, from 40 to 49 inches is mottled reddish yellow, weak red, and light gray clay, and from 49 to 60 inches is weak red sandy clay loam.

Included with this soil in mapping are areas of Ailey and Vaucluse soils. These soils are in the same landscape positions as the Neeses soil. Ailey soils have a sandy surface layer that is more than 20 inches thick, and Vaucluse soils have a loamy subsoil. The included soils make up about 10 percent of the map unit.

The Neeses soil has a low content of organic matter and a low available water capacity. It is strongly acid or very strongly acid throughout. Permeability is slow in the subsoil. The water table is more than 6 feet below the surface. Dense, firm layers partially restrict the root zone at a depth of about 20 to 35 inches.

Because of the low available water capacity and a moderate risk of erosion, this soil is poorly suited to row crops.

This soil is poorly suited to timber production. Loblolly pine is a preferred tree to plant. Vehicle traffic does moderate damage to this soil during wet periods. The risk of erosion is moderate. Roads and fire lanes should be constructed on the contour. The equipment limitation and seedling mortality are slight. The windthrow hazard is moderate because of the dense, firm subsoil. It generally is most severe on abrupt slope breaks and in the steepest areas. Because of the windthrow hazard, trees should be harvested at pulpwood size rather than sawtimber size. Fire lanes and access roads can be built on the contour of the abrupt breaks. Site preparation can include burning, girdling, cutting, or shearing and raking. Roller-drum chopping should be done only when the soil is dry.

This soil is poorly suited to most sanitary facilities. The slow permeability is a severe limitation affecting septic tank absorption fields. Enlarging the absorption field by widening the trench for the distribution lines minimizes this limitation. Seepage and the slope are moderate limitations affecting sewage lagoon areas. Land grading is needed. The sides of the lagoon should be backfilled with less permeable material. The clayey subsoil is a moderate limitation affecting trench type sanitary landfills. At considerable extra cost, this limitation can be minimized by hauling in less clayey soil material for the daily cover.

The slope is a moderate limitation affecting sites for small commercial buildings. Land shaping and grading can minimize this limitation. Low strength is a moderate limitation affecting local roads and streets. Suitable subgrade material is needed.

This soil is fairly suited to habitat for openland wildlife, well suited to woodland wildlife habitat, and very poorly suited to wetland wildlife habitat.

NoA—Norfolk loamy sand, 0 to 2 percent slopes. This well drained soil is on broad ridgetops on uplands of the Coastal Plain. Slopes are smooth and generally are convex. The areas of this soil are about 10 to 75 acres in size.

Typically, the surface layer is brown loamy sand about 7 inches thick. The subsurface layer from a depth of about 7 to 12 inches is yellowish brown loamy sand. The subsoil from 12 to 62 inches is yellowish brown and strong brown sandy loam and sandy clay loam. It has mottles in shades of red. A few gray mottles are in the lower part of the subsoil.

Included with this soil in mapping are areas of soils that have more than 5 percent nodules of plinthite in the subsoil. Also included are small areas of Fuquay and Wagram soils, which are in the same landscape positions as the Norfolk soil. These soils have a sandy surface layer that is more than 20 inches thick. The included soils make up about 10 percent of the map unit.

The Norfolk soil has a low content of organic matter and a moderate available water capacity. It is moderately acid to extremely acid throughout. Permeability is moderate. The water table is 4 to 6 feet below the soil surface for brief periods in winter and early in spring.

This soil is well suited to row crops. No major management problems affect row cropping.

This soil is well suited to timber production. Loblolly pine is a preferred tree to plant. Vehicle traffic does moderate damage to this soil during wet periods. The equipment limitation and seedling mortality are slight. No special management is needed. Shearing and raking and roller-drum chopping do not severely damage the soil during moist or dry periods. Other methods of site preparation can include cutting, girdling, and burning.

This soil is fairly well suited to some sanitary facilities. The moderate permeability and the wetness are moderate limitations affecting septic tank absorption fields. A surface drainage system can remove excess water, and proper fill material can improve the ability of the field to absorb effluent. Seepage is a moderate hazard in sewage lagoon areas. The sides of the lagoon should be backfilled with less permeable material. The wetness is a severe limitation affecting trench type sanitary landfills. An alternative site that does not have a water table within 6 feet of the surface should be selected if possible. The limitations affecting sites for small commercial buildings and local roads and streets are insignificant.

This soil is well suited to habitat for openland and woodland wildlife and very poorly suited to wetland wildlife habitat.

NoB—Norfolk loamy sand, 2 to 6 percent slopes. This well drained soil is on broad ridgetops and smooth side slopes on uplands of the Coastal Plain. The areas of this soil are oblong or irregular in shape and are 5 to 100 acres in size.

Typically, the surface layer is brown loamy sand about 7 inches thick. The subsurface layer from a depth of 7 to 12 inches is yellowish brown loamy sand. The subsoil from 12 to 62 inches is yellowish brown and strong brown sandy loam and sandy clay loam. It has mottles in shades of red. A few gray mottles are in the lower part of the subsoil.

Included with this soil in mapping are 5- to 25-acre areas of soils that have more than 5 percent nodules of plinthite in the subsoil and a few areas of soils that have a clayey subsoil. Also included are areas of Blanton, Fuquay, and Wagram soils, which are in the same landscape positions as the Norfolk soil. Blanton soils have a sandy surface layer that is more than 40 inches thick. Fuquay and Wagram soils have a sandy surface layer that is more than 20 inches thick. The included soils make up about 10 percent of the map unit.

The Norfolk soil has a low content of organic matter and a moderate available water capacity. It is moderately acid to extremely acid throughout. Permeability is moderate. The water table is 4 to 6 feet below the surface for brief periods in winter and early in spring.

This soil is well suited to row crops. Erosion is the chief management concern.

This soil is well suited to timber production. Loblolly pine is a preferred tree to plant. Vehicle traffic does moderate damage to this soil during wet periods. The equipment limitation and seedling mortality are slight. No special management is needed. Site preparation can include burning, cutting, and girdling. Shearing and raking and roller-drum chopping do not severely damage the soil during moist or dry periods.

This soil is fairly well suited to some sanitary facilities. The moderate permeability and the wetness are moderate limitations affecting septic tank absorption fields. These limitations can be minimized by enlarging the absorption field and adding proper fill material. Seepage is a moderate hazard in sewage lagoon areas. This hazard can be reduced if the land is shaped or graded and if the sides of the lagoon are dug out and backfilled with more slowly permeable soil material. The less sloping areas should be selected as sites for the lagoons. The wetness is a severe limitation affecting trench type sanitary landfills. A surface drainage system can remove excess water, or an alternative site can be selected.

The slope is a moderate limitation affecting sites for small commercial buildings. Land shaping and grading can help to minimize this limitation. The limitations affecting local roads and streets are insignificant.

This soil is well suited to habitat for openland and woodland wildlife and very poorly suited to wetland wildlife habitat.

Oa—Ochlockonee loamy sand, occasionally flooded. This well drained soil is in small drainageways throughout the survey area. Slopes are less than 2 percent. Most areas of this soil do not have a defined channel and are covered by water during brief periods of flooding. The areas are long and narrow, and most are 5 to 10 acres in size.

Typically, the surface layer is brown loamy sand about 12 inches thick. The substratum from a depth of about 12 to 31 inches is brown sandy loam, from 31 to 44 inches is very dark grayish brown, brown, and reddish brown loam, and from 44 to 60 inches is brown sandy loam.

Included with this soil in mapping are small areas of soils that are not so well drained as the Ochlockonee soil and small areas of Dothan, Fuquay, Norfolk, and Wagram soils, which have 5 to 20 inches of soil overburden from the surrounding uplands. The included soils make up about 20 percent of the map unit.

The Ochlockonee soil has a low content of organic matter and a low available water capacity. It is strongly acid or very strongly acid throughout. Permeability is moderate in the lower part of the substratum. The water table is 3 to 5 feet below the surface in winter and early in spring. The soil is occasionally flooded for very brief periods.

This soil is well suited to row crops. The major management concerns are the flooding, the leaching of nutrients, and the low available water capacity.

This soil is well suited to timber production. No limitations affect harvesting or the production of timber. Loblolly pine, yellow poplar, and eastern cottonwood are preferred trees to plant. Vehicle traffic does not damage this soil during wet periods. Seedlings survive and grow well if competing vegetation is controlled or removed by proper site preparation, which can include burning, cutting, or girdling. Shearing and raking and roller-drum chopping do not damage the soil.

Because the effects of flooding, wetness, and seepage are very difficult to reduce, this soil is poorly suited to septic tank absorption fields, sewage lagoons, and trench type sanitary landfills. The flooding is a severe hazard on sites for small commercial buildings and for local roads and streets. Reducing this hazard is very difficult.

This soil is well suited to habitat for openland and woodland wildlife and poorly suited to wetland wildlife habitat.

OcA—Ocilla loamy sand, 0 to 2 percent slopes. This somewhat poorly drained soil is on low upland flats and low stream terraces and toe slopes. It formed in Coastal Plain material. The areas of this soil are 5 to 25 acres in size.

Typically, the surface layer is dark grayish brown loamy sand about 8 inches thick. The subsurface layer from a depth of about 8 to 22 inches is pale brown loamy sand. The subsoil from 22 to 28 inches is light yellowish brown sandy clay loam that has gray mottles, from 28 to 40 inches is light gray sandy clay loam, from 40 to 54 inches is gray sandy clay loam, and from 54 to 60 inches is gray sandy clay that has mottles in shades of red and brown.

Included with this soil in mapping are small areas of wet soils on the lower part of the landscape and small areas of well drained soils on the upper part. The included soils make up about 15 percent of the map unit.

The Ocilla soil has a low content of organic matter and a low available water capacity. It is strongly acid or very strongly acid throughout. Permeability is moderate in the subsoil. The water table is 1.0 to 2.5 feet below the surface in winter and early in spring.

This soil is fairly suited to row crops. The major management concerns are the seasonal high water table, droughtiness, and a low nutrient-holding capacity.

This soil is well suited to timber production. Loblolly pine is a preferred tree to plant, and sweetgum and yellow poplar grow well. Vehicle traffic does not damage this soil during wet periods. The wetness moderately restricts the use of equipment, but tile drains and ditches can remove excess water. Seedling mortality is moderate because of the wetness. The mortality rate can be reduced by properly preparing the site and by planting seedlings on a slight bed. Methods of site preparation include cutting, burning, girdling, shearing and raking, and roller-drum chopping.

This soil is poorly suited to most sanitary facilities. The wetness is a severe limitation affecting septic tank absorption fields, sewage lagoon areas, and trench type sanitary landfills. Reducing the wetness is difficult because of the low position of this soil on the landscape. An alternative site should be selected.

The wetness is a severe limitation affecting sites for small commercial buildings and a moderate limitation affecting local roads and streets. This limitation can be minimized by installing a good drainage system on building sites, by designing roads so that they cross areas of better drained soils, and by using a combination of fill material and drainage ditches or tiles on sites for roads.

This soil is fairly suited to habitat for openland wildlife, well suited to woodland wildlife habitat, and fairly suited to wetland wildlife habitat.

Og—Ogeechee sandy loam, ponded. This poorly drained soil is in low upland depressions and in low areas along stream terraces of the Coastal Plain. Slopes are 0 to 1 percent. The areas of this soil generally are oval and are 5 to 25 acres in size.

Typically, the surface layer and subsurface layer are very dark grayish brown and dark grayish brown sandy loam about 12 inches thick. The subsoil is light brownish gray sandy loam from a depth of about 12 to 23 inches and light gray sandy clay loam from 23 to 60 inches.

Included with this soil in mapping are areas of soils that have a surface layer of loamy sand, clay loam, or sandy clay loam; a few areas of Williman soils, which have a surface layer of loamy sand that is more than 20 inches thick; and, in most of the depressions, narrow bands of somewhat poorly drained soils between the Ogeechee soil and the adjacent well drained soils. Also included are small areas of Rembert soils and soils that have a subsoil of sandy clay loam or sandy loam that extends to a depth of at least 60 inches. The included soils make up about 15 percent of the map unit.

The Ogeechee soil has a moderate organic matter content and a moderate available water capacity. It is strongly acid or very strongly acid throughout. Permeability is moderate. This soil is ponded during wet periods. The water table is 1.0 foot above the surface to 0.5 foot below in winter and early in spring.

Because of the seasonal high water table and the ponding, this soil is poorly suited to row crops.

This soil is suited to timber production. Loblolly pine and sweetgum (fig. 2) are preferred trees to plant. Vehicle traffic does heavy damage to this soil during wet periods. The wetness severely restricts the use of equipment; however, it can be reduced in some areas by maintaining drainage outlets. Providing an outlet is not practical in some of the depressions. Seedling mortality is moderate because of the wetness. The mortality rate can be reduced if drainage is improved. Plant competition can be controlled by proper site preparation, which can include burning, cutting, or girdling. Shearing and raking and roller-drum chopping are not suitable during most of the year because of the wetness.

Because of the seasonal high water table, this soil is poorly suited to septic tank absorption fields, sewage lagoon areas, and trench type sanitary landfills. The methods required to lower the water table are generally not practical on this soil.

The seasonal wetness is a severe limitation affecting sites for small commercial buildings and local roads and streets. Minimizing this limitation is difficult, but providing drainage outlets, adding fill material, and shaping the surface can reduce the wetness.

This soil is fairly suited to habitat for openland and woodland wildlife. It usually is well suited to wetland wildlife habitat but is not so well suited following periods of low rainfall, when some of the depressions are dry.

OrA—Orangeburg loamy sand, 0 to 2 percent slopes. This well drained soil is on broad, nearly level, high ridges and in smooth, nearly level areas of the Coastal Plain. The areas of this soil are about 10 to 60 acres in size.

Typically, the surface layer is dark yellowish brown loamy sand about 6 inches thick. The subsoil from a depth of about 6 to 33 inches is yellowish red sandy loam, and from 33 to 62 inches it is red sandy clay loam.

Included with this soil in mapping are areas of soils that have more than 5 percent nodules of plinthite in the subsoil. These soils are in areas where there is a slight ridge or break in the topography. Also included are areas of Lucy soils in the same landscape positions as the Orangeburg soil. These soils have a sandy surface layer that is more than 20 inches thick. The included soils make up about 10 percent of the map unit.

The Orangeburg soil has a low content of organic matter and a moderate available water capacity. It is strongly acid or very strongly acid throughout. Permeability is moderate. The water table is more than 6 feet below the surface.

This soil is well suited to row crops. No major management concerns affect row cropping.

This soil is well suited to timber production. Loblolly pine is a preferred tree to plant. Vehicle traffic does moderate damage to this soil during wet periods. The limitations affecting woodland are insignificant. Site preparation can include burning, cutting, girdling, roller-drum chopping, and shearing and raking.

This soil is well suited to most sanitary facilities. The limitations affecting septic tank absorption fields and trench type sanitary landfills are insignificant. Seepage is a moderate hazard in sewage lagoon areas. The sides of the lagoon should be backfilled with less permeable material. The limitations affecting sites for small commercial buildings and local roads and streets are insignificant.

This soil is well suited to habitat for openland and woodland wildlife and very poorly suited to wetland wildlife habitat.

OrB—Orangeburg loamy sand, 2 to 6 percent slopes. This well drained soil is on broad, high ridges

Figure 2.—Sweetgum and water-tolerant grasses on Ogeechee sandy loam, ponded.

and smooth side slopes of the Coastal Plain. The areas of this soil are 5 to 100 acres in size.

Typically, the surface layer is brown loamy sand about 6 inches thick. The subsoil from a depth of about 6 to 33 inches is red sandy loam, and from 33 to 62 inches it is red sandy clay loam.

Included with this soil in mapping are small areas of soils that have more than 5 percent nodules of plinthite in the subsoil. Also included are small areas of Ailey and Lucy soils. Ailey soils are on the undulating part of the landscape. They have a hard, compact subsoil. Lucy soils are in the same positions on the landscape as the Orangeburg soil. They have a sandy surface layer that is more than 20 inches thick. The included soils make up about 10 percent of the map unit.

The Orangeburg soil has a low content of organic matter and a moderate available water capacity. It is strongly acid or very strongly acid throughout. Permeability is moderate. The water table is more than 6 feet below the surface.

This soil is well suited to row crops. No major management concerns affect row cropping, but erosion is a slight hazard.

This soil is well suited to timber production. Loblolly pine is a preferred tree to plant. Vehicle traffic does moderate damage to this soil during wet periods. The limitations affecting woodland are insignificant. Site preparation can include burning, cutting, girdling, roller-

drum chopping, and shearing and raking.

This soil is well suited to most sanitary facilities. The limitations affecting septic tank absorption fields and trench type sanitary landfills are insignificant. The slope and the hazard of seepage are moderate limitations affecting sewage lagoon areas. The sides of the lagoon should be backfilled with less permeable material. Land shaping can reduce the slope.

The slope is a moderate limitation affecting sites for small commercial buildings. Shaping and grading the soil can reduce the slope. The limitations affecting local roads and streets are insignificant.

This soil is well suited to habitat for openland and woodland wildlife and very poorly suited to wetland wildlife habitat.

OrC—Orangeburg loamy sand, 6 to 10 percent slopes. This well drained soil is on gently rolling breaks below the gently sloping or nearly level ridgetops on the Coastal Plain. The areas of the soil are 5 to 40 acres in size.

Typically, the surface layer is brown loamy sand about 6 inches thick. The subsoil from a depth of about 6 to 33 inches is red sandy loam, and from 33 to 62 inches it is red sandy clay loam.

Included with this soil in mapping are small areas of Ailey and Vaucluse soils. These soils are along rolling side slopes. They have a hard, compact subsoil. Also included are small areas of soils that have more than 5 percent nodules of plinthite in the subsoil. The included soils make up about 10 percent of the map unit.

The Orangeburg soil has a low content of organic matter and a moderate available water capacity. It is strongly acid or very strongly acid throughout. Permeability is moderate. The water table is more than 6 feet below the surface.

This soil is fairly well suited to row crops. Erosion is the major management concern.

This soil is well suited to timber production. Loblolly pine is a preferred tree to plant. Vehicle traffic does moderate damage to this soil during wet periods. The limitations affecting woodland are insignificant. Site preparation can include burning, cutting, girdling, roller-drum chopping, and shearing and raking.

This soil is well suited to most sanitary facilities. The slope is a moderate limitation affecting septic tank absorption fields and trench type sanitary landfills. The absorption fields should be installed on the contour, or the slope should be reduced by grading. The slope is a severe limitation affecting sewage lagoon areas. It can be reduced by land shaping.

The slope is a severe limitation affecting sites for small commercial buildings and a moderate limitation affecting local roads and streets. This limitation can be minimized by shaping and grading building sites and by building roads on the contour.

This soil is well suited to habitat for openland and woodland wildlife and very poorly suited to wetland wildlife habitat.

Pk—Pickney sand, frequently flooded. This very poorly drained soil is on the flood plains along perennial streams on the Coastal Plain and in the Sand Hills. Slopes generally are less than 1 percent. The areas of these soils are long and narrow and are commonly 5 to 50 acres in size.

Typically, the surface soil is black sand about 35 inches thick. The substratum from a depth of about 35 to 50 inches is dark grayish brown sand, and from 50 to 60 inches it is very dark gray sand.

Included with this soil in mapping are small areas of Dorovan and Ogeechee soils and Fluvaquents. Dorovan soils are in positions on the landscape similar to those of the Pickney soil. They have a thick, organic surface layer. Ogeechee soils are in the slightly higher areas that are transitional to better drained soils in the uplands. They have a subsoil of sandy clay loam. Fluvaquents generally are in the same landscape position and at the same elevation as the Pickney soil. They do not have a thick, black surface layer. Included soils make up about 15 percent of the map unit.

The Pickney soil has a high content of organic matter and a low available water capacity. It is strongly acid to extremely acid throughout. Permeability is rapid. The water table is 1 foot above the surface to 1 foot below during wet periods. The soil is frequently flooded for long periods, usually from November through April.

Because of the wetness and the flooding, this soil is unsuited to row crops.

This soil is poorly suited to timber production. Baldcypress and sweetgum are preferred trees to plant. The native plant community includes sweetgum, blackgum, water oak, and swamp tupelo. Vehicle traffic does severe damage to this wet soil. The flooding and the wetness severely restrict the use of equipment and cause severe seedling mortality. Conventional methods of harvesting timber generally are not suitable because of the low load-bearing strength of this wet soil. High lead cables or helicopters can be used to harvest timber without severe damage to the soil. Site preparation can include cutting and girdling.

Because of the wetness and the flooding, this soil is unsuited to septic tank absorption fields, sewage lagoon areas, and trench type sanitary landfills and is severely

limited as a site for small commercial buildings and local roads and streets. Reducing the effects of these limitations is very difficult. Where roads must cross areas of this soil, bridges, pipe, or suitable fill material are needed to prevent the road damage caused by flooding.

This soil is poorly suited to habitat for openland wildlife, fairly suited to woodland wildlife habitat, and suited to wetland wildlife habitat.

Rm—Rembert sandy loam. This poorly drained soil is in upland depressions and low areas along low stream terraces. It formed in marine sediments or stream deposits of the Coastal Plain and Sand Hills. Slopes are 0 to 1 percent. The areas of this soil are 5 to 25 acres in size. Most of the smaller areas are oval depressions.

Typically, the surface layer and subsurface layer are very dark gray and light brownish gray sandy loam about 10 inches thick. The subsoil from a depth of about 10 to 29 inches is dark gray clay, and from 29 to 63 inches it is light brownish gray and gray sandy clay loam.

Included with this soil in mapping are areas of Ogeechee, Smithboro, and Williman soils and small areas of soils that have a surface layer of loamy sand, clay loam, or loam. Ogeechee and Williman soils are in the same landscape positions as the Rembert soil. They have less clay in the surface layer and subsoil than the Rembert soil. Smithboro soils are in the slightly higher areas. The included soils make up about 10 percent of the map unit.

The Rembert soil has a moderate to low content of organic matter and a moderate available water capacity. It is strongly acid to extremely acid throughout. Permeability is slow. The water table is 1 foot above the surface to 1 foot below in winter and early in spring.

Because of the seasonal high water table, this soil is poorly suited to row crops.

This soil is suited to timber production. Sweetgum is a preferred tree to plant. Loblolly pine, eastern cottonwood, and water tupelo grow well. Vehicle traffic does heavy damage to this soil during wet periods. The wetness severely restricts the use of equipment and causes severe seedling mortality. Drainage ditches in areas where outlets are available and land shaping that results in the removal of excess water are needed. Logging activities should be done during dry periods. Improving surface drainage and planting seedlings on beds can increase the seedling survival rate. Site preparation can include burning, cutting, and girdling. It also can include shearing and raking and roller-drum chopping, which do not damage the soil during dry periods.

This soil is very poorly suited to most sanitary facilities. The wetness and the slow permeability are severe limitations affecting septic tank absorption fields. Reducing the effects of these limitations is difficult. The limitations affecting sewage lagoon areas are insignificant. The wetness is a severe limitation affecting trench type sanitary landfills. Extensive drainage ditches are needed.

Because of the wetness, this soil is severely limited as a site for small commercial buildings and local roads and streets. Building on this wet soil generally is not practical.

This soil is poorly suited to habitat for openland wildlife and fairly suited to woodland wildlife habitat. It usually is suited to wetland wildlife habitat but is not so well suited during periods of low rainfall, when some of the depressions are dry.

