United States
Department of
Agriculture

Soil
Conservation
Service

In cooperation with
University of Florida,
Institute of Food and
Agricultural Sciences,