Sh—Shellbluff loam, frequently flooded. This well drained soil is on the flood plains along the Savannah River. It formed in marine and Piedmont sediments. Slopes generally are 0 to 1 percent. The areas of this soil are oblong and irregular in shape and are 30 to 200 acres in size.

Typically, the surface layer is reddish brown loam about 8 inches thick. The subsoil from a depth of about 8 to 27 inches is yellowish red clay loam, and from 27 to 72 inches it is brown loam and silt loam.

Included with this soil in mapping are areas of Tawcaw and Chastain soils. These soils are lower on the landscape than the Shellbluff soil. They have gray colors. Pickney soils are in the same positions as the Shellbluff soil. They generally are close to hills and distant from the river or along small streams that enter the flood plains along the Savannah River. The included soils make up about 15 percent of the map unit.

The Shellbluff soil has a moderately low to low content of organic matter and a high available water capacity. It is slightly acid or strongly acid throughout. Permeability is moderate. The water table is 3 to 5 feet below the surface in winter and early in spring. The soil is frequently flooded for brief periods throughout the year.

Because of the frequent flooding, this soil is poorly suited to row crops.

This soil is well suited to timber production. Loblolly pine, eastern cottonwood, and black walnut are the preferred trees to plant. Yellow poplar, cherrybark oak, scarlet oak, and water oak can be grown. The limitations affecting woodland are insignificant. Most

areas are not easily accessible because of the river on one side and poorly drained soils on the other. Vehicle traffic does severe damage to this soil during wet periods. The survival rate of seedlings is higher if competing vegetation is controlled by proper site preparation, which can include burning, cutting, and girdling. Shearing and raking and roller-drum chopping do not damage the soil during dry periods.

Because of the flooding, this soil is not suited to septic tank absorption fields, sewage lagoon areas, or trench type sanitary landfills. Reducing this hazard is difficult.

The flooding is a severe hazard affecting sites for small commercial buildings and local roads and streets. Building on this soil is not practical.

This soil is well suited to habitat for openland and woodland wildlife and poorly suited to wetland wildlife habitat.

Sm—Smithboro loam. This somewhat poorly drained soil is on upland flats and stream divides. In most areas it formed in a mixture of marine and river sediments. Slopes range from 0 to 2 percent. The areas of this soil are 5 to 50 acres in size.

Typically, the surface layer is dark gray loam about 4 inches thick. The subsoil from a depth of about 4 to 11 inches is light yellowish brown loam, and from 11 to 72 inches it is gray and light gray clay.

Included with this soil in mapping are small areas of better drained soils. These soils are slightly higher on the landscape than the Smithboro soil. Also included are areas of Rembert and Ogeechee soils in small depressions. The included soils make up about 10 percent of the map unit.

The Smithboro soil has a low content of organic matter and a moderate available water capacity. It is strongly acid or very strongly acid in the surface layer and strongly acid to extremely acid in the subsoil. Permeability is slow. The water table is 0.5 foot to 1.5 feet below the surface during winter and spring.

This soil is suited to row crops. The chief management concern is wetness.

This soil is well suited to timber production. Loblolly pine is a preferred tree to plant. Sweetgum, American sycamore, and some hardwoods grow well. Vehicle traffic does moderate damage to this soil during wet periods. The wetness moderately restricts the use of equipment and causes moderate seedling mortality. Logging activities should be done during dry periods. Shallow ditches help to remove excess water. Site preparation can include cutting, burning, or girdling. It can also include shearing and raking and roller-drum chopping, which should be done only when the soil is dry.

This soil is poorly suited to septic tank absorption fields and trench type sanitary landfills because of the wetness and the slow permeability. Reducing the effects of these limitations is difficult. Alternative sites should be selected if possible.

The wetness and low strength are severe limitations affecting sites for small commercial buildings and local roads and streets. These limitations can be overcome if drainage is improved and suitable fill material is added.

This soil is fairly suited to habitat for openland and wetland wildlife and well suited to woodland wildlife habitat.

Ta—Tawcaw silty clay, frequently flooded. This somewhat poorly drained soil is on flood plains along the major streams. It formed in marine and Piedmont sediments deposited by streams. Slopes are 0 to 1 percent. The areas of this soil are 30 to 200 acres in size.

Typically, the surface layer is dark yellowish brown silty clay about 4 inches thick. The subsoil from a depth of about 4 to 38 inches is dark yellowish brown and brown silty clay, and from 38 to 66 inches it is gray and brown loam.

Included with this soil in mapping are areas of Chastain, Pickney, Shellbluff, and Kinston soils. Chastain soils are slightly lower on the flood plains than the Tawcaw soil, and Shellbluff soils are higher. Pickney soils have a higher content of organic matter than the Tawcaw soil. They are near the uplands or along the smaller streams entering the flood plains of the Savannah River. Kinston soils are in areas where the smaller streams enter the flood plains of the river. The included soils make up about 15 percent of the map unit.

The Tawcaw soil has a moderate or low content of organic matter and a moderate available water capacity. It is slighty acid to very strongly acid throughout. Permeability is slow. The water table is 1.5 to 2.5 feet below the surface in winter and early in spring. The soil is frequently flooded for long periods anytime during most years.

Because of the frequent flooding, this soil is poorly suited to row crops.

This soil is well suited to timber production. Sweetgum is a preferred tree to regenerate. Water tupelo, cherrybark oak, American sycamore, yellow poplar, and green ash grow well on this soil. The frequent flooding is a major management concern. Vehicle traffic causes severe damage to this soil during

wet periods. The wetness moderately restricts the use of equipment and causes moderate seedling mortality. Girdling, cutting, burning, and logging activities should be done during the periods of least rainfall. These periods are usually in summer and fall.

Because of the flooding, this soil is unsuited to septic tank absorption fields, sewage lagoon areas, and trench type sanitary landfills and is severely limited as a site for small commercial buildings and local roads and streets. Reducing this hazard is very difficult.

This soil is poorly suited to habitat for openland wildlife and fairly suited to woodland and wetland wildlife habitat.

To—Toccoa loam, frequently flooded. This moderately well drained soil is on the flood plains along the major streams. It is adjacent to more poorly drained soils in larger areas on the flood plains. It formed in sandy and loamy sediments. Slopes generally are 0 to 1 percent but are 2 percent on some narrow ridges adjacent to stream channels. The areas of this soil generally are long and narrow or irregular in shape and commonly are 5 to 20 acres in size.

Typically, the surface layer is brown loam about 6 inches thick. The substratum from a depth of about 6 to 12 inches is strong brown fine sandy loam, from 12 to 40 inches is reddish yellow sandy loam, and from 40 to 65 inches is light reddish brown and light brown loamy fine sand.

Included with this soil in mapping are small areas of Shellbluff and Tawcaw soils and very small areas of Chastain soils. Shellbluff soils are in the same landscape position as the Toccoa soil. They have more silt and clay than the Toccoa soil. Tawcaw and Chastain soils are slightly lower on the landscape than the Toccoa soil. The included soils make up about 10 percent of the map unit.

The Toccoa soil has a low content of organic matter and a moderate available water capacity. It is slightly acid to strongly acid throughout. Permeability is moderately rapid. The water table is 2.5 to 5.0 feet below the surface during wet periods. The soil is frequently flooded for brief periods after heavy rainfall.

Because of the flooding and the wetness, this soil is poorly suited to row crops.

This soil is suited to timber production. It is well suited to the production of loblolly pine. Yellow poplar and American sycamore also grow well. The small areas, however, are not easily accessible because of the river on one side and very poorly drained soils on the other side. Vehicle traffic does moderate damage to this soil during wet periods. The limitations affecting woodland are insignificant. Site preparation can include burning and chopping, which help to control unwanted weeds, brush, and trees.

Because of the hazard of flooding, this soil is poorly suited to septic tank absorption fields, sewage lagoon areas, and trench type sanitary landfills and is severely limited as a site for small commercial buildings and local roads and streets. Reducing this hazard is difficult.

This soil is fairly suited to habitat for openland wildlife, well suited to woodland wildlife habitat, and very poorly suited to wetland wildlife habitat.

TrB—Troup sand, 0 to 6 percent slopes. This well drained soil is on broad ridgetops and side slopes of the Coastal Plain and Sand Hills. Slopes are smooth and convex. The areas of this soil generally are 25 to 100 acres in size.

Typically, the surface layer and subsurface layer are yellowish brown and light reddish brown sand about 54 inches thick. The subsoil from a depth of about 54 to 81 inches is yellowish red sandy clay loam.

Included with this soil in mapping are small areas of soils that have slopes of more than 6 percent. Also included are small areas of Fuquay and Lakeland soils in the same landscape positions as the Troup soil. Fuquay soils are on slight ridges. They have a sandy surface layer that is more than 20 inches thick. Lakeland soils are sandy throughout. The included soils make up about 10 percent of the map unit.

The Troup soil has a low content of organic matter and a low available water capacity. It is moderately acid to very strongly acid in the surface layer and subsurface layer and strongly acid or very strongly acid in the subsoil. Permeability is moderate in the subsoil. The water table is more than 6 feet below the surface.

Because of the low available water capacity, the low content of organic matter, rapid leaching, and low fertility, this soil is poorly suited to row crops.

This soil is suited to timber production. Loblolly pine and longleaf pine are the preferred trees to plant. Vehicle traffic does not damage this soil during wet periods. The sandy surface layer moderately restricts the use of equipment and causes moderate seedling mortality. Tracked or wide-tire vehicles should be used when the soil is dry. The seedling mortality rate can be reduced by planting high-quality seedlings in a shallow furrow early in winter. Site preparation can include burning, cutting, girdling, shearing and raking, and roller-drum chopping. The thin surface layer should not be raked into windrows with the plant debris.

This soil is poorly suited to most sanitary facilities. The limitations affecting septic tank absorption fields are

insignificant. The sandy layers and seepage are severe limitations affecting sewage lagoon areas and trench type sanitary landfills. Reducing the effects of these limitations is difficult. Sloping the banks and backfilling the sides of the lagoon and landfill with loamy material can reduce the risk of seepage.

The slope is a moderate limitation affecting sites for small commercial buildings. The less sloping areas should be selected as building sites, or the sites should be shaped and graded. The limitations affecting local roads and streets are insignificant.

This soil is fairly suited to habitat for most kinds of openland wildlife, poorly suited to woodland wildlife habitat, and very poorly suited to wetland wildlife habitat.

TrC—Troup sand, 6 to 10 percent slopes. This well drained soil is on narrow ridges and side slopes of the Coastal Plain and Sand Hills. Slopes are smooth and convex. The areas of this soil are 10 to 50 acres in size.

Typically, the surface layer and the subsurface layer are yellowish brown and light reddish brown sand about 54 inches thick. The subsoil from a depth of about 54 to 81 inches is yellowish red sandy clay loam.

Included with this soil in mapping are small areas of soils that have slopes of less than 6 percent or more than 10 percent. Also included are a few small areas of Ailey, Fuquay, and Lakeland soils. Ailey and Fuquay soils are on the rolling part of the landscape. They have a loamy subsoil within a depth of 40 inches. Lakeland soils are in the same landscape positions as the Troup soil. They are sandy throughout. The included soils make up less than 12 percent of the map unit.

The Troup soil has a low content of organic matter and a low available water capacity. It is moderately acid to very strongly acid in the surface layer and subsurface layer and strongly acid or very strongly acid in the subsoil. Permeability is moderate in the subsoil. The water table is more than 6 feet below the surface.

Because of the low available water capacity, a low nutrient-holding capacity, and the low content of organic matter, this soil is poorly suited to row crops.

This soil is suited to timber production. Loblolly pine and longleaf pine are the preferred trees to plant. Vehicle traffic does not damage this soil during wet periods. The sandy surface layer moderately restricts the use of equipment and causes moderate seedling mortality. Tracked or wide-tire vehicles are needed when the soil is dry. The seedling mortality rate can be reduced by planting high-quality seedlings in a shallow furrow early in winter. Site preparation can include burning, cutting, girdling, shearing and raking, and roller-drum chopping. The thin surface layer should not be raked into windrows with the plant debris.

This soil is poorly suited to sanitary facilities. The slope is a moderate limitation affecting septic tank absorption fields. It can be reduced by cutting and filling, by using step-down boxes, or by installing the absorption field on the contour. The hazard of seepage, the slope, and the sandy layers are severe limitations affecting sewage lagoon areas and trench type sanitary landfills. Reducing the effects of these limitations is difficult. Sloping the banks and backfilling the sides of the lagoon and landfill with loamy material can reduce the risk of seepage.

The slope is a severe limitation affecting sites for small commercial buildings and a moderate limitation affecting local roads and streets. This limitation can be minimized by major land shaping, grading, and cutting and filling, by designing buildings so that they conform to the slope, and by constructing roads on the contour.

This soil is fairly suited to habitat for most kinds of openland wildlife, poorly suited to woodland wildlife habitat, and very poorly suited to wetland wildlife habitat.

TrD—Troup sand, 10 to 15 percent slopes. This well drained soil is on side slopes of the Coastal Plain and Sand Hills. Most slopes are rolling and are long and narrow. The areas of this soil are 5 to 50 acres in size.

Typically, the surface layer and the subsurface layer are yellowish brown and light reddish brown sand about 54 inches thick. The subsoil from a depth of about 54 to 81 inches is yellowish red sandy clay loam.

Included with this soil in mapping are small areas that have a few gullies 3 to 12 feet deep and small areas of soils that have slopes of less than 10 percent or more than 15 percent. Also included are a few small areas of Ailey, Lakeland, Vaucluse, and Lucy soils. Ailey and Vaucluse soils are on long, narrow, rolling breaks. They have a hard, compact subsoil. Lakeland and Lucy soils are in the same landscape positions as the Troup soil. Lakeland soils are sandy throughout, and Lucy soils have a sandy surface layer that is more than 20 inches thick. The included soils make up about 15 percent of the map unit.

The Troup soil has a low content of organic matter and a low available water capacity. It is moderately acid to very strongly acid in the surface layer and subsurface layer and strongly acid or very strongly acid in the subsoil. Permeability is moderate in the subsoil. The water table is more than 6 feet below the surface.

Because of the low available water capacity, a low nutrient-holding capacity, and the slope, this soil is unsuited to row crops.

This soil is suited to timber production. Loblolly pine and longleaf pine are the preferred trees to plant. Vehicle traffic does not damage this soil during wet periods. The sandy surface layer moderately restricts the use of equipment and causes moderate seedling mortality. Tracked or wide-tire vehicles are needed when the soil is dry. The seedling mortality rate can be reduced by planting high-quality seedlings in a shallow furrow early in winter. Site preparation can include burning, cutting, girdling, shearing and raking, and roller-drum chopping. The thin surface layer should not be raked into windrows with the plant debris.

This soil is poorly suited to sanitary facilities. The slope is a moderate limitation affecting septic tank absorption fields. This limitation can be minimized by moderate cutting and filling, by using step-down boxes, or by installing the absorption field on the contour. The slope and the hazard of seepage are severe limitations affecting sewage lagoon areas and trench type sanitary landfills. Reducing the effects of these limitations is difficult. Sloping the banks and backfilling the sides of the lagoon or landfill with loamy material can reduce the risk of seepage.

The slope is a severe limitation affecting sites for small commercial buildings and a moderate limitation affecting local roads and streets. This limitation can be minimized by major land shaping, grading, and cutting and filling, by designing buildings so that they conform to the slope, and by constructing roads on the contour.

This soil is fairly suited to habitat for openland wildlife, poorly suited to woodland wildlife habitat, and very poorly suited to wetland wildlife habitat.

TuE—Troup and Lucy sands, 15 to 25 percent slopes. These well drained soils are on the southeast banks of Upper Three Runs Creek and Tinker Creek. They occur as intermingled areas of the Coastal Plain and Sand Hills. Many areas are rolling, and most are long and narrow. The areas of these soils are 5 to 30 acres in size.

A typical area of this map unit may be about all Troup soil or about all Lucy soil. About 50 percent of the map unit is Troup soil, and 35 percent is Lucy soil. Because of present and predicted land uses and similar management problems, these soils are mapped as one unit.

Typically, the Troup soil has a surface layer and subsurface layer of yellowish brown and light reddish brown sand about 54 inches thick. The subsoil from a depth of about 54 to 81 inches is yellowish red sandy clay loam.

The Troup soil has a low content of organic matter and a low available water capacity. It is moderately acid to very strongly acid in the surface layer and strongly acid or very strongly acid in the subsoil. Permeability is moderate in the subsoil. The water table is more than 6 feet below the surface.

Typically, the Lucy soil has a surface layer of brown sand about 7 inches thick. The subsurface layer from a depth of about 7 to 25 inches is yellowish red loamy sand. The subsoil from 25 to 30 inches is red sandy loam, and from 30 to 62 inches it is red sandy clay loam.

The Lucy soil has a low content of organic matter and a low available water capacity. It is moderately acid to very strongly acid in the surface layer and subsurface layer and strongly acid or very strongly acid in the subsoil. Permeability is rapid in the surface layer and subsurface layer and moderate in the subsoil.

Included with these soils in mapping are small areas of Ailey and Vaucluse soils and some narrow slope breaks that have slopes of more than 25 percent; a few small areas, generally of Orangeburg and Lucy soils near the foot of slopes, where slopes are less than 15 percent; and some deep, active gullies. Also included in most areas are short drainageways that have eroded but are now stable and support trees on the drainage slope. Inclusions make up about 15 percent of the map unit.

Because of the slope, the Troup and Lucy soils are not suited to row crops.

These soils are suited to timber production. Loblolly pine is a preferred tree to plant. Vehicle traffic does not damage the soils during wet periods. Because of the slope, the hazard of erosion and the equipment limitation are moderate. Using special equipment and constructing logging roads and fire lanes on the contour help to control erosion. Seedling mortality is moderate because of droughtiness. The mortality rate can be reduced by planting high-quality seedlings early in winter in a shallow furrow established on the contour. Site preparation can include shearing and raking, girdling, cutting, and burning. Placing debris along the contour near the middle of the slope break helps to control erosion. The thin surface layer should not be raked into windrows with the plant debris.

Because of the slope, these soils are not suited to sanitary facilities and are severely limited as sites for small commercial buildings and local roads and streets. Minimizing this limitation is very difficult. Extensive cutting and filling are needed. Roads should be built on

the contour. Erosion is a severe hazard on construction sites.

These soils are fairly suited to habitat for openland wildlife, suited to woodland wildlife habitat, and very poorly suited to wetland wildlife habitat.

TuF—Troup and Lucy sands, 25 to 40 percent slopes. These well drained soils are on the southeast banks of Upper Three Runs Creek and Tinker Creek. They occur as intermingled areas of the Coastal Plain and Sand Hills. Most slopes are long and narrow. The areas of these soils are 5 to 30 acres in size.

A typical area of this map unit may be about all Troup soil or about all Lucy soil. About 60 percent of the map unit is Troup soil, and 25 percent is Lucy soil. Because of present and predicted land uses and similar management problems, these soils are mapped as one unit.

Typically, the Troup soil has a surface layer and subsurface layer of yellowish brown and light reddish brown sand about 54 inches thick. The subsoil from a depth of about 54 to 81 inches is yellowish red sandy clay loam.

The Troup soil has a low content of organic matter and a low available water capacity. It is moderately acid to very strongly acid in the surface layer and subsurface layer and strongly acid or very strongly acid in the subsoil. Permeability is rapid in the surface layer and subsurface layer and moderate in the subsoil. The water table is more than 6 feet below the surface.

Typically, the Lucy soil has a surface layer of brown sand about 7 inches thick. The subsurface layer from a depth of about 7 to 25 inches is yellowish red loamy sand. The subsoil from 25 to 30 inches is red sandy loam, and from 30 to 62 inches it is red sandy clay loam.

The Lucy soil has a low content of organic matter and a low available water capacity. It is moderately acid to very strongly acid in the surface layer and subsurface layer and strongly acid or very strongly acid in the subsoil. Permeability is rapid in the surface layer and subsurface layer and moderate in the subsoil. The water table is more than 6 feet below the surface.

Included with these soils in mapping are small areas of Ailey and Vaucluse soils on some long, narrow slope breaks; a few small areas, generally of Orangeburg or Lucy soils near toe slopes, where slopes are less than 25 percent; and a few deep, active gullies. Also included in most areas are short drainageways that have eroded but are now stable and support trees on the drainage slope. Inclusions make up about 15 percent of the map unit.

Because of the slope, the Troup and Lucy soils are not suited to row crops.

These soils are fairly suited to timber production. Loblolly pine is a preferred tree to plant. Because of the slope, the hazard of erosion and the equipment limitation are moderate. Using special equipment and logging on the contour help to control erosion. Minimizing the equipment limitation is difficult. Logging roads and trails should be established on the contour, and special harvesting equipment is needed. Seedling mortality is moderate. The mortality rate can be reduced by planting high-quality seedlings early in winter. Hand planting is needed in most areas. Site preparation can include burning, cutting, and girdling.

Because of the slope, these soils are not suited to septic tank absorption fields, sewage lagoon areas, or trench type sanitary landfills and are severely limited as sites for small commercial buildings and local roads and streets. Minimizing this limitation is very difficult. If roads are constructed across areas of these soils, extensive grading, cutting, and filling are needed. The roads should be constructed on the contour. Erosion is a severe hazard on construction sites.

This soil is fairly suited to habitat for openland and woodland wildlife and very poorly suited to wetland wildlife habitat.

Ud—Udorthents, firm substratum. These well drained soils generally are on the bottom of borrow pits. The upper part of the original soil has been completely removed or so truncated by heavy equipment that most of the diagnostic horizons are gone. The remaining soil material is indurated layers high in content of ironstone that once were plinthite or dense, brittle material similar to some layers in the lower part of the subsoil and the substratum of Ailey and Vaucluse soils. The areas of the Udorthents are irregularly shaped, rectangular, or nearly square and commonly are 5 to 20 acres in size. Slopes are dominantly 0 to 10 percent.

Typically, the surface layer is sandy clay loam to sandy loam that is coarsely mottled in shades of red, brown, yellow, and gray. This layer is 1 to more than 6 feet thick. The substratum below 6 feet is sandy clay loam to loamy sand that is mottled in shades of red, brown, yellow, and gray. The gray mottles generally increase in number with increasing depth.

Included with these soils in mapping are small areas of Ailey, Blanton, Dothan, Fuquay, Troup, and Vaucluse soils. The areas of these included soils are too small to be mapped separately at the selected scale. Also included are small areas of friable soil material that is too mixed to be identified at the series level and a few

areas that do not have an outlet and are ponded during wet periods. Included soils make up about 20 percent of the map unit.

The Udorthents have a very low content of organic matter and a low available water capacity. They are strongly acid to extremely acid throughout. Permeability is slow to moderate. The water table is 6 feet or more below the surface in most areas.

Because of a very low supply of plant nutrients, the firm soil material, and the very low content of organic matter, these soils are not suited to row crops. Sludge, compost, fertilizer, and straw help to replenish the supply of organic matter and nutrients.

These soils are not suited to timber production. A perennial cover crop of deep-rooted plants, such as sericea, is needed. Mulch and sludge are very effective in rebuilding the soils. Scarifying the surface to a depth of 6 to 12 inches helps roots to penetrate the firm, hard, compact soil material. A close-growing grass-legume mixture and applications of plant nutrients are needed to restore productivity.

These soils are poorly suited to sanitary facilities. Because of extreme variability within short distances, careful onsite evaluation is necessary.

The variability of the soil material, the slope, low load-bearing strength, and erosion are moderate limitations affecting sites for small commercial buildings and local roads and streets. Careful onsite evaluation is needed because of the variability.

These soils are fairly suited to habitat for openland wildlife, poorly suited to woodland wildlife habitat, and very poorly suited to wetland wildlife habitat.

Uo—Udorthents, friable substratum. These soils occur as spoil from excavated areas, disturbed areas, and borrow pits of friable soil material. The soil series cannot be identified because heavy equipment has extensively moved the soil material. Slopes are dominantly 0 to 6 percent, but the side slopes of some pits are steep to nearly vertical. Soil properties generally vary within a few feet. The areas of these soils are irregularly shaped or nearly square and commonly are 5 to 40 acres in size.

Typically, the surface layer and the substratum to a depth of 6 feet or more are layers of loamy and sandy material. The color generally is shades of red, brown, and yellow. Shades of gray occur where the soil material is from a depth of 5 to 6 feet or more and where the soils are not well drained. The soils generally are friable, but they are firm in a few areas that have been compacted by heavy equipment.

Included with these soils in mapping are areas of firm or very firm soil material, a few pits that are ponded for a few months after heavy rainfall, and areas of Ailey, Blanton, Norfolk, Fuquay, Dothan, and Wagram soils that have layers of loamy and sandy overburden 5 to 15 inches thick. Also included are parking lots, sidewalks, and small buildings that if larger would have been mapped as Urban land. Inclusions make up about 15 percent of the map unit.

The Udorthents have a very low content of organic matter and a low available water capacity. They are strongly acid to extremely acid throughout. Permeability is dominantly moderate but ranges from moderately slow to rapid. The water table is about 3 feet above the surface on the bottom of some pits and more than 6 feet below the surface in the friable areas.

Because of a very low supply of plant nutrients, acidity, and the very low content of organic matter, these soils are unsuited to row crops.

These soils are poorly suited to timber production. Loblolly pine or Virginia pine can grow in some areas. The equipment limitation is moderate during wet periods, and seedling mortality is moderate. Erosion is a moderate hazard (fig. 3). Intensive management and onsite evaluation are needed because of a wide variability in soil properties and environmental conditions.

In general, some surface shaping or grading, erosion-control structures, and applications of fertilizer and lime are needed if vegetation is to be established on these soils. Applications of sludge increase the content of organic matter and provide nitrogen that is not readily leached from the soils. Planting close-growing grass-legume crops a few years before trees are planted helps to control erosion, rebuilds the soils, and increases the seedling survival rate.

The slope is a moderate limitation affecting sites for small commercial buildings. This limitation can be minimized by grading. Onsite evaluation is needed because some areas require a surface drainage system. The limitations affecting local roads and streets are slight or moderate. Onsite evaluation is needed before construction.

These soils are fairly suited to habitat for openland and woodland wildlife and very poorly suited to wetland wildlife habitat.

Ur—Udorthents-Urban land complex, gently sloping. This map unit consists of areas affected by major land shaping or grading (fig. 4) intermingled with streets, sidewalks, buildings, and parking lots and areas of undisturbed soils. The soil is about 50 percent Udorthents, 30 percent Urban land, and 20 percent

Figure 3.—Erosion on unstabilized banks in an area of Udorthents, friable substratum.

undisturbed soils. Dothan, Fuquay, Troup, and Wagram soils are in the undisturbed areas. Individual areas of the Udorthents, Urban land, and undisturbed soils are too small or too intermingled to be mapped separately at the selected scale. Slopes are generally 0 to 6 percent.

The Udorthents occur as friable, loamy layers deposited in the process of grading and shaping large areas of land. The layers with similar color and texture generally are 3 to 6 inches thick. The surface layer generally is sandy clay loam. The upper part of the underlying material generally is a few inches of sandy material, the next part is 4 or 5 inches of sandy loam, and the lower part to a depth of 6 feet or more is sandy clay loam. In some areas the textures are nearly all the same throughout the profile, but the colors are different within a few inches.

The Urban land is covered with paved lots, sidewalks, buildings, and other structures in areas where no soil is exposed.

Because of the complexity of the areas of this unit, any soil interpretation requires onsite evaluation.

Uu—Urban land. This map unit consists of areas covered with parking lots, buildings, and other structures. It is about 85 percent Urban land, 10 percent Udorthents, and 5 percent small areas of Fuquay, Dothan, and Blanton soils. Slopes range from 0 to 6 percent. Any soil interpretation of the areas of this unit requires careful onsite evaluation.

VaB—Vaucluse sandy loam, 2 to 6 percent slopes. This well drained soil is on narrow ridges and short, undulating side slopes of the Coastal Plain and Sand Hills. The areas of this soil are about 10 to 30 acres in size.

Typically, the surface layer is brown sandy loam about 5 inches thick. The subsoil from a depth of 5 to 10 inches is strong brown sandy clay loam, from 10 to 17 inches is yellowish red sandy clay loam, from 17 to

20 inches is strong brown sandy clay, from 20 to 32 inches is red sandy loam, and from 32 to 62 inches is reddish brown sandy clay loam. The substratum from 62 to 72 inches is reddish yellow sandy loam.

Included with this soil in mapping are small areas of Ailey, Blanton, Neeses, and Troup soils. Ailey and Neeses soils are in the same landscape position as the Vaucluse soil. Ailey soils have a sandy surface layer that is more than 20 inches thick. Neeses soils have a clayey subsoil. Blanton and Troup soils are in smooth, broad, gently sloping areas. They have a sandy surface layer that is more than 40 inches thick. The included soils make up about 15 percent of the map unit.

The Vaucluse soil has a low content of organic matter and a low available water capacity. It is strongly acid to extremely acid throughout. Permeability is slow or moderately slow in the subsoil. The water table is below a depth of 6 feet. Dense, brittle layers in the subsoil partly restrict the root zone.

Because of the slow or moderately slow permeability and a severe hazard of erosion, this soil is poorly suited to row crops.

This soil is suited to timber production. Loblolly pine is a preferred tree to plant. Vehicle traffic does moderate damage to this soil during wet periods. Windthrow is a moderate hazard because of the restricted root zone. Site preparation can include burning, cutting, or girdling. The hazard of erosion is moderate. Building roads on the contour along slope breaks helps to control erosion and provides access for the removal of windthrown trees.

This soil is poorly suited to sanitary facilities. The slow or moderately slow permeability is a severe limitation affecting septic tank absorption fields. Enlarging the absorption field can help to minimize this limitation. Seepage is a severe hazard in sewage lagoon areas and in trench type sanitary landfills. The bottom and sides of the lagoon and landfill area should be backfilled with less permeable material.

The slope is a moderate limitation affecting sites for

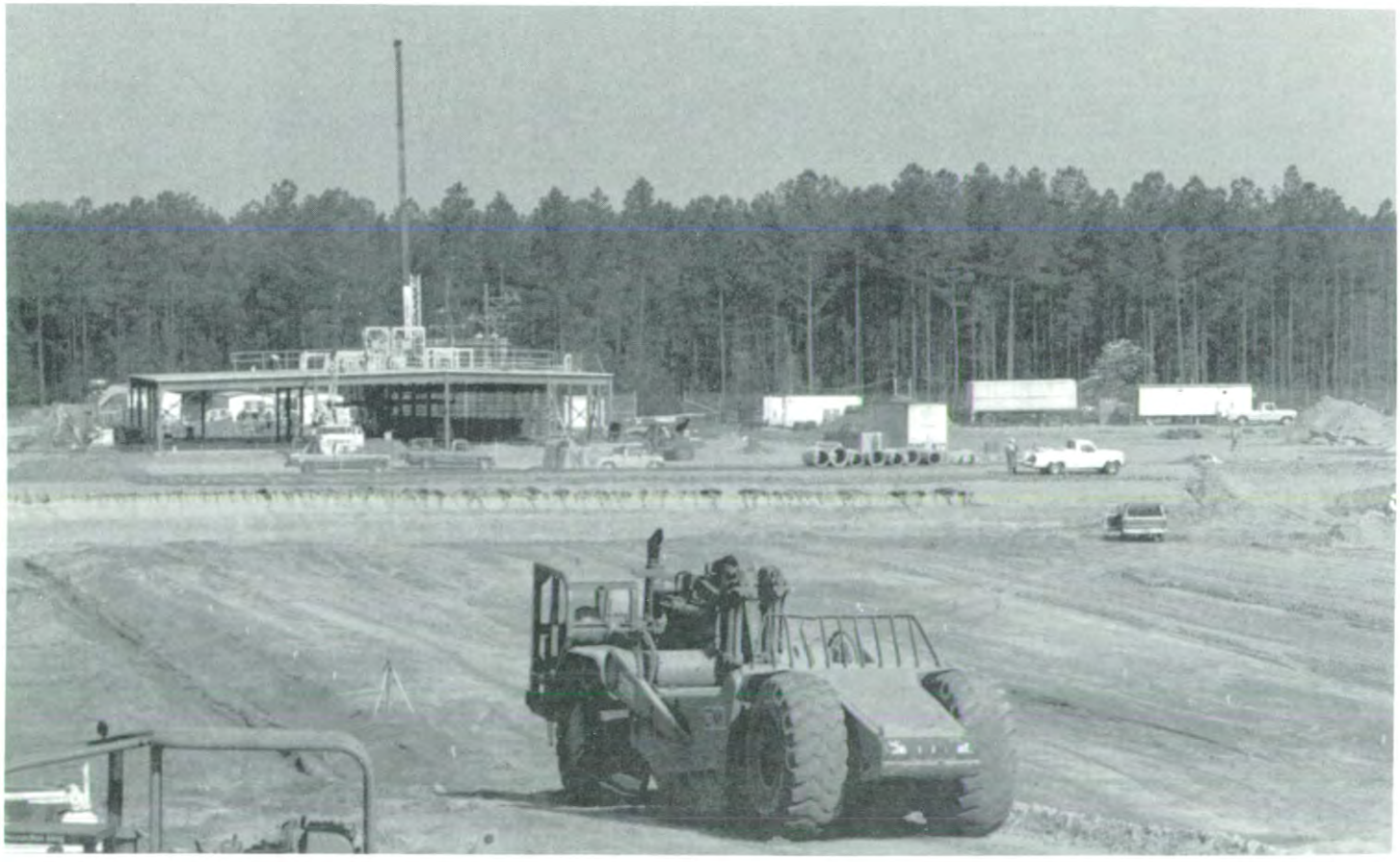


Figure 4.—An area of Udorthents-Urban land complex, gently sloping.

small commercial buildings. The building can be designed so that it conforms to the slope, or the slope can be reduced by land shaping. The limitations affecting local roads and streets are insignificant.

This soil is fairly well suited to habitat for openland and woodland wildlife and very poorly suited to wetland wildlife habitat.

VeC—Vaucluse-Ailey complex, 6 to 10 percent slopes. These soils are on short, rolling, convex slope breaks along drainageways and on long, narrow ridgetops of the Sand Hills and Coastal Plain. The Vaucluse soil makes up about 40 percent of the unit, and the Ailey soil makes up about 30 percent. The two soils occur as areas so intermingled that they could not be mapped separately at the selected scale. Most areas are 20 to 80 acres in size.

Typically, the Vaucluse soil has a surface layer of brown sandy loam about 5 inches thick. The subsoil from a depth of 5 to 10 inches is strong brown sandy clay loam, from 10 to 17 inches is yellowish red sandy clay loam, from 17 to 20 inches is strong brown sandy clay, from 20 to 32 inches is red sandy loam, and from 32 to 62 inches is reddish brown sandy clay loam. The substratum from 62 to 72 inches is reddish yellow sandy loam.

The Vaucluse soil has a low content of organic matter and a low available water capacity. It is strongly acid to extremely acid throughout. Permeability is slow or moderately slow. The water table is below a depth of 6 feet. Dense, brittle layers in the subsoil partly restrict the root zone.

Typically, the Ailey soil has a surface layer of brown sand about 6 inches thick. The subsurface layer from a depth of 6 to 26 inches is brown sand. The subsoil from 26 to 40 inches is brown sandy clay loam, and from 40 to 55 inches it is sandy clay loam that is coarsely mottled in shades of brown and red. The substratum from 55 to 65 inches is coarsely mottled red, brown, and gray sandy loam.

The Ailey soil has a low content of organic matter and a low available water capacity. It is strongly acid or very strongly acid throughout. Permeability is slow in the subsoil. A perched high water table is 4 to 6 feet below the surface during wet periods. Dense, brittle layers in the subsoil partly restrict the root zone.

Included with these soils in mapping are areas of soils that have about 10 percent nodules of plinthite and Lucy, Wagram, Blanton, and Troup soils, which have a sandy surface layer that is 20 to more than 40 inches thick, have a friable subsoil, and generally are on the smooth parts of the landscape and in areas that are transitional to other less sloping or less rolling soils. Also included are small, narrow areas of somewhat poorly drained or moderately well drained soils at the base of slopes or on most toe slopes that are transitional to drainageways or bottom land. The included soils make up about 30 percent of the map unit.

Because of the low available water capacity and a low nutrient-holding capacity, the Vaucluse and Ailey soils are poorly suited to row crops.

These soils are poorly suited to timber production. Loblolly pine is a preferred tree to plant. Vehicle traffic does moderate damage to the Vaucluse soil during wet periods. The hazard of erosion is moderate, and deep gullies can form. Building logging roads and fire lanes on the contour helps to control erosion. Seedling mortality and the equipment limitation are slight on the Vaucluse soil and moderate on the Ailey soil. The moderate equipment limitation can be minimized by using wide-tread or tracked equipment. Windthrow is a moderate hazard on the Vaucluse soil because of the dense, brittle layers in the subsoil. Because of windthrow, the soil should be managed for pulpwood rather than sawtimber. Building access roads on the contour along slope breaks facilitates the removal of windthrown trees. Site preparation can include cutting, girdling, and burning.

In most areas these soils are poorly suited to sanitary facilities. The slow or moderately slow permeability and the slope are severe limitations affecting septic tank absorption fields. These limitations can be minimized by enlarging the absorption field, installing the absorption lines on the contour, and constructing a wide, deep trench below the distribution lines. Constructing the trench helps to break up the brittle subsoil. The slope and seepage are severe limitations on sites for sewage lagoons and trench type sanitary landfills. Reducing the effects of these limitations is difficult. The less sloping soils away from the slope breaks should be selected.

The slope is a severe limitation affecting sites for small commercial buildings and a moderate limitation affecting local roads and streets. This limitation can be minimized by land shaping and grading. Also, the roads should be built on the contour.

These soils are fairly suited to habitat for openland and woodland wildlife. They are very poorly suited to wetland wildlife habitat.

VeD—Vaucluse-Ailey complex, 10 to 15 percent slopes. These soils are on narrow, strongly rolling, convex slope breaks along hillsides and on long,

narrow, upland ridgetops of the Sand Hills and Coastal Plain. The Vaucluse soil makes up about 50 percent of the unit, and the Ailey soil makes up about 25 percent. The two soils occur as areas so intermingled that they could not be mapped separately at the selected scale. Most areas are 5 to 60 acres in size.

Typically, the Vaucluse soil has a surface layer of brown sandy loam about 5 inches thick. The subsoil from a depth of about 5 to 10 inches is strong brown sandy clay loam, from 10 to 17 inches is red sandy clay loam, from 17 to 20 inches is strong brown sandy clay, from 20 to 32 inches is red sandy loam, and from 32 to 62 inches is reddish brown sandy clay loam. The substratum from 62 to 72 inches is reddish yellow sandy loam.

The Vaucluse soil has a low content of organic matter and a low available water capacity. It is strongly acid to extremely acid throughout. Permeability is slow or moderately slow. The water table is below a depth of 6 feet. Dense, brittle layers in the subsoil partly restrict the root zone.

Typically, the Ailey soil has a surface layer of brown sand about 6 inches thick. The subsurface layer from a depth of about 6 to 26 inches is brown sand. The subsoil from 26 to 40 inches is brown sandy clay loam, and from 40 to 55 inches it is sandy clay loam that is coarsely mottled in shades of brown and red. The substratum from 55 to 65 inches is coarsely mottled red, brown, and gray sandy loam.

The Ailey soil has a low content of organic matter and a low available water capacity. It is strongly or very strongly acid throughout. Permeability is slow in the subsoil. A perched high water table is 4 to 6 feet below the surface during wet periods. Dense, brittle layers in the subsoil partly restrict the root zone.

Included with these soils in mapping are areas of soils that have about 10 percent nodules of plinthite and Lucy, Wagram, Blanton, and Troup soils, which have a sandy surface layer that is 20 to more than 40 inches thick, have a friable subsoil, and generally are on the less rolling parts of the landscape and in areas that are transitional to other less sloping soils on more uniform slopes. Also included are small, narrow areas of somewhat poorly drained or moderately well drained soils. These soils are at the base of most slopes or on toe slopes in areas that are transitional to drainageways or flood plains. The included soils make up about 25 percent of the map unit.

Because of the low available water capacity, the slope, and a low nutrient-holding capacity, the Vaucluse and Ailey soils are poorly suited to row crops.

These soils are poorly suited to timber production. Loblolly pine is a preferred tree to plant. Vehicle traffic does moderate damage to the Vaucluse soil during wet periods. The hazard of erosion is moderate, and deep gullies can form. Building logging roads and fire lanes on the contour helps to control erosion. Seedling mortality and the equipment limitation are slight on the Vaucluse soil and moderate on the Ailey soil. The moderate equipment limitation can be minimized by using wide-tread or tracked equipment. Windthrow is a moderate hazard on the Vaucluse soil because of the dense, brittle layers in the subsoil. Because of windthrow, the soil should be managed for pulpwood rather than sawtimber. Building access roads on the contour along slope breaks facilitates the removal of windthrown trees. Site preparation can include cutting, girdling, and burning.

These soils are poorly suited to septic tank absorption fields, sewage lagoon areas, and trench type sanitary landfills because of the slow or moderately slow permeability and the slope. Reducing the effects of these limitations is difficult. An alternative site should be selected if possible.

The slope is a severe limitation affecting sites for small commercial buildings and a moderate limitation affecting local roads and streets. Land shaping and grading are needed, and the roads should be constructed on the contour.

These soils are fairly suited to habitat for openland and woodland wildlife and very poorly suited to wetland wildlife habitat.

WaA—Wagram sand, 0 to 2 percent slopes. This well drained soil is on fairly broad ridgetops, generally at a higher elevation than the surrounding soils of the Coastal Plain. The areas of this soil are about 30 to 60 acres in size.

Typically, the surface layer is pale brown sand about 9 inches thick. The subsurface layer from a depth of about 9 to 22 inches is pale yellow sand. The subsoil from 22 to 27 inches is yellowish brown fine sandy loam, from 27 to 39 inches is brownish yellow fine sandy loam, and from 39 to 61 inches is yellowish brown fine sandy loam.

Included with this soil in mapping are areas of soils that have slopes of slightly more than 2 percent and small areas of soils that have more than 5 percent nodules of plinthite in the subsoil. Also included are small areas of Blanton soils, which have a sandy surface layer that is more than 40 inches thick. The included soils make up about 10 percent of the map unit.

The Wagram soil has a low content of organic matter

and a low available water capacity. It is moderately acid to very strongly acid throughout. Permeability is moderate in the subsoil. The water table is more than 6 feet below the surface.

This soil is suited to row crops. Droughtiness and a low nutrient-holding capacity are the main management concerns.

This soil is suited to timber production. Loblolly pine is a preferred tree to plant. Vehicle traffic does not damage this soil during wet periods. The sandy surface layer and subsurface layer moderately restrict the use of equipment. Tracked or wide-tread vehicles are needed when the soil is dry. Seedling mortality is moderate because nutrients are leached through this soil and the available water capacity is low. Planting high-quality seedlings in a shallow furrow early in winter can increase the survival rate. Site preparation can include burning, cutting, girdling, shearing and raking, and roller-drum chopping. The top few inches of the surface layer should not be raked into windrows with the plant debris.

This soil is suited to some sanitary facilities. The limitations affecting septic tank absorption fields and trench type sanitary landfills are insignificant. Seepage is a severe hazard in sewage lagoon areas. The sides of the lagoon should be backfilled with less permeable material. The limitations affecting sites for small commercial buildings and local roads and streets are insignificant.

This soil is well suited to habitat for openland and woodland wildlife and very poorly suited to wetland wildlife habitat.

WaB—Wagram sand, 2 to 6 percent slopes. This well drained soil is on ridges, generally at a higher elevation than the surrounding soils of the Coastal Plain. The areas of this soil are about 10 to 40 acres in size.

Typically, the surface layer is pale brown sand about 9 inches thick. The subsurface layer from a depth of about 9 to 22 inches is pale yellow sand. The subsoil from 22 to 27 inches is yellowish brown fine sandy loam, from 27 to 39 inches is brownish yellow fine sandy loam, and from 39 to 61 inches is yellowish brown fine sandy loam.

Included with this soil in mapping are areas of soils that have slopes of slightly less than 2 percent or slightly more than 6 percent and areas of soils that have more than 5 percent nodules of plinthite in the subsoil. Also included are small areas of Blanton soils. The included soils are in the same landscape positions as the Wagram soil. They make up about 10 percent of the map unit.

The Wagram soil has a low content of organic matter and a low available water capacity. It is moderately acid to very strongly acid throughout. Permeability is moderate in the subsoil. The water table is more than 6 feet below the surface.

This soil is suited to row crops. Droughtiness and a low nutrient-holding capacity are the main management concerns.

This soil is suited to timber production. Loblolly pine is a preferred tree to plant. Vehicle traffic does not damage this soil during wet periods. The sandy surface layer and subsurface layer moderately restrict the use of equipment. Tracked or wide-tread vehicles are needed when the soil is dry. Seedling mortality is moderate because nutrients are leached through this soil and the available water capacity is low. Planting high-quality seedlings early in winter can increase the survival rate. The seedlings should be planted in a shallow furrow established on the contour. Site preparation can include burning, cutting, girdling, shearing and raking, and roller-drum chopping. The top few inches of the surface layer should not be raked into windrows with the plant debris.

This soil is suited to some sanitary facilities. The limitations affecting septic tank absorption fields and trench type sanitary landfills are insignificant. Seepage is a severe hazard in sewage lagoon areas. The sides and bottom of the lagoon should be backfilled with less permeable material.

The slope is a moderate limitation affecting sites for small commercial buildings. This limitation can be minimized by land shaping and grading or by designing the buildings so that they conform to the slope. The limitations affecting local roads and streets are insignificant.

This soil is well suited to habitat for openland and woodland wildlife and very poorly suited to wetland wildlife habitat.

Wm—Williman sand. This poorly drained soil is on low, broad flats, in depressions, and along small drainageways. It formed in sandy and loamy sediments of the Coastal Plain. Slopes are less than 2 percent. The areas of this soil are somewhat oval and are commonly 5 to 30 acres in size.

Typically, the surface layer is very dark gray sand about 5 inches thick. The subsurface layer from a depth of about 5 to 24 inches is light gray sand. The subsoil from 24 to 55 inches is gray sandy clay loam, and from

55 to 65 inches it is gray sandy loam.

Included with this soil in mapping are small areas of Rembert and Ogeechee soils. These soils are in the same landscape positions as the Williman soil. Also included are small areas of Norfolk, Dothan, and Wagram soils on the upper parts of the landscape; a few areas of soils that are subject to ponding; and a few areas along drainageways that are subject to brief flooding. The included soils make up about 15 percent of the map unit.

The Williman soil has a low content of organic matter and a low available water capacity. It is strongly acid to extremely acid throughout. Permeability is moderate in the subsoil. The water table is within 1 foot of the surface during wet periods.

Because of the wetness and a low supply of available nutrients, this soil is very poorly suited to row crops. Outlets that can help to drain off excess water during wet periods are not readily available.

This soil is suited to timber production. Loblolly pine and sweetgum are the preferred trees to plant. The native plant community includes sweetgum, blackgum, water oak, and waxmyrtle. Vehicle traffic does moderate damage to this wet soil by cutting deep ruts into the sandy surface layer. The wetness severely restricts the use of equipment and causes severe seedling mortality and severe plant competition. Land shaping, removing excess water through shallow ditches where outlets are available, and planting seedlings on beds can help overcome the wetness. Chopping and burning during site preparation help to control plant competition.

This soil is not suited to septic tank absorption fields, sewage lagoon areas, and trench type sanitary landfills because of the wetness and the hazard of seepage. Reducing the effects of these limitations is not practical. Alternative sites that have better drained soils should be selected if possible.

The wetness is a severe limitation affecting sites for small commercial buildings and local roads and streets. Reducing the wetness is very difficult. An extensive drainage system and large quantities of fill material are needed.

This soil is suited to habitat for openland and woodland wildlife and fairly well suited to wetland wildlife habitat.

Prime Farmland

In this section, prime farmland is defined and discussed and the prime farmland soils in the Savannah River Plant area are listed.

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, must encourage and facilitate the wise use of our nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is the land that is best suited to food, feed, forage, fiber, and oilseed crops. It may be cultivated land, pasture, woodland, or other land, but it is not urban and built-up land or water areas. It either is used for food or fiber crops or is available for those crops. The soil qualities, growing season, and moisture supply are those needed for a well managed soil to produce a sustained high yield of crops in an economic manner. Prime farmland produces the highest yields with minimal expenditure of energy and economic resources, and farming it results in the least damage to the environment.

Urban or built-up land, public land, and water areas cannot be considered prime farmland. Urban or built-up land is any contiguous unit of land 10 acres or more in size that is used for such purposes as housing, industrial, and commercial sites, sites for institutions or public buildings, small parks, golf courses, cemeteries, railroad yards, airports, sanitary landfills, sewage treatment plants, and water control structures. Public land is land not available for farming in national forests, national parks, military or defense reservations, and state parks.

Prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The level of acidity or alkalinity is acceptable. Prime farmland has few or no rocks and is permeable to water and air. It is not excessively erodible or saturated with water for long periods and is not frequently flooded during the growing season. The slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Soil Conservation Service.

The map units in the survey area that are considered prime farmland are listed at the end of this section. This list does not constitute a recommendation for a particular land use. The location of each map unit is shown on the detailed soil maps at the back of this publication. The extent of each unit is given in table 4. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

Some soils that have a seasonal high water table and all soils that are frequently flooded during the growing season qualify for prime farmland only in areas where these limitations have been overcome by drainage measures or flood control. The need for these measures is indicated after the map unit name on the following list. Onsite evaluation is needed to determine whether or not these limitations have been overcome by corrective measures.

The map units that meet the requirements for prime farmland are:

DoA	Dothan sand, 0 to 2 percent slopes
DoB	Dothan sand, 2 to 6 percent slopes
EnA	Eunola fine sandy loam, 0 to 2 percent slopes
HoA	Hornsville fine sandy loam, 0 to 2 percent slopes
NoA	Norfolk loamy sand, 0 to 2 percent slopes
NoB	Norfolk loamy sand, 2 to 6 percent slopes
Oa	Ochlockonee loamy sand, occasionally flooded (where drained)
OrA	Orangeburg loamy sand, 0 to 2 percent slopes
OrB	Orangeburg loamy sand, 2 to 6 percent slopes
Sh	Shellbluff loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)

Ta Tawcaw silty clay, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)

To Toccoa loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, and highways and other transportation systems; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in the survey area. The survey can help planners to maintain or create a land use pattern that is in harmony with nature.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where wetness or very firm soil layers can cause difficulty in excavation.

Health and highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, building sites, lawns, trees, and shrubs.

Crops and Plant Cover

Gene Hardee, conservation agronomist, Soil Conservation Service, helped prepare this section.

General management needed for crops and plant cover is suggested in this section. The crops or plants best suited to the soils, including some not commonly grown in the survey area, are identified.

Planners of management systems for individual fields or tracts should consider the detailed information given in the description of each soil under "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

The soils on uplands in the survey area are mainly droughty, acid, low in fertility, and subject to excessive leaching of nutrients. Ailey, Blanton, Lakeland, and Troup soils are fairly well suited or poorly suited to the field and fruit crops commonly grown in this geographical area. Bahiagrass, coastal panicgrass, sericea lespedeza, and weeping lovegrass can be grown for permanent plant cover on these soils.

The survey area includes 27,725 acres of soils that are considered prime farmland. These soils are well suited to almost all of the field and fruit crops grown in this geographical area. Bahiagrass, coastal panicgrass, common bermudagrass, weeping lovegrass, witchgrass, sericea lespedeza, centipedegrass, and white clover can be grown for permanent plant cover on these soils.

Erosion is a moderate hazard on the gently sloping soils in the survey area and a severe hazard on the sloping to steep soils. A permanent plant cover is needed on the more sloping soils. If land use prohibits a permanent plant cover, plant rotations, diversions or terraces, cover crops, crop residue management, and water-disposal systems should be used to control erosion.

On about 40,000 acres in the survey area, wetness is a limitation, and on 27,600 acres flooding is a hazard. The survey area has about 37,700 acres of potential wetlands. Bahiagrass, Dallisgrass, fescue, reed canarygrass, and maidencane can be grown for permanent plant cover on the wet soils.

Woodland Management and Productivity

Norman W. Runge, forester, Soil Conservation Service, helped prepare this section.

In the forest land that originally covered much of the

survey area, pine, oak, and hickory grew in the uplands and baldcypress and water-tolerant hardwoods grew in the low areas. The forest provided material for naval stores and logging industries.

Forest land now makes up 174,379 acres, or more than 85 percent of the survey area. This acreage includes 6,021 acres of national forest land recently transferred to the Department of Energy. Southern pine and upland hardwood forest types cover 84 percent of the forest land. The most important pine species are loblolly pine, longleaf pine, and slash pine. Slash pine is not suitable for planting because of potential ice damage. The upland hardwoods are mainly oaks and hickories. The rest of the forest land supports bottom land hardwood forest types, such as oak, American sycamore, and gum.

Excellent stands of commercial trees are produced in the survey area. The commercial value of forest products is substantial but somewhat below its potential capacity. The annual growth is almost double the amount harvested. On most of the existing commercial forest land, forest management is intensive. Weeding out undesirable species could improve some areas. Continued protection from wildfire and control of diseases and insects are needed to improve the stands. Management practices include controlled burning, the selection of genetically improved seedlings for planting, applications of pesticide, measures that improve natural regeneration, applications of fertilizer, and the introduction of new species, such as sand pine, which is native to Florida.

In addition to wood products and pine straw, the forest land provides wildlife habitat, natural beauty, conservation of soil and water, research opportunities, opportunities for controlled hunting, and other benefits.

Soils differ in their suitability for trees because of the different elevations, landscape positions, and intrinsic characteristics. The most important characteristics that determine moisture supply and growing space for tree roots are the thickness and texture of the surface layer and subsoil, the depth to a root-restricting layer, and depth to the water table.

Table 5 provides information useful to woodland owners or forest managers planning the management of soils for wood crops. Map unit symbols for the soils in the survey area are listed, and the potential productivity is given for the common trees growing on specific soils. The soils are also rated for a number of factors to be considered in management. *Slight, moderate,* and *severe* are used to indicate the degree of major soil limitations.

The first tree listed for each soil under the column "Common trees" is the indicator species for that soil. An indicator species is a tree that is common in the area and that is generally the most productive on a given soil.

Table 5 lists the potential productivity of a soil for the indicator species in cubic feet per acre. The larger the number, the greater the potential productivity. Potential productivity is based on the site index and the point where mean annual increment is the greatest.

Ratings of the *erosion hazard* indicate the probability that damage may occur if site preparation activities or harvesting operations expose the soil. The risk is *slight* if no particular preventive measures are needed under ordinary conditions; *moderate* if erosion-control measures are needed for particular silvicultural activities; and *severe* if special precautions are needed to control erosion for most silvicultural activities. Ratings of *moderate* or *severe* indicate the need for construction of higher standard roads, additional maintenance of roads, additional care in planning for harvesting and reforestation, or the use of specialized equipment.

Ratings of *equipment limitation* indicate limits on the use of forest management equipment, year-round or seasonal, because of such soil characteristics as slope, wetness, stoniness, or susceptibility of the surface layer to compaction. As slope gradient and length increase, operating wheeled equipment becomes more difficult. On the steeper slopes, tracked equipment must be used. On the steepest slopes, even tracked equipment cannot operate; more sophisticated systems are needed. The rating is *slight* if equipment use is restricted by soil wetness for less than 2 months and if special equipment is not needed. The rating is *moderate* if slopes are so steep that wheeled equipment cannot be operated safely across the slope, if soil wetness restricts equipment use from 2 to 6 months per year, if stoniness restricts ground-based equipment, or if special equipment is needed to prevent or minimize soil compaction. The rating is *severe* if slopes are so steep that tracked equipment cannot be operated safely across the slope, if soil wetness restricts equipment use for more than 6 months per year, if stoniness restricts ground-based equipment, or if special equipment is needed to prevent or minimize soil compaction. Ratings of *moderate* or *severe* indicate a need for choosing the most suitable equipment and for the careful timing of harvesting and other management operations.

Ratings of *seedling mortality* indicate the probable death of naturally occurring or properly planted seedlings of good stock in periods of normal rainfall as influenced by kinds of soil or topographic features. *Seedling mortality* is caused primarily by too much water

or too little water. The factors used in rating a soil for seedling mortality are texture of the surface layer, depth to and duration of the water table, rock fragments in the surface layer, rooting depth, and slope. Mortality generally is greatest on soils that have a sandy or clayey surface layer. The risk is *slight* if, after site preparation, expected mortality is less than 25 percent; *moderate* if expected mortality is between 25 and 50 percent; and *severe* if expected mortality exceeds 50 percent. Ratings of *moderate* or *severe* indicate that it may be necessary to use containerized or larger than usual planting stock or to make special site preparations, such as bedding, furrowing, installation of a surface drainage system, or measures that provide artificial shade for seedlings. Reinforcement planting is often needed if the risk is *moderate* or *severe*.

Ratings of *windthrow hazard* indicate the likelihood that trees will be uprooted by the wind. A restricted rooting depth is the main reason for windthrow. The rooting depth can be restricted by a high water table, by plinthite, or by a combination of such factors as soil wetness, texture, structure, and depth. The risk is *slight* if strong winds break trees but do not uproot them; *moderate* if strong winds blow over a few trees and break many trees; and *severe* if moderate or strong winds commonly blow trees over. Ratings of *moderate* or *severe* indicate that the stand should be carefully thinned or possibly not thinned at all. Specialized equipment may be needed to prevent damage to shallow root systems in partial cutting operations. A plan for the periodic removal of windthrown trees and the maintenance of a road and trail system may be needed.

Ratings of *plant competition* indicate the likelihood of the growth or invasion of undesirable plants. Plant competition is most severe on the more productive soils, on poorly drained soils, and on soils having a restricted root zone that holds moisture. The risk is *slight* if competition from undesirable plants hinders adequate natural or artificial reforestation but does not necessitate intensive site preparation and maintenance. The risk is *moderate* if competition from undesirable plants hinders natural or artificial reforestation to the extent that intensive site preparation and maintenance are needed. The risk is *severe* if competition from undesirable plants prevents adequate natural or artificial reforestation unless the site is intensively prepared and maintained. A *moderate* or *severe* rating indicates the need for site preparation to ensure the development of an adequately stocked stand. Managers must plan site preparation measures to ensure reforestation without delays.

The potential productivity of *common trees* on a soil is expressed as a *site index*. Common trees are listed in the order of their observed general occurrence. Generally, only two or three tree species dominate.

The *site index* is determined by taking height measurements and determining the age of selected trees within stands of a given species. This index is the average height, in feet, that the trees attain in a specified number of years. This index applies to fully stocked, even-aged, unmanaged stands.

The *volume* represents an expected volume produced by the most important trees, expressed in cubic feet per acre per year. Cubic feet per acre can be converted to board feet by multiplying by a factor of about 5. For example, a productivity class of 114 means that the soil can be expected to produce about 570 board feet per acre per year at the point where mean annual increment culminates.

Trees to plant are those that are used for reforestation or, under suitable conditions, for natural regeneration. They are suited to the soils and can produce a commercial wood crop. The desired wood product, topographic position (such as a low, wet area), and personal preference are three factors of many that can influence the choice of trees for reforestation.

Wildlife Habitat

Lawrence H. Robinson, biologist, Soil Conservation Service, helped prepare this section.

Since the construction of the Savannah River Plant, the wildlife population in the survey area has changed because most of the openland was converted to woodland. White-tailed deer and feral hogs are hunted in an effort to reduce the number of animal-vehicle accidents and the damage to trails caused by the hogs. Wild turkey was stocked by the South Carolina Wildlife Department between 1972 and 1974. Since that time, the wild turkey population has increased. Bobwhite quail is abundant only in regeneration areas, rights-of-way, and reclaimed borrow pits.

The Savannah River Swamp, Carolina bays, areas of bottom land hardwoods, and ponds (fig. 5) are inhabited by waterfowl, heron, alligator, and other reptiles and amphibians. Par Pond is inhabited by largemouth bass, bluegill, and crappie, but no public fishing is permitted. Many species of fish are in the Savannah River.

Endangered and threatened species include bald eagle, red-cockaded woodpecker, alligator, and woodcock. The Savannah River Plant was designated as the first National Environmental Research Park for

Figure 5.—Shallow water area in Par Pond, which provides good habitat for wetland wildlife.

the study of the interaction between a nuclear industrial site and the environment.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 6, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; in protecting

endangered species; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, lovegrass, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, wheatgrass, and grama.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, the available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian olive, autumn olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, cedar, and juniper.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, and slope. Examples of wetland plants are smartweed, wild millet, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, slope, and permeability. Examples of shallow water areas are cooling ponds, swamps, and bays.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, pheasant, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey (fig. 6), woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, and deer.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water

Figure 6.—Wild turkey in an area of Blanton sand, 0 to 6 percent slopes.

management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations must be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water

table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreational uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 7 shows the degree and kind of soil limitations that affect shallow excavations, small structures with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer, stone content, soil texture, and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Small structures and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for small structures no higher than three stories. Ratings are made for small commercial buildings without basements, for small structures with basements, and for small structures without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. Depth to a high water table, depth to bedrock or to a cemented pan, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, depth to a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, depth to a high water table, depth to bedrock or to a cemented pan, and the available water capacity in the upper 40 inches affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 8 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoon areas, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 8 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, depth to a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 8 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, depth to a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 8 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, and soil reaction affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported

to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 9 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. These soils may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 9, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation

Figure 7.—A properly designed cooling pond with shaped and vegetated banks, which help to control erosion.

of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones, have little or no gravel, and have slopes of less than 8 percent. They are naturally fertile or respond well to fertilizer and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel or stones, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel or stones, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 10 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The

limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, and terraces and diversions.

Pond reservoir areas hold water behind a dam or embankment (fig. 7). Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders or of organic matter. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; and subsidence of organic layers. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by very low fertility. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of soil blowing or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 14.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 11 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system *(2)* and the system adopted by the American Association of State Highway and Transportation Officials *(1)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested, with group index numbers in

parentheses, is given in table 14.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 12 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They influence the soil's adsorption of cations, moisture retention, shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3 bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of movement of water through the soil when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture

content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur over a sustained period. The rate is in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 12, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 13 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to two hydrologic groups in table 13, the first letter is for drained areas and the second is for undrained areas.

Flooding, the temporary inundation of an area, is caused by overflowing streams or by runoff from adjacent slopes. Water standing for short periods after rainfall or snowmelt is not considered flooding, nor is water in swamps and marshes.

Table 13 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency generally is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *occasional* that it occurs, on the average, once or less in 2 years; and *frequent* that it occurs, on the average, more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 days to 1 month, and *very long* if more than 1 month. Probable dates are expressed in months.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered is local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils.

The estimates are based mainly on the evidence of a saturated zone, namely, grayish colors or mottles in the soil. Indicated in table 13 are the depth to the seasonal high water table; the kind of water table—that is, perched or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 13.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

The two numbers in the "High water table—Depth" column indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

Subsidence is the settlement of organic soils or of saturated mineral soils of very low density. Subsidence results from either desiccation and shrinkage or oxidation of organic material, or both, following drainage. Subsidence takes place gradually, usually over a period of several years. Table 13 shows the expected initial subsidence, which usually is a result of drainage, and total subsidence, which results from a combination of factors.

Not shown in the table is subsidence caused by an imposed surface load or by the withdrawal of ground water throughout an extensive area as a result of lowering the water table.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and the amount of sulfates in the saturation extract.

Engineering Index Test Data

Table 14 shows laboratory test data for several pedons sampled at carefully selected sites in the survey area. The pedons are typical of the series and are described in the section "Soil Series and Their Morphology." The soil samples were tested by the South Carolina Department of Highways and Public Transportation.

The testing methods generally are those of the American Association of State Highway and Transportation Officials (AASHTO) or the American Society for Testing and Materials (ASTM).

The tests and methods are AASHTO classification—M 145 (AASHTO), D 3282 (ASTM); Unified classification—D 2487 (ASTM); Mechanical analysis—T 88 (AASHTO), D 2217 (ASTM); Liquid limit—T 89 (AASHTO), D 423 (ASTM); and Plasticity index—T 90 (AASHTO), D 424 (ASTM).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(9)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 15 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Entisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquent (*Aqu*, meaning water, plus *ent*, from Entisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Fluvaquents (*Fluv*, meaning flood plain, plus *aquent*, the suborder of the Entisols that has an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Fluvaquents.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine, mixed, acid, thermic Typic Fluvaquents.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. There can be some variation in the texture of the surface layer or of the substratum within a series. An example is the Chastain series on the Savannah River flood plain.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the *Soil Survey Manual (8)*. Many of the technical terms used in the descriptions are defined in *Soil Taxonomy (9)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Ailey Series

The Ailey series consists of well drained, slowly permeable soils that formed in thick beds of unconsolidated sandy and clayey material in the Sand Hills. These soils are on long, narrow ridgetops and short, complex hill slopes. Slopes range from 2 to 15 percent. Ailey soils are classified as loamy, siliceous, thermic Arenic Hapludults.

Ailey soils are on the same general landscape as Vaucluse, Fuquay, and Dothan soils. Vaucluse and Dothan soils are not in an arenic subgroup. Fuquay and Dothan soils have more than 5 percent nodules of plinthite in the lower part of the subsoil. They are on smooth or simple slopes.

Typical pedon of Ailey sand, 2 to 6 percent slopes, wet substratum; from Aiken Gate House, southwest 1.7 miles on road 2, southeast 4.7 miles on road F, southwest 2.7 miles on road 4, southeast 5.3 miles on road C, east 1.3 miles on road B, south 0.4 mile on road 9, south along powerline access 0.9 mile, and east 550 feet into loblolly pine stand:

Ap—0 to 6 inches, 0 to 15 centimeters; brown (10YR 5/3) sand; moderate medium granular structure; very friable; many fine and medium roots; strongly acid; clear wavy boundary.

E—6 to 26 inches, 15 to 66 centimeters; light yellowish brown (10YR 6/4) sand; single grained; loose; few fine roots; strongly acid; gradual wavy boundary.

Bt1—26 to 36 inches, 66 to 92 centimeters; yellowish brown (10YR 5/6) sandy clay loam; moderate medium subangular blocky structure; friable; common distinct clay films on faces of peds; few fine roots; strongly acid; clear wavy boundary.

Bt2—36 to 40 inches, 92 to 102 centimeters; yellowish brown (10YR 5/6) sandy clay loam; common medium prominent strong brown (7.5YR 5/6) and red (2.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; common distinct clay films on faces of peds; few fine roots; 3 percent nodules of plinthite; strongly acid; clear smooth boundary.

Btx—40 to 55 inches, 102 to 140 centimeters; coarsely mottled yellowish brown (10YR 5/8), strong brown (7.5YR 5/6), and red (2.5YR 4/8) sandy clay loam; common medium prominent very pale brown (10YR 7/3) and yellow (10YR 7/6) mottles; weak coarse subangular blocky and weak thick platy structure; firm when moist, hard and brittle in red part of horizon when dry; few fine roots on faces of plates in the upper 5 inches; common distinct clay films on the horizontal faces of peds; common fine pores; strongly acid; gradual wavy boundary.

C—55 to 65 inches, 140 to 165 centimeters; coarsely mottled red (2.5YR 5/6), strong brown (7.5YR 5/6), and light gray (10YR 7/2) sandy loam; massive; hard and firm in place; very hard when dry, firm when moist; brittle in red part of horizon when moist; few fine tubular pores in red part; strongly acid.

The thickness of the solum ranges from 50 to more than 60 inches. The soils are strongly acid or very strongly acid throughout. A compact and brittle layer is within a depth of 35 to 45 inches.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. Ironstone pebbles make up 0 to 5 percent of the horizon.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 3 or 4. It is sand or loamy sand.

The Bt horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 to 8 and has mottles in shades of red, yellow, or brown. It is sandy loam or sandy clay loam.

The Btx horizon has colors similar to those of the Bt horizon or is mottled in shades of yellow, brown, and red. Most pedons have gray or very pale brown mottles in some part of the horizon. This horizon is sandy clay loam or sandy loam. When dry and in place, it is hard and compact in part of the mass.

The C horizon has hue of 2.5YR to 10YR, value of 4 to 6, and chroma of 4 to 8 or is coarsely mottled in shades of brown, yellow, gray, or red. In pedons that have gray mottles, the gray part has a higher content of clay than the red, brittle part. This horizon is sandy clay loam, sandy loam, or coarse sandy loam.

Albany Series

The Albany series consists of somewhat poorly drained, moderately rapidly permeable soils that formed in thick beds of unconsolidated sandy and loamy sediment of the upper Coastal Plain. These soils are on low toe slopes and in nearly level sandy areas that are transitional to more poorly drained soils. Slopes range from 0 to 6 percent. Albany soils are classified as loamy, siliceous, thermic Grossarenic Paleudults.

Albany soils are on the same general landscape as Eunola and Ocilla soils. Eunola soils have an argillic horizon less than 20 inches below the surface. Ocilla soils are in an aquic arenic subgroup.

Typical pedon of Albany loamy sand, 0 to 6 percent slopes; from Aiken Gate House, south 1.7 miles on road

2. southwest 4.7 miles on road F, south 2.7 miles on road 4, southeast 0.4 mile on road C, southwest 2.8 miles on road 5, southwest 2.7 miles on road 6, southeast 5.4 miles on road 125, south and southwest at Steel Creek 2.3 miles on road A-17.2, northwest 800 feet on road A-17, southwest 0.6 mile along forest trail, and northwest 600 feet through forest to site at edge of hardwood stand:

A—0 to 10 inches, 0 to 26 centimeters; dark grayish brown (10YR 4/2) loamy sand; moderate medium granular structure; very friable; many fine, medium, and coarse roots; strongly acid; clear smooth boundary.

E1—10 to 27 inches, 26 to 69 centimeters; dark yellowish brown (10YR 4/4) sand; common medium distinct very pale brown (10YR 7/3) mottles; single grained; loose; common fine and medium roots; strongly acid; gradual wavy boundary.

E2—27 to 32 inches, 69 to 81 centimeters; yellowish brown (10YR 5/4) sand; few medium prominent light gray (10YR 7/2) mottles; single grained; loose; few medium roots; strongly acid; gradual wavy boundary.

E3—32 to 56 inches, 81 to 142 centimeters; mottled light gray (10YR 7/2) and brownish yellow (10YR 6/6) sand; single grained; loose; strongly acid; diffuse wavy boundary.

E4—56 to 78 inches, 142 to 198 centimeters; light gray (2.5Y 7/2) sand; few medium prominent yellowish brown (10YR 5/4) mottles; single grained; loose; few fine flakes of mica; strongly acid; gradual irregular boundary.

Bt—78 to 82 inches, 198 to 208 centimeters; strong brown (7.5YR 5/8) sandy loam; common medium prominent pinkish gray (7.5YR 7/2) mottles; weak medium subangular blocky structure; friable; sand grains coated and bridged with clay; strongly acid.

The solum is more than 80 inches thick. The soils are moderately acid to very strongly acid throughout.

The A horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. The E horizon has hue of 10YR or 2.5Y, value of 5 to 8, and chroma of 1 to 8. It is mottled in shades of gray, yellow, and brown. It is sand, loamy sand, or loamy fine sand.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 1 to 8, or it is neutral in hue and has value of 4 to 6. It has mottles in shades of white, gray, or yellow. The lower part of this horizon does not have a matrix color in some pedons. It is mottled in shades of brown, red, yellow, or gray or is gleyed.

Blanton Series

The Blanton series consists of somewhat excessively drained, moderately permeable soils that formed in sandy and loamy sediments of the Coastal Plain and Sand Hills. These soils are on low ridges and side slopes and in broad swales adjacent to the lower side slopes. Slopes range from 0 to 10 percent. These soils are classified as loamy, siliceous, thermic Grossarenic Paleudults.

Blanton soils are on the same general landscape as Lakeland and Troup soils. Troup soils are redder and slightly higher on the landscape than the Blanton soils. Lakeland soils do not have an argillic horizon.

Typical pedon of Blanton sand, 0 to 6 percent slopes; from Aiken Gate House, north 0.8 mile on road 2, east 1.5 miles on U.S. Highway 278, north 0.2 mile on forest trail, and east about 200 feet into pine forest:

Ap—0 to 7 inches, 0 to 18 centimeters; dark grayish brown (10YR 4/2) sand; weak fine granular structure; very friable; many fine roots; very strongly acid; abrupt wavy boundary.

E1—7 to 29 inches, 18 to 74 centimeters; yellow (10YR 7/6) sand; single grained; loose; few medium roots; very strongly acid; clear smooth boundary.

E2—29 to 48 inches, 74 to 122 centimeters; very pale brown (10YR 7/4) sand; few pockets of clean sand; weak fine granular structure; very friable; few fine roots; very strongly acid; clear wavy boundary.

Bt1—48 to 61 inches; 122 to 155 centimeters; strong brown (7.5YR 5/6) sandy loam; moderate medium subangular blocky structure; friable; most sand grains coated with clay, some bridged with clay; few medium roots; few quartz pebbles; strongly acid; clear wavy boundary.

Bt2—61 to 70 inches, 155 to 178 centimeters; mottled light yellowish brown (10YR 6/4) and yellowish red (5YR 5/6) fine sandy loam; weak coarse subangular blocky structure; friable; sand grains coated and bridged with clay; few nodules of plinthite; brittle in yellowish red part; strongly acid; gradual wavy boundary.

Btv—70 to 80 inches, 178 to 203 centimeters; mottled yellowish brown (10YR 5/4), light gray (10YR 7/2), and reddish yellow (7.5YR 6/6) fine sandy loam; weak coarse subangular blocky structure; firm; sand grains coated and gray peds bridged with clay; about 3 percent nodules of plinthite; strongly acid.

The thickness of the solum ranges from 60 to more than 80 inches. The soils are moderately acid to very

strongly acid in the A and E horizons and strongly acid or very strongly acid in the Bt horizon.

The A horizon has hue of 10YR, value of 3 to 6, and chroma of 1 to 3. The E horizon has hue of 7.5YR to 2.5Y, value of 5 to 8, and chroma of 3 to 8. It is sand or loamy sand.

The Bt horizon has hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 4 to 8 or is mottled in shades of brown, yellow, and red. The lower part of the horizon has mottles with chroma of 2 or less. This horizon is fine sandy loam, sandy loam, or sandy clay loam.

Chastain Series

The Chastain series consists of poorly drained, slowly permeable soils that formed in clayey sediment on flood plains of the larger streams, mostly near the Savannah River. The sediment is a mixture of marine and Piedmont soil material. Slopes generally are 0 to 1 percent. Chastain soils are classified as fine, mixed, acid, thermic Typic Fluvaquents.

The Chastain soils in this survey area are taxadjuncts because they have kaolinitic mineralogy, have slightly more clay in the control section than is defined as the range for the series, and are slightly more acid. These differences do not significantly alter the use and management of the soils.

Chastain soils are on the same general landscape as Tawcaw, Shellbluff, and Pickney soils. Tawcaw and Shellbluff soils are slightly higher on the landscape than the Chastain soils. Pickney soils are in landscape positions similar to those of the Chastain soils. They have a black, organic surface layer. Shellbluff soils do not have gray mottles within 30 inches of the surface. Tawcaw soils have dominant chroma of more than 2 in the upper 20 inches.

Typical pedon of Chastain clay, frequently flooded; southeast 0.5 mile from Jackson on South Carolina secondary road 5, southwest 2.3 miles on Cowden Plantation road, southeast curving to south about 4.8 miles, southwest about 0.4 mile on unimproved forest trail, and south 300 feet into bottom land hardwoods:

A—0 to 2 inches, 0 to 5 centimeters; dark grayish brown (10YR 4/2) clay; moderate medium granular structure; friable; many fine to coarse roots; extremely acid; abrupt smooth boundary.

Bg—2 to 45 inches, 5 to 114 centimeters; grayish brown (2.5Y 5/2) clay; few fine faint light gray mottles; weak medium subangular blocky structure; friable; many fine to coarse roots; extremely acid; gradual diffuse boundary.

Cg—45 to 60 inches, 114 to 152 centimeters; light gray (10YR 6/1) clay; massive; firm, slightly sticky and nonplastic; many fine to coarse roots; extremely acid.

The thickness of the solum ranges from 40 to more than 60 inches. The soils are strongly acid to extremely acid throughout.

The A horizon has hue of 7.5YR to 2.5Y, value dominantly of 4 to 6, and chroma of 1 to 4. Where this horizon is less than 6 inches thick, value ranges to 3.

The Bg horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2, or it is neutral in hue and has value of 4 to 6. It is silty clay loam, clay loam, silty clay, or clay. The content of silt is more than 25 percent.

The Cg horizon has colors similar to those of the Bg horizon and has the same textures. In many pedons this horizon has strata 2 to 3 inches thick of coarse sand to clay at a depth of more than 40 inches.

Dorovan Series

The Dorovan series consists of very poorly drained, moderately permeable soils that formed in organic material near streams of the Coastal Plain. These soils are on the flood plains of major streams and typically are near toe slopes. Slopes are 0 to 1 percent. Dorovan soils are classified as dysic, thermic Typic Medisaprists.

Dorovan soils are on the same general landscape as Pickney soils and Fluvaquents. Pickney soils have an umbric epipedon, and Fluvaquents are wet and sandy.

Typical pedon of Dorovan muck, frequently flooded; from Aiken Gate House, south 1.2 miles on road 2, east 2.3 miles on road 201, south 0.7 mile on road F-1, south and west 1.3 miles around wetland area, and 410 feet east into swamp:

Oa1—0 to 6 inches, 0 to 15 centimeters; black (N 2/0) muck; some moss, leaves, twigs, and roots; about 18 percent fiber unrubbed and about 5 percent rubbed; extremely acid; gradual wavy boundary.

Oa2—6 to 40 inches, 15 to 102 centimeters; black (10YR 2/1) muck; about 15 percent fiber unrubbed and less than 5 percent rubbed; fibers remaining after rubbing are partly decomposed roots 0.5 centimeter to 2.0 centimeters in diameter; massive; common roots and partly decomposed fragments of wood; extremely acid; diffuse wavy boundary.

Oa3—40 to 53 inches, 102 to 135 centimeters; black (10YR 2/1) muck; about 10 percent fiber unrubbed and about 2 percent rubbed; fibers remaining after

rubbing are partly decomposed roots 2 millimeters to 1 centimeter in diameter; massive; few roots and partly decomposed fragments of wood; extremely acid; diffuse wavy boundary.

2Cg—53 to 60 inches, 135 to 152 centimeters; black (10YR 2/1) sandy loam; massive; friable; 5 percent partly decayed fragments of wood; extremely acid.

The thickness of the organic material ranges from 51 to 65 inches. The soils are extremely acid in the organic horizon and strongly acid to extremely acid in the 2C horizon.

The upper part of the Oa horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2, or it is neutral in hue and has value of 2 or 3. The fiber content is about 18 percent before rubbing and about 5 percent after rubbing.

The lower part of the Oa horizon has colors similar to those of the upper part. It has 10 to 15 percent fibers before rubbing and less than 5 percent after rubbing. The content of organic material decreases with depth.

The 2Cg horizon has hue of 10YR or 2.5Y, value of 2 to 4, and chroma of 1 or 2, or it is neutral in hue and has value of 2 to 4. Texture ranges from sand to sandy loam. The content of partly decayed fragments of wood ranges from 3 to 10 percent.

Dothan Series

The Dothan series consists of well drained, moderately slowly permeable soils that formed in thick beds of unconsolidated sandy and loamy marine sediment. These soils are on broad ridgetops and fairly smooth side slopes of the Coastal Plain and are intermingled with other soils of the Sand Hills. Slopes range from 0 to 6 percent. Dothan soils are classified as fine-loamy, siliceous, thermic Plinthic Paleudults.

Dothan soils are on the same general landscape as Ailey, Fuquay, Orangeburg, and Wagram soils. Ailey soils are compact and brittle in parts of the subsoil. Ailey, Fuquay, and Wagram soils are in an arenic subgroup. Orangeburg soils have a yellowish red or red Bt horizon.

Typical pedon of Dothan sand, 2 to 6 percent slopes; from Aiken Gate House, southwest 1.6 miles on road 2, southeast 4.7 miles on road F, southwest 2.7 miles on road 4, southeast 2.6 miles on road C, north 0.2 mile along powerline, east 0.2 mile on forest trail, and south 275 feet into planted loblolly stand:

Ap—0 to 7 inches, 0 to 18 centimeters; brown (10YR 4/3) sand; weak fine granular structure; very friable; many fine roots, mostly in first inch; very strongly acid; clear wavy boundary.

Bt1—7 to 12 inches, 18 to 30 centimeters; yellowish brown (10YR 5/6) sandy loam; weak fine subangular blocky structure; very friable; few faint clay films on faces of peds; few fine roots; very strongly acid; gradual wavy boundary.

Bt2—12 to 26 inches, 30 to 66 centimeters; yellowish brown (10YR 5/6) sandy clay loam; few medium prominent red (2.5YR 4/6) mottles; moderate medium subangular blocky structure; friable; common distinct clay films on faces of peds; few very fine roots; few fine tubular pores; few pebbles of ironstone; very strongly acid; gradual wavy boundary.

Bt3—26 to 38 inches, 66 to 97 centimeters; yellowish brown (10YR 5/6) sandy clay loam; few medium prominent reddish brown (5YR 5/4) mottles; moderate medium subangular blocky structure; friable; common distinct clay films on faces of peds; few nodules of plinthite; few pebbles of ironstone; very strongly acid; clear wavy boundary.

Btv1—38 to 45 inches, 97 to 114 centimeters; strong brown (7.5YR 5/6) sandy clay loam; many medium prominent red (2.5YR 5/6), common medium prominent light yellowish brown (10YR 6/4), and few medium prominent light gray (10YR 7/2) mottles; moderate coarse subangular blocky structure; firm, brittle; few distinct clay films on faces of peds; few fine tubular pores; 8 percent nodules of plinthite; few nodules of ironstone; extremely acid; gradual wavy boundary.

Btv2—45 to 65 inches, 114 to 165 centimeters; coarsely mottled strong brown (7.5YR 5/6) and yellowish brown (10YR 5/6) sandy clay loam; many medium prominent reddish brown (5YR 5/3) and common medium prominent light gray (10YR 7/2) mottles; weak coarse subangular blocky structure; firm, brittle; few faint clay films on faces of peds; about 15 percent nodules of plinthite; few quartz pebbles 5 to 10 millimeters in diameter; extremely acid.

The thickness of the solum ranges from 60 to more than 70 inches. The soils are moderately acid to very strongly acid in the A and Bt horizons and range to extremely acid in the Btv horizon.

The A horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4. Some pedons have an E horizon, which has hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 3 or 4. This horizon is sand or loamy sand.

The Bt horizon has hue of 7.5YR or 10YR, value of 5

or 6, and chroma of 6 to 8. Mottles in shades of red, yellow, brown, or gray are in the lower part of the horizon. Gray mottles are at a depth of about 33 to 60 inches. The content of plinthite nodules ranges from 5 to 18 percent at a depth of 30 to 60 inches. The maximum content of plinthite is 35 to 45 inches below the surface. Dominantly, the Bt horizon is sandy clay loam. In some pedons this horizon is sandy clay at a depth of 30 to 60 inches, and in many pedons the upper part of the horizon is sandy loam.

Eunola Series

The Eunola series consists of moderately well drained, moderately permeable soils that formed in loamy marine deposits of the upper Coastal Plain. These soils are on stream terraces directly above the flood plain. Slopes are 0 to 2 percent. Eunola soils are classified as fine-loamy, siliceous, thermic Aquic Hapludults.

Eunola soils are on the same general landscape as Hornsville and Smithboro soils. Eunola soils are in slight depressions and on toe slopes adjacent to Norfolk and Wagram soils. Hornsville and Smithboro soils have a clayey Bt horizon. Norfolk and Wagram soils are higher on the landscape than the Eunola soils. They do not have gray mottles in the upper part of the subsoil. Also, Wagram soils are in an arenic subgroup.

Typical pedon of Eunola fine sandy loam, 0 to 2 percent slopes; from Aiken Gate House, north 0.8 mile to U.S. Highway 278, east 4.4 miles on U.S. Highway 278, northeast 0.4 mile on road 781-4, and northeast at 330 degrees, about 210 feet into woods:

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

Bt1—4 to 13 inches, 10 to 33 centimeters; yellowish brown (10YR 5/4) sandy loam; weak medium subangular blocky structure; very friable; sand grains coated and bridged with clay; common fine roots; strongly acid; gradual wavy boundary.

Bt2—13 to 25 inches, 33 to 64 centimeters; yellowish brown (10YR 5/6 and 5/4) sandy loam; common medium prominent light gray (10YR 7/2) and common medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; very friable; common faint clay films on faces of peds; few fine roots; strongly acid; gradual wavy boundary.

Bt3—25 to 42 inches, 64 to 106 centimeters; mottled strong brown (7.5YR 5/6) and yellowish brown (10YR 5/6) sandy loam; many coarse prominent light gray (10YR 7/2) and common medium distinct yellowish red (5YR 5/6) mottles; weak coarse subangular blocky structure; friable; common faint clay films on faces of peds; few fine roots; few ironstone concretions 1 to 3 centimeters in diameter; few plinthite nodules; strongly acid; gradual irregular boundary.

Cg—42 to 65 inches, 106 to 165 centimeters; white (10YR 8/2) sand; common coarse distinct light gray (10YR 7/1) clay loam pockets; discontinuous reddish yellow (7.5YR 6/6) strata; single grained; loose; most sand grains clean; common fine and medium roots in pockets of loamy material; very strongly acid.

The thickness of the solum ranges from 40 to 60 inches. The soils are strongly acid or very strongly acid throughout.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. The Bt horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 to 8. Mottles in shades of brown, gray, and red are in the lower part of this horizon. This horizon commonly is sandy loam, but the range includes sandy clay loam in some pedons. The C horizon has hue of 7.5YR to 2.5Y, value of 5 to 8, and chroma of 2. Mottles are in shades of gray and yellow. This horizon is mostly sand or loamy sand, but in some pedons the lower part has strata of contrasting textures.

Fluvaquents

The Fluvaquents consist of poorly drained, moderately permeable soils that formed along the flood plain of small streams and drainageways in sandy sediment of the Coastal Plain and Sand Hills. These soils are in long, narrow, low areas and are frequently flooded. Slopes generally are less than 1 percent.

Fluvaquents are associated on the landscape with Pickney, Ochlockonee, Ogeechee, and Williman soils. Pickney soils are Inceptisols. Ochlockonee soils do not have a matrix or mottles with chroma of 2 within 20 inches of the surface. Ogeechee soils have a loamy Bt horizon, and Williman soils are in an arenic subgroup.

Typical pedon of Fluvaquents, frequently flooded; from Aiken Gate House, south 1.7 miles on road 2, southeast 4.7 miles on road F, south 2.7 miles on road 4, southeast 2.1 miles on road C, west 1.1 miles on road 6, south 1,400 feet on forest trail along east side

of railroad, east 0.5 mile on forest trail, northeast 0.4 mile on forest trail crossing two drainageways, and southwest 150 feet from hill down into drainageway:

A—0 to 4 inches, 0 to 10 centimeters; dark grayish brown (10YR 4/2) loamy sand; weak fine granular structure; very friable; many fine, medium, and coarse roots; very strongly acid; clear wavy boundary.

Cg1—4 to 10 inches, 10 to 26 centimeters; light gray (10YR 7/2) sand; strata of light yellowish brown (10YR 6/4) loamy sand; single grained; loose; few fine roots; very strongly acid; clear wavy boundary.

Cg2—10 to 30 inches, 26 to 76 centimeters; light gray (10YR 6/1) sand; single grained; loose; few medium roots; few strata of loamy sand; very strongly acid; clear wavy boundary.

Cg3—30 to 38 inches, 76 to 97 centimeters; light gray (10YR 7/2) sand; pockets of gray (10YR 5/1) loamy sand; single grained; loose; few rounded quartz pebbles; very strongly acid; clear wavy boundary.

Ab—38 to 45 inches, 97 to 114 centimeters; dark gray (10YR 4/1) sandy loam; massive; very friable; very strongly acid; clear wavy boundary.

2Cg—45 to 60 inches; 114 to 152 centimeters; light brownish gray (10YR 6/2) sand; strata of nearly white sand; single grained; loose; few rounded quartz pebbles; very strongly acid.

The soils are strongly acid to extremely acid throughout. The A horizon has hue of 10YR, value of 2 to 5, and chroma of 1 or 2. Where this horizon has value of less than 3.5, it is less than 6 inches thick. The Cg horizon has hue of 10YR to 5Y, value of 4 to 8, and chroma of 1 or 2, or it is neutral in hue and has value of 4 to 8. Most pedons are mottled in shades of gray or brown. This horizon is loamy sand or sand. Buried surface layers of dark gray or dark brown loam or sandy loam are in most pedons.

Fuquay Series

The Fuquay series consists of well drained, slowly permeable soils that formed in loamy marine sediment on the upper Coastal Plain and the Sand Hills. These soils are on broad ridges and side slopes. Slopes range from 0 to 10 percent. Fuquay soils are classified as loamy, siliceous, thermic Arenic Plinthic Paleudults.

Fuquay soils are on the same general landscape as Dothan, Lakeland, Orangeburg, and Troup soils. Dothan and Orangeburg soils are not in an arenic subgroup. Troup soils are in a grossarenic subgroup. Lakeland soils are Entisols.

Typical pedon of Fuquay sand, 0 to 2 percent slopes; from Aiken Gate House, southeast 0.7 mile on forest trail and northeast about 600 feet into planted pine forest:

Ap—0 to 8 inches, 0 to 20 centimeters; grayish brown (10YR 5/2) sand; single grained; loose; many fine roots; moderately acid; abrupt smooth boundary.

E—8 to 22 inches, 20 to 56 centimeters; yellowish brown (10YR 5/4) sand; single grained; loose; few fine and medium roots; few nodules of ironstone; strongly acid; clear wavy boundary.

Bt—22 to 35 inches, 56 to 89 centimeters; yellowish brown (10YR 5/6) sandy clay loam; common medium prominent yellowish red (5YR 5/6) and common medium distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; few faint clay films on faces of most peds; few fine roots; few fine and medium holes; few plinthite nodules in the lower part; moderately acid; gradual wavy boundary.

Btv1—35 to 45 inches, 89 to 114 centimeters; yellowish brown (10YR 5/6) sandy clay loam; common medium prominent yellowish red (5YR 5/6) and few fine distinct gray (10YR 6/1) mottles; weak coarse subangular blocky structure; friable, slightly hard when dry; common distinct clay films on faces of peds; few fine roots; about 10 percent nodules of plinthite; strongly acid; gradual wavy boundary.

Btv2—45 to 60 inches, 114 to 152 centimeters; mottled red (2.5YR 5/6), strong brown (7.5YR 5/6), and light gray (10YR 7/2) sandy clay loam; weak coarse subangular blocky structure; firm; common distinct clay films between horizontal fracture planes and on faces of light gray peds; about 12 percent plinthite; brittle in about 15 percent of red and strong brown peds; strongly acid.

The solum is more than 60 inches thick. The soils are moderately acid to very strongly acid throughout. Depth to horizons that have 5 to 20 percent plinthite ranges from 35 to 60 inches.

The A horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 or 3. The E horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 4 to 6. It is sand or loamy sand. The Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 4 to 6. Most pedons have mottles in shades of brown, red, and yellow. The Btv horizon is mottled in shades of red, brown, yellow, and gray or is reticulately mottled. The Bt horizon is dominantly sandy clay loam, but the range includes sandy loam.

Hornsville Series

The Hornsville series consists of moderately well drained, moderately slowly permeable soils that formed in marine and river deposits on the Coastal Plains. These soils are on broad flats on uplands and low, nearly level ridges on stream terraces and are adjacent to well drained upland soils. Slopes are 0 to 2 percent. Hornsville soils are classified as clayey, kaolinitic, thermic Aquic Hapludults.

The Hornsville soils in this survey area are taxadjuncts because they have more silt in the control section and are slightly more acid than is defined as the range for the series. The differences do not significantly alter the use and management of the soils.

Hornsville soils are on the same general landscape as Rembert, Smithboro, and Wagram soils. Rembert and Smithboro soils are in the slightly lower positions on the landscape, and Wagram soils are in the slightly higher positions. Wagram soils are in an arenic subgroup. Rembert soils are Aquults.

Typical pedon of Hornsville fine sandy loam, 0 to 2 percent slopes; from Jackson, southeast 0.5 mile on South Carolina secondary road 5, southwest 2.3 miles on Cowden Plantation road, southeast curving to south 3.5 miles on improved woodland road, southwest about 0.3 mile on forest road, north 150 feet on unimproved forest trail, and west about 75 feet on trail in stand of loblolly pine:

Ap—0 to 5 inches; 0 to 13 centimeters; brown (10YR 4/3) fine sandy loam; weak medium granular structure; very friable; common fine and medium roots; very strongly acid; clear smooth boundary.

BE—5 to 7 inches; 13 to 18 centimeters; very pale brown (10YR 7/4) loam; weak fine subangular blocky structure; very friable; few fine and medium roots; extremely acid; clear wavy boundary.

Bt1—7 to 20 inches; 18 to 51 centimeters; light yellowish brown (2.5Y 6/4) clay; few medium prominent red (2.5YR 5/8) mottles; strong coarse subangular blocky structure; firm; many distinct clay films on faces of peds; few fine and medium roots; extremely acid; gradual wavy boundary.

Bt2—20 to 28 inches; 51 to 71 centimeters; light yellowish brown (2.5Y 6/4) clay; many coarse prominent red (2.5YR 5/8) and common coarse distinct gray (10YR 6/1) mottles; moderate coarse subangular blocky structure; firm; many distinct clay films on faces of peds; few fine roots; extremely acid; gradual wavy boundary.

Bt3—28 to 39 inches; 71 to 99 centimeters; mottled gray (10YR 6/1), red (2.5YR 4/8), and brownish yellow (10YR 6/6) clay; moderate coarse subangular blocky structure; firm; many distinct clay films on faces of peds; extremely acid; clear wavy boundary.

Btg—39 to 65 inches; 99 to 165 centimeters; light gray (10YR 6/1) clay; common medium prominent red (2.5YR 4/8) and few medium distinct brownish yellow (10YR 6/6) mottles; moderate coarse prismatic structure parting to strong coarse angular blocky; firm; common faint clay films on faces of peds; few fine roots; extremely acid.

The thickness of the solum ranges from 60 to more than 75 inches. The soils are moderately acid to extremely acid throughout.

The A horizon has hue of 10YR to 2.5Y, value of 3 or 4, and chroma of 2 to 4. The Bt horizon has hue of 2.5Y to 7.5YR, value of 5 or 6, and chroma of 4 to 8 or is mottled in shades of gray, red, brown, and yellow in the lower part. Mottles that have chroma of 2 or less are within 24 inches of the upper boundary of this horizon and increase in size and number with depth. The Btg horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. Red and brownish yellow mottles are at a depth of about 40 to 60 inches. Flakes of mica are in some pedons.

Kinston Series

The Kinston series consists of poorly drained, moderately permeable soils that formed in stream sediment on the Sand Hills, Coastal Plain, and Piedmont. These soils are on low flood plains, mainly around the mouth of Four Mile Creek, Steel Creek, and Pen Branch. Slopes are 0 to 1 percent. Kinston soils are classified as fine-loamy, siliceous, thermic Typic Fluvaquents.

Kinston soils are on the same general landscape as Chastain and Tawcaw soils. Chastain and Tawcaw soils have a fine textured particle-size class. Tawcaw soils are slightly higher on the landscape than the Kinston soils.

Typical pedon of Kinston loam, frequently flooded; from Aiken Gate House, south 8.9 miles on road 2, southeast 5.1 miles on road 125, southwest 2.2 miles on road A-13; at curve in road (A-13.2) continue southwest 1.6 miles parallel to Four Mile Creek, southwest 0.2 mile on forest trail, north 250 feet to center of flood plain, southwest 2,000 feet along center of flood plain, and northwest 200 feet from channel of stream:

A1—0 to 4 inches, 0 to 10 centimeters; dark grayish brown (10YR 4/2) loam; weak fine granular structure; very friable; many very fine roots; strata of strong brown (7.5YR 5/6) sand 1 inch thick at lower boundary; strongly acid; clear wavy boundary.

A/C—4 to 13 inches, 10 to 33 centimeters; dark gray (10YR 4/1) sandy loam; weak fine granular structure; very friable; medium and coarse white sand pockets in the lower 3 inches of horizon; strongly acid; gradual smooth boundary.

Cg1—13 to 30 inches, 33 to 76 centimeters; dark gray (10YR 4/1) loam; massive in place breaking to weak fine subangular blocky structure; very friable; few thin strata of very pale brown sand; strongly acid; gradual irregular boundary.

Cg2—30 to 40 inches, 76 to 102 centimeters; dark gray (10YR 4/1) silt loam; massive in place breaking to weak fine subangular blocky structure; very friable; common fine, medium, and coarse dead roots and twigs; few fine flakes of mica; strongly acid; diffuse irregular boundary.

Cg3—40 to 60 inches, 102 to 152 centimeters; grayish brown (10YR 5/2) sandy loam; strata of white sand; massive; very friable; many fine and medium and few coarse dead roots and twigs; strongly acid.

The thickness of the loamy sediment ranges from 30 to more than 50 inches. The soils are strongly acid or very strongly acid.

The A horizon has hue of 10YR to 2.5Y, value of 4 to 6, and chroma of 1 or 2, or it is neutral in hue and has chroma of 1 or 2. Some pedons have a light colored, sandy stratum between the A and the Cg1 horizons. This stratum is 2 to 5 inches thick.

The Cg horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2, or it is neutral in hue and has value of 4 to 6. It is loam, silt loam, clay loam, sandy loam, or sandy clay loam. The lower part of the Cg horizon has strata of gravel, sand, and clayey material. Varying amounts of organic matter are in the clayey material.

Lakeland Series

The Lakeland series consists of excessively drained, rapidly permeable soils that formed in sandy marine sediment on the Coastal Plain and in areas intermingled with the Sand Hills. These soils are on broad ridges and side slopes. Slopes range from 0 to 10 percent. Lakeland soils are classified as thermic, coated Typic Quartzipsamments.

Lakeland soils are on the same general landscape as Blanton, Troup, Fuquay, Wagram, and Lucy soils. The associated soils have a Bt horizon.

Typical pedon of Lakeland sand, 0 to 6 percent slopes; from Aiken Gate House, north 0.8 mile on South Carolina Highway 19, east 0.7 mile on U.S. Highway 278, north 500 feet on forest trail, east 300 feet on forest trail, north 0.75 mile on forest trail, and southeast about 170 feet into field of planted pines:

Ap—0 to 3 inches, 0 to 8 centimeters; yellowish brown (10YR 5/4) sand; single grained; loose; few fine and medium roots; very strongly acid; abrupt wavy boundary.

C1—3 to 50 inches, 8 to 127 centimeters; very pale brown (10YR 7/4) sand; single grained; loose; few fine and medium roots; most sand grains coated; strongly acid; gradual wavy boundary.

C2—50 to 60 inches, 127 to 152 centimeters; light yellowish brown (10YR 6/4) sand; single grained; loose; about 15 percent clean sand grains; strongly acid; gradual wavy boundary.

C3—60 to 80 inches, 152 to 203 centimeters; very pale brown (10YR 7/4) sand; single grained; loose; about 20 percent clean sand grains; few coarse sand grains and small pebbles; moderately acid.

The thickness of the sandy layers is more than 80 inches. The soils are moderately acid to very strongly acid throughout.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 1 to 4. The C horizon has hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 4 to 8. Mottles or pockets of brownish yellow, reddish yellow, very pale brown, or light gray are in the lower part of this horizon in some pedons.

Lucy Series

The Lucy series consists of well drained, moderately permeable soils that formed in beds of marine sediment on relatively high ridgetops and on side slopes in the Sand Hills and the upper Coastal Plain. Slopes range from 0 to 40 percent. Lucy soils are classified as loamy, siliceous, thermic Arenic Paleudults.

Lucy soils are on the same general landscape as Ailey, Dothan, Fuquay, Norfolk, Orangeburg, Troup, and Wagram soils. Ailey soils have hard, brittle, slightly cemented layers in the subsoil. Dothan and Fuquay soils have more than 5 percent nodules of plinthite in the subsoil. Norfolk and Orangeburg soils are not in an arenic subgroup. Wagram soils have a yellowish brown subsoil. Troup soils are in a grossarenic subgroup.

Typical pedon of Lucy sand, 0 to 2 percent slopes; about 2.2 miles south of Savannah River Forest Service Headquarters, south 1.0 mile on road 2, east 1.9 miles on road F, southeast 0.3 mile along powerline trail, and east about 165 feet to approximate center of powerline clearing:

Ap—0 to 7 inches, 0 to 18 centimeters; brown (10YR 4/3) sand; weak fine granular structure; very friable; many fine roots; very strongly acid; abrupt smooth boundary.

E—7 to 25 inches, 18 to 64 centimeters; yellowish red (5YR 5/6) loamy sand; weak fine granular structure; very friable; common fine roots; very strongly acid; clear wavy boundary.

Bt1—25 to 30 inches, 64 to 76 centimeters; red (2.5YR 5/8) sandy loam; weak medium subangular blocky structure; very friable; sand grains coated and bridged with clay; few fine roots; very strongly acid; clear wavy boundary.

Bt2—30 to 41 inches, 76 to 104 centimeters; red (2.5YR 4/6) sandy clay loam; weak coarse subangular blocky structure; friable; many faint clay films on faces of peds; few fine roots; very strongly acid; gradual wavy boundary.

Bt3—41 to 62 inches, 104 to 157 centimeters; red (2.5YR 4/8) sandy clay loam; few medium prominent strong brown (7.5YR 5/8) mottles; weak coarse subangular blocky structure; friable; common faint clay films on faces of peds; very strongly acid.

The thickness of the solum ranges from 60 to more than 80 inches. The soils are moderately acid to very strongly acid in the A and E horizons and strongly acid or very strongly acid in the Bt horizon.

The A horizon has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 2 or 3. The E horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 6 to 8. It is sand or loamy sand. The Bt horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 to 8. It is sandy loam or sandy clay loam. The content of plinthite nodules ranges from 0 to 3 percent.

Neeses Series

The Neeses series consists of well drained, slowly permeable soils that formed in thick beds of unconsolidated clayey and loamy sediment. These soils are on the intermingled Sand Hills and Coastal Plains. They are on long, narrow ridgetops and short, complex side slopes. Slopes range from 2 to 6 percent. Neeses soils are classified as clayey, kaolinitic, thermic Typic Hapludults.

The Neeses soils in this survey area are taxadjuncts because they have more clay in the particle-size control section than is defined as the range for the series. This difference does not significantly alter the use and management of the soils.

Neeses soils are on the same general landscape as Ailey and Vaucluse soils. Ailey soils are in an arenic subgroup and have hard, brittle layers in the subsoil. Vaucluse soils have a loamy Bt horizon.

Typical pedon of Neeses loamy sand, 2 to 6 percent slopes; from Aiken Gate House, south 1.7 miles on road 2, southeast 4.7 miles on road F, south about 2.7 miles on road 4, southeast 0.4 mile on road C, southwest about 2.5 miles on road 5, west about 1.5 miles on Turner Road, and north 50 feet into pines:

A—0 to 6 inches, 0 to 15 centimeters; dark grayish brown (10YR 4/2) loamy sand; moderate medium granular structure; very friable; many fine and medium roots; few rounded quartz pebbles 0.25 to 1.0 inch in diameter; very strongly acid; abrupt smooth boundary.

BE—6 to 10 inches, 15 to 25 centimeters; reddish brown (5YR 4/4) fine sandy loam; moderate medium granular structure; very friable; few medium roots; few rounded quartz pebbles 0.25 to 1.0 inch in diameter; very strongly acid; clear smooth boundary.

Bt1—10 to 21 inches, 25 to 53 centimeters; yellowish red (5YR 5/6) clay; few medium distinct reddish yellow (7.5YR 6/6) mottles; moderate medium subangular blocky structure; friable; few medium roots; few rounded quartz pebbles 0.5 to 1.0 inch in diameter; strongly acid; gradual wavy boundary.

Bt2—21 to 40 inches, 53 to 102 centimeters; yellowish red (5YR 5/6) clay; many medium prominent dusky red (10R 3/3) mottles; moderate medium subangular blocky structure; firm and dense; common distinct clay films on faces of peds; few medium roots; estimated 2 percent plinthite; very strongly acid; gradual wavy boundary.

Bt3—40 to 49 inches, 102 to 125 centimeters; mottled reddish yellow (7.5YR 6/6), weak red (10R 4/4), and light gray (10YR 7/2) clay; strong very coarse angular blocky and prismatic structure; very firm and dense; many prominent clay films on faces of peds; very strongly acid; abrupt wavy boundary.

2C—49 to 60 inches, 125 to 152 centimeters; weak red (10R 4/4) sandy clay loam; few coarse prominent strong brown (7.5YR 5/6) and few fine prominent very pale brown (10YR 7/3) mottles; massive; friable; some pockets of sandy loam and a few

round pockets of kaolin clay; very strongly acid.

The thickness of the solum ranges from 40 to 65 inches. The soils are strongly acid or very strongly acid throughout. A dense, firm layer is at a depth of 20 to 35 inches. The surface layer and subsoil have up to 5 percent gravel.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. Some pedons have an E horizon, which has hue of 10YR, value of 4 to 7, and chroma of 4 to 6. This horizon is sand or loamy sand.

The upper part of the Bt horizon has hue of 2.5YR to 7.5YR, value of 4 or 5, and chroma of 6 to 8. Most pedons have mottles in shades of red and brown. This part of the Bt horizon is sandy clay or clay. The lower part of this horizon has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 6 to 8 or is mottled in shades of red, brown, or yellow. Most pedons have mottles with chroma of 2. This part of the Bt horizon is sandy clay or clay. The red and brown parts of this horizon are dense and brittle. Some pedons have up to 5 percent platy ironstone.

The 2C horizon has hue of 10R to 5YR, value of 4 or 5, and chroma of 4 to 8. It has coarse mottles in shades of red, yellow, or brown. This horizon ranges from sandy loam to sandy clay loam. In most pedons, this horizon has 1 to 5 percent quartz gravel.

Norfolk Series

The Norfolk series consists of well drained, moderately permeable soils that formed in thick beds of unconsolidated loamy sediment. These soils are on broad ridgetops and smooth side slopes on uplands of the Coastal Plain. Slopes range from 0 to 6 percent. Norfolk soils are classified as fine-loamy, siliceous, thermic Typic Paleudults.

Norfolk soils are on the same general landscape as Ailey, Dothan, Fuquay, Orangeburg, and Wagram soils. Ailey soils have compact and brittle layers in the subsoil. Ailey, Fuquay, and Wagram soils are in an arenic subgroup. Orangeburg soils have a yellowish red or red Bt horizon.

Typical pedon of Norfolk loamy sand, 2 to 6 percent slopes; from Aiken Gate House, southwest about 1.8 miles on road 2, southwest about 0.2 mile on forest trail, and southeast at 170 degrees about 750 feet into pine forest:

Ap—0 to 7 inches, 0 to 18 centimeters; brown (10YR 5/3) loamy sand; weak fine granular structure; very friable; many fine and few medium roots; few medium quartz pebbles; very strongly acid; clear wavy boundary.

A—7 to 12 inches, 18 to 30 centimeters; yellowish brown (10YR 5/4) loamy sand; moderate medium granular structure; very friable; common fine roots; few medium quartz pebbles; very strongly acid; gradual wavy boundary.

Bt1—12 to 20 inches, 30 to 51 centimeters; yellowish brown (10YR 5/6) sandy loam; weak medium subangular blocky structure; very friable; few faint clay films on faces of peds; common fine and few medium roots; few medium quartz pebbles; extremely acid; gradual wavy boundary.

Bt2—20 to 40 inches, 51 to 102 centimeters; yellowish brown (10YR 5/6) sandy clay loam; few fine prominent yellowish red (5YR 5/6) mottles; weak coarse subangular blocky structure; friable; common faint clay films on faces of peds; few fine roots; few medium quartz pebbles; very strongly acid; gradual wavy boundary.

Bt3—40 to 58 inches, 102 to 147 centimeters; yellowish brown (10YR 5/8) sandy clay loam; common medium distinct yellowish red (5YR 5/6) mottles; weak coarse subangular blocky structure; friable; common faint clay films on faces of peds; few medium quartz pebbles; extremely acid; gradual wavy boundary.

Bt4—58 to 62 inches, 147 to 157 centimeters; strong brown (7.5YR 5/8) sandy clay loam; common medium faint brownish yellow (10YR 6/6) and few fine prominent yellowish red (5YR 5/6) and light brownish gray (10YR 6/2) mottles; weak coarse subangular blocky structure; friable; common faint clay films on faces of peds; about 4 percent plinthite; few medium and small pebbles; extremely acid.

The thickness of the solum ranges from 60 to more than 80 inches. The soils are moderately acid to extremely acid throughout.

The A horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4. Some pedons have an E horizon, which has hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 3 or 4. The Bt horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 6 to 8. Mottles in shades of red, yellow, or brown are in the lower part of this horizon. Gray mottles are at a depth of 48 to 60 inches. The content of plinthite nodules ranges from 0 to 4 percent at a depth of more than 50 inches.

Ochlockonee Series

The Ochlockonee series consists of well drained, moderately permeable soils that formed in mostly sandy sediment of the Coastal Plain. These soils are on flood plains and in low areas adjacent to small drainageways that do not have a well defined channel in most areas. They are subject to very brief, occasional flooding during periods of high rainfall. Slopes are less than 2 percent. Ochlockonee soils are classified as coarse-loamy, siliceous, acid, thermic Typic Udifluvents.

Ochlockonee soils are higher on the landscape than Fluvaquents and Pickney soils, which are along drainageways or the smaller streams. Fluvaquents have a gray subsoil. Pickney soils are Inceptisols.

Typical pedon of Ochlockonee loamy sand, occasionally flooded; from Aiken Gate House, west 3.3 miles on road 1, southeast 0.5 mile on forest trail, north about 0.2 mile on forest trail along east side of drainageway, and west 180 feet:

Ap—0 to 6 inches, 0 to 15 centimeters; brown (10YR 4/3) loamy sand; weak fine granular structure; very friable; few medium roots; strongly acid; clear wavy boundary.

C1—6 to 12 inches, 15 to 31 centimeters; brown (7.5YR 4/4) loamy sand; many coarse distinct reddish yellow (7.5YR 6/6) pockets of sand; weak fine granular structure; very friable; many fine and common medium roots; strongly acid; gradual wavy boundary.

C2—12 to 28 inches, 31 to 71 centimeters; brown (10YR 4/3) sandy loam; few medium prominent light yellowish brown (10YR 6/4) mottles; weak fine granular structure; very friable; few fine roots; strongly acid; clear wavy boundary.

C3—28 to 31 inches, 71 to 79 centimeters; brown (10YR 4/3) sandy loam; common coarse prominent light yellowish brown (10YR 6/4) mottles; moderate medium granular structure; friable; few fine roots; strongly acid; clear wavy boundary.

Ab—31 to 34 inches, 79 to 86 centimeters; very dark grayish brown (10YR 3/2) loam; few fine prominent strong brown (7.5YR 5/6) mottles; weak medium granular structure; very friable; few fine roots; few fine pores; strongly acid; abrupt wavy boundary.

Cb1—34 to 37 inches, 86 to 94 centimeters; brown (7.5YR 4/4) loam; many coarse prominent reddish brown (5YR 4/4) mottles; moderate medium granular structure; friable; common fine roots; common fine pores; few fine flakes of mica; strongly acid; clear wavy boundary.

Cb2—37 to 44 inches, 94 to 112 centimeters; reddish brown (5YR 4/4) loam; strata of brown (10YR 5/3) silt loam; moderate coarse granular structure; friable; common fine roots; many fine pores; strongly acid; clear wavy boundary.

Cb3—44 to 60 inches, 112 to 152 centimeters; brown (7.5YR 4/4) sandy loam; few medium distinct strata of reddish yellow (7.5YR 6/6) loamy sand; weak medium granular structure; very friable; strongly acid.

The thickness of the loamy horizons is more than 60 inches. The soils are strongly acid or very strongly acid throughout.

The A or Ap horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 to 4. The C horizon has hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 6. It is dominantly sandy loam or loam. Strata of loamy sand or silt loam are in most pedons. Most pedons have a buried A horizon that has hue of 5YR to 10YR, value of 3 to 5, and chroma of 1 or 2. A few flakes of mica are in some pedons.

Ocilla Series

The Ocilla series consists of somewhat poorly drained, moderately permeable soils that formed in marine and river deposits on the Coastal Plain. These soils are on low-lying upland flats and low stream terraces and toe slopes. Slopes are 0 to 2 percent. Ocilla soils are classified as loamy, siliceous, thermic Aquic Arenic Paleudults.

Ocilla soils are on the same general landscape as Albany and Rembert soils. They are lower on the landscape than Blanton or Fuquay soils. Rembert soils are slightly lower on the landscape than the Ocilla soils. They have horizons that have a gray matrix near the surface. Albany soils are in a grossarenic subgroup. Blanton and Fuquay soils are not in an aquic subgroup.

Typical pedon of Ocilla loamy sand, 0 to 2 percent slopes; from Aiken Gate House, south 1.7 miles on road 2, southeast 4.7 miles on road F, south about 2.7 miles on road 4, southeast 0.4 mile on road C, southwest about 2.8 miles on road 5, southwest about 2.7 miles on road 6, southeast about 4.2 miles on road 125, west about 0.4 mile along trail, southeast at large pine about 0.25 mile, and northeast 110 feet into woods from woodland trail:

A—0 to 8 inches, 0 to 20 centimeters; dark grayish brown (10YR 4/2) loamy sand; weak fine granular structure; very friable; common fine and medium

roots; very strongly acid; clear wavy boundary.

E—8 to 22 inches, 20 to 56 centimeters; pale brown (10YR 6/3) loamy sand; single grained; loose; few medium roots; very strongly acid; gradual wavy boundary.

Bt—22 to 28 inches, 56 to 71 centimeters; light yellowish brown (10YR 6/4) sandy clay loam; common medium prominent light gray (10YR 7/2) and many medium distinct brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; friable; few distinct clay films on faces of peds; few fine and medium roots; very strongly acid; gradual smooth boundary.

Btg1—28 to 40 inches, 71 to 102 centimeters; light gray (10YR 7/1) sandy clay loam; many coarse prominent brownish yellow (10YR 6/6) and common medium prominent reddish yellow (7.5YR 6/6) mottles; weak coarse subangular blocky structure; friable; common prominent clay films on faces of peds; few medium roots; very strongly acid; gradual smooth boundary.

Btg2—40 to 54 inches, 102 to 137 centimeters; gray (10YR 6/1) sandy clay loam; common medium prominent reddish yellow (5YR 6/6) and brownish yellow (10YR 6/6) mottles; weak coarse subangular blocky structure; friable; common prominent clay films on faces of peds; very strongly acid; gradual smooth boundary.

Btg3—54 to 60 inches, 137 to 152 centimeters; gray (10YR 6/1) sandy clay; common medium prominent red (2.5YR 5/6) and few medium distinct strong brown (7.5YR 5/6) mottles; weak coarse subangular blocky structure; friable; common prominent clay films on faces of peds; very strongly acid.

The solum is more than 60 inches thick. The soils are strongly acid or very strongly acid throughout.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2, or it is neutral in hue and has value of 3 to 5. Where the A horizon has value of less than 3.5, it is less than 6 inches thick.

The E horizon has hue of 10YR, value of 4 to 7, and chroma of 2 to 4; hue of 2.5Y, value of 5 to 8, and chroma of 2 to 4; or hue of 5Y, value of 6 or 7, and chroma of 3. It has mottles in shades of brown. This horizon is sand, fine sand, or loamy sand.

The Bt horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 3 to 8. Mottles in shades of gray, yellow, brown, or red are in most pedons. The number and size of gray mottles increase with depth. This horizon is sandy clay loam or sandy loam.

The Btg horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. Mottles are in shades of gray, brown, yellow, or red. This horizon generally is sandy clay loam, but sandy loam and sandy clay are in the lower part of the horizon in some pedons.

Ogeechee Series

The Ogeechee series consists of poorly drained, moderately permeable soils that formed from loamy marine deposits of the Coastal Plain. These soils are mainly in depressions. Slopes are 0 to 1 percent. Ogeechee soils are classified as fine-loamy, siliceous, thermic Typic Ochraquults.

Ogeechee soils are on the same general landscape as Rembert, Williman, Hornsville, and Smithboro soils and are lower on the landscape than Dothan or Fuquay soils. Hornsville, Smithboro, Dothan, and Fuquay soils have higher chroma near the surface than the Ogeechee soils. Also, they do not have a gray matrix directly below the surface horizon. Rembert soils have a clayey subsoil. Williman soils are in an arenic subgroup.

Typical pedon of Ogeechee sandy loam, ponded; from Aiken Gate House, south 1.6 miles on road 2, east 8.7 miles on road 2-1, southeast 1.6 miles from gate 14 to gate 15, west about 1.3 miles on road 8.8, west about 100 feet in depression, and south 100 feet off trail into woods:

A—0 to 6 inches, 0 to 15 centimeters; very dark grayish brown (10YR 3/2) and dark grayish brown (10YR 4/2) sandy loam; moderate medium granular structure; very friable; common fine roots; strongly acid; clear wavy boundary.

BE—6 to 12 inches, 15 to 31 centimeters; dark grayish brown (10YR 4/2) sandy loam; few fine faint brownish yellow (10YR 6/6) mottles; weak medium granular structure; very friable; sand grains bridged with clay in some pockets, clean sand grains in others; few fine roots; strongly acid; clear wavy boundary.

Btg1—12 to 23 inches, 31 to 59 centimeters; light brownish gray (10YR 6/2) sandy loam; weak fine subangular blocky structure; friable; few distinct clay films on faces of peds; few fine roots; strongly acid; gradual wavy boundary.

Btg2—23 to 32 inches, 59 to 81 centimeters; light gray (10YR 7/1) sandy clay loam; few medium prominent yellow (10YR 7/6) mottles; weak medium subangular blocky structure; friable; common distinct clay films on faces of peds; few fine roots; strongly acid; clear wavy boundary.

Btg3—32 to 42 inches, 81 to 107 centimeters; light gray

(10YR 7/1) sandy clay loam; moderate medium prominent red (2.5YR 5/6) mottles; weak coarse subangular blocky structure; firm, about 30 percent dense and brittle; many faint clay films on faces of peds; few fine roots; strongly acid; clear wavy boundary.

Btg4—42 to 60 inches, 107 to 150 centimeters; light gray (10YR 7/1) sandy clay loam; many coarse distinct very pale brown (10YR 7/4) and few medium prominent strong brown (7.5YR 5/6) mottles; weak coarse subangular blocky structure; friable, about 15 percent dense and brittle; few faint clay films on faces of some peds; strongly acid.

The thickness of the solum ranges from 50 to more than 60 inches. The soils are strongly acid or very strongly acid throughout.

The A horizon has hue of 10YR to 2.5Y, value of 2 to 4, and chroma of 1 or 2. Some pedons have an E horizon, which has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. It is sand or loamy sand.

The Btg horizon has hue of 10YR to 2.5Y, value of 4 to 7, and chroma of 1 or 2, or it is neutral in hue and has value of 4 to 7. Mottles in shades of yellow, red, and brown are in some pedons. This horizon is sandy loam, clay loam, or sandy clay loam. The content of clay drops by 20 percent within a depth of 60 inches.

Some pedons have a C horizon, which has colors similar to those of the Btg horizon. This horizon ranges from sandy loam to sand, but in most pedons it is loamy sand that has pockets and strata of loamy material.

Orangeburg Series

The Orangeburg series consists of well drained, moderately permeable soils that formed in loamy marine sediment on the Coastal Plain. These soils are on broad ridgetops; moderately long, smooth side slopes; and gently rolling breaks below gentle side slopes and nearly level ridgetops. Slopes range from 0 to 10 percent. Orangeburg soils are classified as fine-loamy, siliceous, thermic Typic Paleudults.

Orangeburg soils are on the same general landscape as Ailey, Dothan, Fuquay, Lucy, Norfolk, Vaucluse, and Wagram soils. Ailey, Fuquay, Lucy, and Wagram soils are in an arenic subgroup. Norfolk soils have a yellowish brown subsoil. Dothan and Fuquay soils have over 5 percent nodules of plinthite in the subsoil. Vaucluse and Ailey soils have brittle and cemented layers in the subsoil. They are on the complex slope breaks.

Typical pedon of Orangeburg loamy sand, 2 to 6 percent slopes; from Savannah River Forest Service Headquarters, south 1 mile on road 2, southeast about 2 miles on road F, about 300 feet west of road F and about 300 feet south of powerline in pine forest:

Ap—0 to 6 inches, 0 to 15 centimeters; dark yellowish brown (10YR 4/4) loamy sand; weak medium granular structure; very friable; common fine roots; very strongly acid; abrupt wavy boundary.

Bt1—6 to 10 inches, 15 to 25 centimeters; yellowish red (5YR 4/6) sandy loam; weak medium subangular blocky structure; very friable; few faint clay films on faces of peds; few fine, medium, and large roots; very strongly acid; gradual wavy boundary.

Bt2—10 to 17 inches, 25 to 43 centimeters; yellowish red (5YR 5/6) sandy loam; weak medium subangular blocky structure; friable; few faint clay films on faces of peds; common fine and few medium and large roots; very strongly acid; gradual wavy boundary.

Bt3—17 to 33 inches, 43 to 84 centimeters; yellowish red (5YR 4/6) sandy loam; weak medium and coarse subangular blocky structure; friable; common faint clay films on faces of peds; common fine and few medium roots; few fine holes; very strongly acid; diffuse smooth boundary.

Bt4—33 to 56 inches, 84 to 142 centimeters; red (2.5YR 4/8) sandy clay loam; weak coarse subangular blocky structure; friable; common faint clay films on faces of peds; few medium roots; few fine holes; very strongly acid; gradual wavy boundary.

Bt5—56 to 62 inches, 142 to 157 centimeters; red (2.5YR 4/8) sandy clay loam; few fine prominent strong brown (7.5YR 5/6) mottles; weak coarse subangular blocky structure; friable; common faint clay films on faces of peds; few small pebbles of quartz; very strongly acid.

The thickness of the solum ranges from 60 to more than 80 inches. The soils are strongly acid or very strongly acid throughout.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 to 4 or hue of 7.5YR, value of 4, and chroma of 2. Some pedons have an E horizon, which has hue of 10YR, value of 5 or 6, and chroma of 3 to 6. This horizon is dominantly loamy sand, but the range includes sand. The Bt horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 to 8. Few to common medium brown or very pale brown mottles are in the lower part of the horizon in some pedons. This horizon is dominantly sandy clay loam, but the range

includes textures of sandy clay to sandy loam.

Pickney Series

The Pickney series consists of very poorly drained, rapidly permeable soils that formed in stream sediment. These soils are on the flood plain along major streams, typically in areas where the stream has no well defined channel. Slopes are less than 1 percent. Pickney soils are classified as sandy, siliceous, thermic Cumulic Humaquepts.

Pickney soils are on the same general landscape as Dorovan soils and Fluvaquents. Dorovan soils have a histic epipedon. Fluvaquents are sandy and do not have an umbric epipedon.

Typical pedon of Pickney sand, frequently flooded; from Aiken Gate House, south 1.2 miles on road 2, east 3.2 miles on road 2-1, southwest 0.1 mile on forest trail, and southeast 145 feet into swamp:

A1—0 to 5 inches, 0 to 13 centimeters; black (N 2/0) sand; weak fine granular structure; very friable; many medium and coarse roots; extremely acid; gradual wavy boundary.

A2—5 to 35 inches, 13 to 89 centimeters; black (10YR 2/1) sand; weak fine granular structure; very friable; many fine, medium, and coarse roots, mostly living; few strata of sand 0.5 inch to 2 inches thick; extremely acid; gradual wavy boundary.

C1g—35 to 50 inches, 89 to 127 centimeters; dark grayish brown (10YR 4/2) sand; massive; very friable; common medium and coarse roots, about 60 percent living; sand flows into pit; extremely acid; diffuse irregular boundary.

C2g—50 to 60 inches, 127 to 152 centimeters; very dark gray (10YR 3/1) sand; single grained; loose; common medium and coarse roots, mostly living; extremely acid.

The soils are strongly acid to extremely acid throughout. Some pedons have a few inches of light-colored sandy overburden on the black surface layer.

The A horizon has hue of 5YR to 2.5Y, value of 2 or 3, and chroma of 1 or 2, or it is neutral in hue and has value of 2 or 3. The Cg horizon has hue of 10YR to 5Y, value of 3 to 7, and chroma of 1 or 2, or it is neutral in hue and has value of 3 to 7. It is sand or loamy sand.

Rembert Series

The Rembert series consists of poorly drained, slowly permeable soils that formed in clayey marine deposits. These soils are in depressions on uplands and along low stream terraces. Slopes are 0 to 1 percent. Rembert soils are classified as clayey, kaolinitic, thermic Typic Ochraquults.

Rembert soils are on the same general landscape as Hornsville, Ocilla, and Smithboro soils. Hornsville, Ocilla, and Smithboro soils are slightly higher on the landscape than the Rembert soils. Also, they have higher chroma near the surface. Dothan, Norfolk, and Wagram soils are much higher on the landscape than the Rembert soils. They have no gray colors. The associated soils do not have a gray matrix directly below the surface horizon.

Typical pedon of Rembert sandy loam; from Jackson, southeast 0.5 mile on South Carolina secondary road 5, southwest 2.3 miles on Cowden Plantation road, southeast curving to south about 3.5 miles, southwest about 0.8 mile, and north 310 feet into hardwood forest:

A—0 to 1 inch, 0 to 3 centimeters; very dark gray (10YR 3/1) sandy loam; moderate medium granular structure; very friable; many fine and medium roots; extremely acid; abrupt smooth boundary.

E1—1 to 6 inches, 3 to 15 centimeters; light brownish gray (10YR 6/2) sandy loam; many medium prominent strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; very friable; few fine roots; few fine tubular pores; extremely acid; clear smooth boundary.

E2—6 to 10 inches, 15 to 25 centimeters; light gray (10YR 7/1) sandy loam; many coarse faint light brownish gray (10YR 6/2) mottles; weak fine subangular blocky structure; very friable, slightly hard and brittle; few fine roots; extremely acid; clear smooth boundary.

Btg—10 to 29 inches, 25 to 74 centimeters; dark gray (10YR 4/1) clay; common coarse prominent yellowish brown (10YR 5/8) mottles; strong coarse prismatic structure parting to angular blocky; firm, hard; many distinct clay films on faces of peds; few fine roots; few fine tubular pores; extremely acid; gradual wavy boundary.

BCg1—29 to 45 inches, 74 to 114 centimeters; light brownish gray (10YR 6/2) sandy clay loam; common medium prominent strong brown (7.5YR 5/8) and few common prominent dark gray (10YR 4/1) mottles; weak coarse subangular blocky structure; friable in brown part of horizon, very firm in gray part; hard; few distinct clay films on faces of peds; few fine flakes of mica; extremely acid; gradual irregular boundary.

BCg2—45 to 63 inches, 114 to 160 centimeters; gray (10YR 6/1) sandy clay loam; common coarse

prominent strong brown (7.5YR 5/6), common medium faint gray (10YR 5/1), and few medium prominent yellowish red (5YR 4/8) mottles; weak coarse subangular blocky structure; firm; few faint clay films on faces of peds; few fine roots; few fine flakes of mica; extremely acid.

The solum is more than 60 inches thick. The soils are strongly acid to extremely acid throughout.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1 or 2, or it is neutral in hue and has value of 4 to 7. Where the value is less than 3.5, this horizon is less than 10 inches thick.

The E horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. It is sandy loam or loam. Some pedons do not have an E horizon.

The Btg horizon has hue of 10YR, value of 4 to 7, and chroma of 1 or 2, or it is neutral in hue and has value of 4 to 7. Mottles in shades of yellow, red, and brown are in most pedons. This horizon is clay, clay loam, or sandy clay.

The BCg horizon generally is gray sandy clay loam, but it has colors similar to those of the Btg horizon. The BCg horizon ranges from clay loam to sandy loam or is stratified with these textures.

Some pedons have a Cg horizon, which has the same color range as that of the Btg horizon. The Cg horizon ranges from sandy clay loam to loamy sand. Some pedons have pockets of coarser textured material.

Shellbluff Series

The Shellbluff series consists of well drained, moderately permeable soils that formed in loamy sediment on flood plains of the larger streams, mostly near the Savannah River. The sediment is a mixture of marine and Piedmont soil material. These soils are frequently flooded. Slopes are 0 to about 1 percent. Shellbluff soils are classified as fine-silty, mixed, thermic Fluventic Dystrochrepts.

Shellbluff soils are on the same general landscape as Chastain, Tawcaw, Kinston, and Pickney soils. The associated soils are slightly lower on the landscape than the Shellbluff soils. Tawcaw soils have gray mottles within a depth of 24 inches and have more clay in the particle-size control section than the Shellbluff soils. Chastain and Kinston soils have a gray matrix directly below the surface. Pickney soils have an umbric epipedon.

Typical pedon of Shellbluff loam, frequently flooded; from Jackson, southeast 0.5 mile on South Carolina secondary road 5, southwest 2.3 miles on Cowden Plantation road, southeast curving to south for about 4.8 miles on road A-1.1, southwest about 0.4 mile on unimproved woodland road, east about 1,500 feet to the Savannah River Plant and Cracker Neck property line, and southeast about 0.5 mile along property line:

A—0 to 8 inches, 0 to 20 centimeters; reddish brown (5YR 4/4) loam; weak medium subangular blocky structure; very friable; common fine roots; few coarse tubular pores; common fine flakes of mica; very strongly acid; clear wavy boundary.

Bw1—8 to 27 inches, 20 to 69 centimeters; yellowish red (5YR 4/6) clay loam; weak coarse subangular blocky structure; friable; few faint clay films on faces of some peds; few fine and medium roots; few coarse tubular pores; common fine flakes of mica; very strongly acid; diffuse wavy boundary.

Bw2—27 to 46 inches, 69 to 117 centimeters; brown (7.5YR 4/4) loam; many fine and medium prominent strong brown (7.5YR 5/6) pockets of silt loam; weak coarse subangular blocky structure; friable; few faint clay films on faces of some peds; few fine roots; few fine and coarse tubular pores; common fine flakes of mica; strata of silt loam and loam 2 to 10 millimeters thick; strongly acid; diffuse wavy boundary.

Bw3—46 to 72 inches, 117 to 183 centimeters; brown (7.5YR 4/4) silt loam; many fine distinct pinkish gray (7.5YR 7/2) mottles; weak coarse subangular blocky structure; friable; few faint clay films on faces of peds; few fine roots; common fine flakes of mica; strongly acid.

The solum is more than 40 inches thick. The soils are slightly acid to very strongly acid throughout. Few to common flakes of mica are in one or more horizons of most pedons.

The A horizon has hue of 5YR to 10YR, value of 3 to 5, and chroma of 2 to 8. Where value is 3, the horizon is less than 6 inches thick.

The Bw horizon has hue of 5YR to 10YR, value of 4 or 5, and chroma of 4 to 8. At a depth of 24 inches or more, mottles with chroma of 2 or less range from none to common. This horizon is silt loam, silty clay loam, clay loam, or loam. The content of silt combined with the content of very fine sand is more than 50 percent.

Some pedons have a C horizon, which has hue of 5YR to 10YR, value of 3 to 8, and chroma of 1 to 8. Mottles in shades of red, brown, yellow, and gray are in most pedons. The texture of this horizon is similar to

that of the Bw horizon or is stratified sandy loam, loamy sand, or sand.

Smithboro Series

The Smithboro series consists of somewhat poorly drained, slowly permeable soils that formed in marine and stream sediments on the Sand Hills, Coastal Plain, and Piedmont. These soils are on upland flats and in stream divides. Slopes are 0 to 2 percent. Smithboro soils are classified as clayey, kaolinitic, thermic Aeric Paleaquults.

Smithboro soils are on the same general landscape as Hornsville, Rembert, Ocilla, and Blanton soils. Rembert soils are slightly lower on the landscape than the Smithboro soils. They have an argillic horizon that has matrix chroma of 2 or less directly below the surface soil. Ocilla soils are in an aquic arenic subgroup. Blanton soils are in a grossarenic subgroup. Hornsville soils are slightly higher on the landscape than the Smithboro soils. They are Udults.

Typical pedon of Smithboro loam; from Jackson, southeast 0.5 mile on South Carolina secondary road 5, southwest 2.3 miles on Cowden Plantation road, southeast curving to south for about 3.5 miles on road 1-1.1, southwest about 0.8 mile on woodland road, north on unimproved forest trail about 1.0 mile, and about 40 feet west of forest trail in loblolly pines:

Ap—0 to 4 inches, 0 to 10 centimeters; dark gray (10YR 4/1) loam; moderate medium granular structure; very friable; common fine and medium roots; very strongly acid; clear smooth boundary.

Bt—4 to 11 inches, 10 to 28 centimeters; light yellowish brown (2.5Y 6/4) loam; common medium distinct gray (10YR 6/1) mottles; moderate medium subangular and angular blocky structure; firm; few faint clay films on faces of peds; extremely acid; clear wavy boundary.

Btg1—11 to 19 inches, 28 to 48 centimeters; gray (10YR 6/1) clay; common medium prominent brownish yellow (10YR 6/6) and few medium prominent red (2.5YR 4/6) mottles; strong medium subangular blocky structure; firm; many distinct clay films on faces of peds; few fine roots; few medium tubular pores; extremely acid; gradual wavy boundary.

Btg2—19 to 36 inches, 48 to 91 centimeters; gray (10YR 5/1) clay; many medium prominent strong brown (7.5YR 5/6) mottles; strong coarse angular blocky structure; firm, very hard; many prominent clay films on faces of peds; few fine roots; common fine and medium tubular pores; extremely acid; gradual wavy boundary.

Btg3—36 to 57 inches, 91 to 145 centimeters; gray (10YR 6/1) clay; many coarse prominent red (2.5YR 5/6) and common medium prominent reddish yellow (7.5YR 6/6) mottles; moderate coarse angular blocky structure; firm, very hard; many prominent clay films on faces of peds; few fine roots between faces of peds; common fine tubular pores; very strongly acid; gradual wavy boundary.

Btg4—57 to 72 inches, 145 to 183 centimeters; light gray (10YR 7/1) clay; few medium prominent red (2.5YR 4/6) and few medium prominent strong brown (7.5YR 5/6) mottles; moderate very coarse angular blocky structure; firm, hard; many distinct clay films on faces of peds; few fine roots between faces of peds; extremely acid.

The solum is more than 60 inches thick. The soils are strongly acid or very strongly acid in the surface layer and strongly acid to extremely acid in the subsoil.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2. The Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 to 6. It has few to many mottles with chroma of 2 or less. This horizon is loam or clay loam. The Btg horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. Mottles are in shades of brown, red, and yellow. This horizon is typically clay, but the range includes clay loam and silty clay. The content of silt is more than 30 percent. Few to many fine flakes of mica are in some pedons.

Tawcaw Series

The Tawcaw series consists of somewhat poorly drained, slowly permeable soils that formed in silty and clayey sediment. These soils are on flood plains along the larger streams, mostly near the Savannah River. The sediment is a mixture of marine and Piedmont soil material. These soils are frequently flooded. Slopes are 0 to 1 percent. Tawcaw soils are classified as fine, kaolinitic, thermic Fluvaquentic Dystrochrepts.

Tawcaw soils are on the same general landscape as Shellbluff, Kinston, and Pickney soils. Pickney and Kinston soils are slightly lower on the landscape than the Tawcaw soils, and Shellbluff soils are slightly higher. Shellbluff soils do not have gray mottles within 24 inches of the surface. Kinston soils have a gray B horizon. Pickney soils have an umbric epipedon.

Typical pedon of Tawcaw silty clay, frequently flooded; from Jackson, southeast 0.5 mile on South Carolina secondary road 5, southwest 2.3 miles on

Cowden Plantation road, southeast curving to south for about 4.8 miles on road A-1.1, southwest about 0.4 mile on unimproved woodland road, east about 1,500 feet to Savannah River Plant and Cracker Neck property line, and southeast about 1,700 feet along property line:

A—0 to 4 inches, 0 to 10 centimeters; dark yellowish brown (10YR 4/4) silty clay; few fine distinct dark brown (10YR 3/3) mottles; moderate medium subangular blocky structure; friable; common fine to coarse roots; very strongly acid; abrupt smooth boundary.

Bw1—4 to 12 inches, 10 to 30 centimeters; dark yellowish brown (10YR 4/4) silty clay; few fine distinct dark brown (10YR 3/3) mottles; moderate medium subangular blocky structure; friable; common fine and few medium roots; common coarse crayfish holes; very strongly acid; clear smooth boundary.

Bw2—12 to 21 inches, 30 to 53 centimeters; brown (10YR 5/3) silty clay; many medium distinct brown (10YR 4/3) and few medium prominent black (10YR 2/1) mottles; moderate coarse subangular blocky structure; friable; many distinct coatings on faces of peds; many fine and few medium roots; common coarse tubular pores; few fine flakes of mica; strongly acid; clear smooth boundary.

Bw3—21 to 38 inches, 53 to 97 centimeters; brown (10YR 4/3) silty clay loam; many coarse prominent gray (10YR 5/1) and few medium distinct brown (7.5YR 4/4) mottles; moderate medium subangular blocky structure; friable; few dark gray coatings on faces of peds; few fine roots; common coarse tubular pores; many fine flakes of mica; strongly acid; gradual smooth boundary.

BC—38 to 66 inches, 97 to 168 centimeters; coarsely mottled gray (10YR 5/1) and brown (10YR 5/3) loam; common medium faint dark brown (10YR 4/3) mottles; weak coarse subangular blocky structure; friable; few fine roots; few coarse tubular pores; many fine flakes of mica; moderately acid.

The thickness of the solum ranges from 40 to more than 60 inches. The soils are slightly acid to very strongly acid throughout. Few to many flakes of mica are in one or more horizons of most pedons.

The A horizon has hue of 7.5YR or 10YR, value of 4, and chroma of 2 to 4. This horizon is less than 10 inches thick where the value is less than 3.

The upper part of the Bw horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 3 to 6. Mottles are in shades of brown or yellow. The lower part of the Bw horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 to 3. Mottles with chroma of 2 or less are within 24 inches of the surface. The Bw horizon generally is silty clay, but it is silty clay loam, clay loam, or clay in some pedons.

The BC horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2 or is mottled in shades of gray, brown, or yellow. It generally is on silty clay loam, but it is loam or silty clay in some pedons. Most pedons are stratified with several textures in the BC or Cg horizons and have few to many fine flakes of mica. Some pedons do not have a BC horizon.

Toccoa Series

The Toccoa series consists of moderately well drained, moderately rapidly permeable soils that formed in sandy and loamy stream sediments. The sediment is mainly a mixture of sandy soil material from the Sand Hills and Coastal Plain. These soils are on flood plains, mostly near the Savannah River, in the higher positions on the landscape relative to other soils on the flood plain. They are frequently flooded. Slopes are 0 to 2 percent. Toccoa soils are classified as coarse-loamy, mixed, nonacid, thermic Typic Udifluvents.

Toccoa soils are on a landscape similar to that of Chastain, Shellbluff, and Tawcaw soils. Chastain and Tawcaw soils are slightly lower on the landscape than the Toccoa soils and are Inceptisols. Shellbluff soils have a fine-silty particle-size control section.

Typical pedon of Toccoa loam, frequently flooded; from Aiken Gate House, south 1.7 miles on road 2, southwest 4.7 miles on road F, south 2.7 miles on road 4, southeast 0.4 mile on road C, southwest 2.8 miles on road 5, southwest 2.7 miles on road 6, southeast 5.4 miles on road 125, west at Steel Creek 2.3 miles on road A-17.2, north 0.8 mile on road A-17, southwest 0.5 mile on forest trail, southeast 0.1 mile on forest trail along flood plain escarpment, and southwest at 230 degrees about 2,600 feet:

A—0 to 6 inches, 0 to 15 centimeters; brown (7.5YR 5/4) loam; weak medium granular structure; very friable; many fine and few medium and large roots; moderately acid; clear wavy boundary.

C1—6 to 12 inches, 15 to 31 centimeters; strong brown (7.5YR 5/6) fine sandy loam; moderate medium granular structure; very friable; many fine and few medium roots; many fine and medium flakes of mica; moderately acid; gradual wavy boundary.

C2—12 to 40 inches, 31 to 102 centimeters; reddish yellow (5YR 6/6) sandy loam; weak fine granular

structure; very friable; few medium roots; common fine flakes of mica; moderately acid; clear wavy boundary.

C3—40 to 50 inches, 102 to 127 centimeters; light reddish brown (5YR 6/4) loamy fine sand; single grained; loose; few medium roots; few fine flakes of mica; strongly acid; clear wavy boundary.

C4—50 to 65 inches, 127 to 165 centimeters; light brown (7.5YR 6/4) loamy fine sand; few medium roots; few faint pinkish gray (7.5YR 6/2) mottles; single grained; loose; few fine flakes of mica; few pockets of reddish yellow (7.5YR 6/6) fine sandy loam; strongly acid.

The soils are slightly acid to strongly acid throughout. Bedding planes and strata of contrasting textures are in most pedons.

The A horizon has hue of 5YR to 10YR, value of 4 or 5, and chroma of 3 or 4. The C horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 4 to 8. Most pedons have gray mottles in the lower part of this horizon. The C horizon is fine sandy loam or sandy loam in the upper part and loamy fine sand or sand in the lower part. It has few to many fine and medium flakes of mica. A few pedons have buried horizons that have color and texture similar to those of the A horizon but that have chroma of 2, indicating a slight increase in content of organic matter.

Troup Series

The Troup series consists of well drained, moderately permeable soils that formed in sandy and loamy sediment of the Coastal Plain and Sand Hills. These soils are on broad, high ridges and long, smooth side slopes. Slopes range from 0 to 40 percent. Troup soils are classified as loamy, siliceous, thermic Grossarenic Paleudults.

Troup soils are on the same general landscape as Blanton, Dothan, Fuquay, Lakeland, and Wagram soils. Dothan and Fuquay soils have more than 5 percent plinthite nodules. Fuquay and Wagram soils are in an arenic subgroup. Blanton soils have gray colors in the subsoil, and Lakeland soils are Entisols.

Typical pedon of Troup sand, 0 to 6 percent slopes; from Aiken Gate House, south 1.6 miles on road 2, southeast 4.7 miles on road F, southwest 2.7 miles on road 4, southeast 5.3 miles on road C, east 3.4 miles on road B, south 2.1 miles on road B-6, northeast 1.5 miles on woodland trail, southeast about 0.9 mile on woodland trail, and northeast about 100 feet in planted loblolly pine stand:

Ap—0 to 10 inches, 0 to 25 centimeters; brown (10YR 4/3) sand; single grained; loose; few fine roots; moderately acid; abrupt smooth boundary.

E1—10 to 30 inches, 25 to 76 centimeters; yellowish brown (10YR 5/4) sand; single grained; loose; few fine roots in the upper part; moderately acid; gradual wavy boundary.

E2—30 to 54 inches, 76 to 137 centimeters; light reddish brown (5YR 6/4) sand; single grained; loose; strongly acid; gradual wavy boundary.

Bt—54 to 81 inches, 137 to 206 centimeters; yellowish red (5YR 5/8) sandy clay loam; weak fine subangular blocky structure; friable; strongly acid.

The solum is more than 60 inches thick. The soils are moderately acid to very strongly acid in the A and E horizons and strongly acid or very strongly acid in the Bt horizon.

The A horizon has hue of 10YR, value of 4 to 6, and chroma of 2 to 4. The E horizon has hue of 5YR to 10YR, value of 5 to 8, and chroma of 4 to 8. It is sand or loamy sand. The Bt horizon has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8. In some pedons the lower part of this horizon has mottles in shades of brown, yellow, or red. The Bt horizon is dominantly sandy clay loam, but the range includes sandy loam.

Udorthents

Udorthents consist of mostly well drained soils that formed in heterogeneous materials, which are the spoil or refuse from excavations and major construction operations. The soil material has been removed, mixed, and moved. It occurs in such irregular patterns on the landscape that classification below the Great Group is not practical.

Udorthents are divided into two groups. One is firm material, which consists largely of borrow pits and areas that are compacted by traffic, and the other is friable layers of spoil material, often in the form of overburden. A few borrow pits are ponded after periods of heavy rainfall.

Slopes generally range from 0 to about 10 percent. The sides of pits may be vertical. In a few spoil piles, slopes are more than 10 percent and erosion is a severe hazard. Udorthents range from sandy to clayey, depending upon the source of material or geologic parent material.

Udorthents are most commonly associated with well drained to excessively drained upland soils. A few small, poorly drained areas that have spoil are also

included. Because of variability within short distances, a typical profile is not shown.

Vaucluse Series

The Vaucluse series consists of well drained, slowly permeable and moderately slowly permeable soils that formed in thick beds of unconsolidated sand and clay of the Sand Hills. These soils are on long, narrow ridgetops and short, complex side slopes. Slopes range from 2 to 15 percent. Vaucluse soils are classified as fine-loamy, siliceous, thermic Typic Hapludults.

Vaucluse soils are on the same general landscape as Ailey soils and are in positions on the landscape similar to those of the Fuquay and Dothan soils. Ailey soils are in an arenic subgroup. Dothan and Fuquay soils have more than 5 percent plinthite nodules.

Typical pedon of Vaucluse sandy loam, in an area of Vaucluse-Ailey complex, 10 to 15 percent slopes; from Aiken Gate House, southwest 1.6 miles on road 2, southeast 4.7 miles on road F, southwest 2.7 miles on road 4, southeast 5.3 miles on road C, east 1.3 miles on road B, south 4.1 miles on road 9, east 1.6 miles (gate 22) on Kirkland road, north 0.3 mile on forest trail, east 0.2 mile on forest trail, and northeast 75 feet into pine stand:

A—0 to 5 inches, 0 to 13 centimeters; brown (10YR 5/3) sandy loam; weak medium granular structure; very friable; many fine and few large roots; about 10 percent pebbles 10 to 50 millimeters in diameter; extremely acid; clear wavy boundary.

Bt1—5 to 10 inches, 13 to 25 centimeters; strong brown (7.5YR 5/8) sandy clay loam; few medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; few faint clay films on faces of peds; few fine and large roots; extremely acid; clear wavy boundary.

Bt2—10 to 17 inches, 25 to 43 centimeters; yellowish red (5YR 5/6) sandy clay loam; many coarse prominent brownish yellow (10YR 6/6) mottles; weak coarse subangular blocky structure; firm; brittle, dense, and slightly cemented in 30 percent of mass; few fine and medium roots along vertical and horizontal faces of peds; extremely acid; clear wavy boundary.

Bt3—17 to 20 inches, 43 to 51 centimeters; strong brown (7.5YR 5/6) clay; many medium distinct brownish yellow (10YR 6/6) and common medium prominent dark reddish gray (10R 4/1) pockets of kaolin; weak medium subangular blocky structure; firm; common distinct clay films on faces of peds; few fine roots; strongly acid; clear wavy boundary.

Btx—20 to 32 inches, 51 to 81 centimeters; red (2.5YR 4/6) sandy loam; many fine prominent very pale brown (10YR 8/3) and few medium distinct brownish yellow (10YR 6/6) mottles; weak very coarse subangular blocky structure; friable, dense in place; about 50 percent of red is brittle when dry; few distinct clay films on faces of peds; thick clay films along vertical faces of peds; extremely acid; gradual wavy boundary.

BCx—32 to 62 inches, 81 to 158 centimeters; reddish brown (5YR 5/4) sandy clay loam; many medium prominent light gray (5YR 6/1) mottles; weak coarse subangular blocky structure; friable; 90 percent of red is slightly compact and brittle when dry; extremely acid; gradual wavy boundary.

2C—62 to 72 inches, 158 to 183 centimeters; reddish yellow (5YR 6/8) sandy loam; massive; very friable; horizontal bedding strata; pockets or balls of kaolin clay; extremely acid.

The thickness of the solum ranges from 40 to more than 75 inches. The soils are strongly acid to extremely acid throughout. Most pedons have 2 to 10 percent quartz and ironstone pebbles in the surface layer and 0 to 10 percent in the subsurface layer and subsoil. A compact and brittle layer is within a depth of 17 to 35 inches.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. Some pedons have an E horizon, which has hue of 10YR, value of 4 to 7, and chroma of 4 to 6. It is sandy loam or loamy sand.

The Bt horizon has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8. Some pedons range to 10YR in hue. Mottles in shades of red, yellow, or brown range from few to many and fine to coarse. This horizon is dominantly sandy clay loam. Thin layers of sandy loam, sandy clay, or clay are in some pedons. The content of platy ironstone ranges from 0 to 10 percent, and the content of plinthite nodules ranges from 0 to 4 percent.

The Btx horizon has colors similar to those of the Bt horizon, or it is coarsely mottled in shades of red, yellow, and brown. It is sandy clay loam or sandy loam that generally has slightly less clay than is in the Bt horizon. From 40 to 50 percent of the red part of the horizon is dense and brittle when dry. Platy ironstone is in some pedons at the contact of the Btx horizon or below that point.

The BCx horizon has hue of 2.5YR to 10YR, value of 4 to 6, and chroma of 4 to 8. Mottles in shades of gray, brown, and yellow are in some pedons. From 40 to 90

percent of the red part of the horizon is slightly cemented and brittle. This horizon generally is sandy loam, but the range includes sandy clay loam. Vertical seams of gray or yellow kaolin clay ⅛ inch in diameter are common in many pedons.

The 2C horizon has colors similar to those of the BCx horizon. It generally is sandy loam, but the range includes loamy sand in some pedons. Common horizontal bedding planes and pockets of kaolin and sand are in some pedons. Some pedons do not have a 2C horizon.

Wagram Series

The Wagram series consists of well drained, moderately permeable soils that formed in beds of loamy marine sediment. These soils are on relatively broad ridgetops and side slopes of the Coastal Plain. Slopes range from 0 to 6 percent. Wagram soils are classified as loamy, siliceous, thermic Arenic Paleudults.

Wagram soils are on the same general landscape as Blanton, Dothan, Fuquay, Norfolk, Orangeburg, and Troup soils. Dothan and Fuquay soils have more than 5 percent plinthite nodules in the subsoil. Norfolk and Orangeburg soils are not in an arenic subgroup. Troup and Blanton soils are in a grossarenic subgroup.

Typical pedon of Wagram sand, 0 to 2 percent slopes; from Aiken Gate House, southwest 1.6 miles on road 2, southeast 4.7 miles on road F, southwest 2.7 miles on road 4, southeast 2.2 miles on road C, southwest 1.1 miles on road 6, south 0.8 mile along forest trail, east 0.2 mile along forest trail, and north 150 feet in loblolly pine stand:

Ap—0 to 9 inches, 0 to 23 centimeters; pale brown (10YR 6/3) sand; single grained; loose; common fine roots; very strongly acid; clear wavy boundary.

E—9 to 22 inches, 23 to 56 centimeters; pale yellow (2.5Y 7/4) sand; single grained; loose; few fine roots; very strongly acid; clear wavy boundary.

BE—22 to 27 inches, 56 to 69 centimeters; yellowish brown (10YR 5/4) fine sandy loam; moderate fine subangular blocky structure; very friable; clay bridges on most sand grains; few faint clay films on faces of peds; few fine roots; few pockets of clean sand grains; very strongly acid; clear wavy boundary.

Bt1—27 to 39 inches, 69 to 99 centimeters; brownish yellow (10YR 6/6) fine sandy loam; few fine distinct reddish yellow (7.5YR 6/6) mottles; moderate medium subangular blocky structure; friable; common faint clay films on faces of peds; few fine roots; few nodules of plinthite in the lower part; very strongly acid; gradual wavy boundary.

Bt2—39 to 61 inches, 99 to 155 centimeters; yellowish brown (10YR 5/6) fine sandy loam; few medium distinct yellowish red (5YR 5/6) and strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; common faint clay films on faces of peds; few medium roots; about 3 percent nodules of plinthite; very strongly acid.

The thickness of the solum ranges from 60 to more than 80 inches. The soils are moderately acid to very strongly acid throughout.

The A horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 4. The E horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 2 to 4. It is sand or loamy sand. The Bt horizon has hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 4 to 8. It is fine sandy loam, sandy loam, or sandy clay loam. The content of plinthite nodules ranges to 4 percent. Mottles of red, brown, or yellow are common in the lower part of this horizon. Mottles with chroma of 2 or less are in some pedons below a depth of 60 inches.

Williman Series

The Williman series consists of poorly drained, moderately permeable soils that formed in sandy and loamy marine sediment of the Coastal Plain. These soils are in low, broad, flat areas; in depressions on the uplands; and along some small drainageways. Slopes are less than 2 percent. Williman soils are classified as loamy, siliceous, thermic Arenic Ochraquults.

Williman soils are on the same general landscape as Ogeechee and Rembert soils. Ogeechee and Rembert soils are not in an arenic subgroup. Rembert soils have a clayey particle-size control section.

Typical pedon of Williman sand; from the Savannah River Ecology Lab, southwest 0.7 mile on road 1-A, south 3.5 miles on road D, west 2.3 miles on road 2, southeast 12.0 miles on road A just past Steel Creek, northeast almost 0.5 mile on forest trail, north 450 feet downslope of hill, northwest 160 feet along path, and about 100 feet south of Meyers Branch flood plain:

A—0 to 5 inches, 0 to 13 centimeters; very dark gray (10YR 3/1) sand; weak fine granular structure; very friable; many fine, medium, and coarse roots; strongly acid; clear wavy boundary.

E—5 to 24 inches, 13 to 61 centimeters; light gray (10YR 7/2) sand; single grained; loose; many fine

and medium roots; strongly acid; clear wavy boundary.

Btg1—24 to 35 inches, 61 to 89 centimeters; gray (10YR 6/1) sandy clay loam; common medium prominent strong brown (7.5YR 5/6) and common medium prominent reddish yellow (7.5YR 7/8) mottles; moderate medium subangular blocky structure; friable; many prominent clay films on faces of peds; strongly acid; gradual wavy boundary.

Btg2—35 to 55 inches, 89 to 140 centimeters; gray (10YR 6/1) sandy clay loam; common medium prominent strong brown (7.5YR 5/6) mottles; mottles decrease with depth; weak coarse subangular blocky structure; friable; common distinct clay films on faces of peds; strongly acid; gradual wavy boundary.

BCg—55 to 65 inches, 140 to 165 centimeters; gray (10YR 6/1) sandy loam; few fine prominent strong brown (7.5YR 5/6) mottles; massive; friable; common coarse tubular pores; common pockets of clean sand grains; strongly acid.

The thickness of the solum ranges from 40 to more than 60 inches. The soils are strongly acid to extremely acid. A high water table is at a depth of about 50 inches (127 centimeters).

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1, or it is neutral in hue and has value of 2 to 4. Where value is less than 3.5, this horizon is less than 10 inches thick.

The E horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 to 3. It is sand or loamy sand.

The Btg horizon is neutral in hue or has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2. It has mottles in shades of yellow, brown, or red in some pedons. This horizon generally is sandy clay loam but is sandy clay in some pedons.

The BCg horizon has colors and textures similar to those of the Btg horizon but also has strata of contrasting textures. Some pedons do not have a BCg horizon.

Some pedons have a Cg horizon, which has hue of 10YR or 2.5Y, value of 5 to 8, and chroma of 1 or 2 or is coarsely mottled in shades of red, brown, or yellow. This horizon ranges from coarse sand to loamy fine sand. In some pedons, the lower part of this horizon has strata of contrasting textures.

Formation of the Soils

This section describes the factors of soil formation and the processes of horizon differentiation.

Factors of Soil Formation

Soil forms through processes that act on accumulated or deposited geologic material. The five important factors of soil formation are parent material, climate, living organisms (plants and animals), relief, and time.

Climate and living organisms are the active forces of soil formation. Their effect on the parent material is modified by relief and by the length of time that the parent material has been in place. The relative importance of each factor differs from place to place. In some areas one dominant factor fixed most of the properties of the soil, but normally all five factors interact to determine what kind of soil forms at any given place.

Although soil formation is complex, some understanding of the soil-forming processes may be gained by considering each of the five factors separately. Each factor, however, is affected by each of the others.

Parent Material

Parent material is the unconsolidated mass in which a soil forms. It largely determines the mineral and chemical composition of the soil. The parent material of the soils in the survey area is alluvium that was deposited by the ocean, by streams, or successively by both.

The geology of the survey area consists mainly of three geologic formations near the surface. These are the Hawthorn, Barnwell, and McBeam Formations. The Hawthorn Formation generally is at the surface or is overlain by as much as 30 feet of stratified sandy and loamy alluvium. The McBeam Formation is dissected in places by Upper Three Runs Creek. A few artesian wells are in the McBeam Formation at an elevation of 70 to 150 feet above sea level.

The Congaree and Ellenton Formations are below the McBeam Formation, and the Tuscaloosa Formation is at a depth of 800 to 1,200 feet *(4)*. The Tuscaloosa Formation supplies a large volume of quality water to coastal residents.

Most of the material of the Sand Hills and Coastal Plain was deposited during the Tertiary period. The Barnwell and McBeam Formations are about 55 million years old. These formations typically have strata of sandy and loamy material that have many bedding planes. The material is quartz sand and gravel of varying size interbedded with strata of kaolin clay. The nutrients useful to plants were leached away as the soil particles were transported by moving water *(6)*.

On about 15 percent of acreage in the survey area, the soils are on flood plains and river terraces. In some areas, soil material has been moved by streams and the ocean. Alluvial material and some material of the Hawthorn and Barnwell Formations have been eroded, washed downstream, and deposited on the terraces and present flood plains along the major streams. The Savannah River has also deposited piedmont soil material on the adjacent flood plains and river terraces. The soils in these areas are younger than other soils in the survey area *(4)*. Some of the soils on flood plains are only a few hundred years old. The older soils on the flood plains and river terraces range in age from a few thousand years to about 5 million years *(5)*.

Climate

The survey area has a temperate climate. Rainfall is well distributed throughout the year. Temperature and precipitation are described in the section "Climate" under the heading "General Nature of the Survey Area." Climate, particularly precipitation and temperature, affects the physical, chemical, and biological relationships in the soil. Water dissolves minerals, aids chemical and biological activity, and transports the dissolved mineral and organic material through the soil profile. High annual rainfall promotes the leaching of soluble bases and the translocation of

the less soluble and colloidal material downward through the soil. A long frost-free season and heavy rainfall result in the downward movement of fine textured soil material and the loss of plant nutrients.

The amount of water that percolates through the soil depends on the amount of rainfall, the relative humidity, and the length of the frost-free season. Percolation, or the downward movement of water, is also affected by relief and by the permeability of the soil material. Weathering of the parent material takes place more rapidly if the percolation is interrupted by brief periods of shallow freezing. A high average temperature, therefore, speeds weathering. In addition, a high average temperature increases the number and kinds of living organisms in the soil and lengthens the season in which they are most active.

Living Organisms

The number and kinds of plants and animals that live in and on the soils are determined mainly by the climate and, to a lesser extent, by parent material, relief, and age of the soil. Bacteria, fungi, and other micro-organisms are indispensable in soil formation. They hasten the weathering of minerals and the decomposition of organic material. The larger plants alter the soil microclimate, furnish organic matter, and transfer chemical elements from the subsoil to the surface layer.

Most of the fungi, bacteria, and other micro-organisms in the soils of the survey area are in the upper few inches of the soil profile. Earthworms and other small invertebrates are active chiefly in the A horizon and the upper part of the B horizon, where they slowly but continuously mix the soil material. Bacteria and fungi decompose organic matter and release nutrients for plant use. Other animals play a secondary but important role in soil formation. By eating plants, they help to return plant material to the soil.

The native vegetation in the survey area is mainly loblolly pine, longleaf pine, oak, and hickory in the uplands and sweetgum, blackgum, yellow poplar, maple, tupelo, cypress, and water oak on bottom land. Large trees affect soil formation by bringing nutrients from deep within the soil to the upper layers, by bringing soil material from varying depths to the surface when a tree is blown over, and by providing large openings to be filled by soil material as large roots decay.

Relief

Relief, or lay of the land, influences soil formation because of its effect on moisture, temperature, and erosion. This influence, however, is modified somewhat by the influence of the other soil-forming factors.

Slopes in the survey area range from 0 to 40 percent. The upland soils have a thick, well developed profile. The most extensive soils in the survey area are gently sloping to strongly sloping and have not been greatly affected by relief. The soils on bottom land have slopes of 0 to 2 percent. These soils are young and show little evidence of profile development.

Time

Time is needed for the formation of soils. The length of time required for a soil to form depends largely on the intensity of other soil-forming factors. The soils in this survey area range from young or immature soils that show very little evidence of profile development to soils that have well defined horizons.

The soils on the smoother parts of the uplands generally have developed to maturity. The Dothan soils are mature soils. The soils on the first bottoms of streams are young because the material has not been in place long enough for soil horizons to form. The Toccoa soils are young soils.

Processes of Horizon Differentiation

When a vertical cut is made into a soil, several distinct layers, or horizons, become evident. Many soil-forming processes have produced this differentiation of horizons. Examples are the accumulation of organic matter, the leaching of soluble salts, the reduction and translocation of iron, the formation of soil structure, physical weathering through such processes as freezing and thawing, and chemical weathering of primary minerals of rocks. Some of these processes take place continuously in all soils; however, the number of active processes and the degree of their activity may vary from one soil to another.

Most soils have four major horizons—the A, E, B, and C horizons *(8)*. These horizons are sometimes subdivided by the use of subscripts and letters to indicate variations within a horizon. For example, the Bt horizon represents a layer within the B horizon that has translocated clay illuviated from the A horizon.

The A horizon is the surface layer. If the soils are cleared and plowed, the surface layer is called the Ap horizon. The A horizon normally is the layer that has the largest accumulation of organic matter and also the layer of maximum leaching or eluviation of clay and iron. If considerable leaching or eluviation has taken place, an E horizon forms directly below the surface layer. Generally, this E horizon is the lightest colored

horizon in the soil. Fuquay and Troup soils have a well expressed E horizon.

The B horizon is below the A horizon. In some soils, such as the Lakeland and Toccoa soils, the B horizon has not formed and the C horizon is directly below the A horizon. The material of the C horizon is little altered by the soil-forming processes; however, it can be modified by weathering.

Some soils, such as Vaucluse soils, have dense, brittle layers in part of the Btx horizon. This horizon has a very low content of organic matter. It tends to be cemented in the dense parts, which are hard or very hard when dry and slightly brittle when moist. This layer generally is mottled. It is slowly permeable or moderately slowly permeable and partly restricts plant roots.

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Glossary

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Available water capacity (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 moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bottom land. The normal flood plain of a stream, subject to flooding.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Coarse textured soil. Sand or loamy sand.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds 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; little affected by moistening.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:
Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.
Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.
Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.
Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.
Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.
Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.
Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.
Erosion (geologic)—Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as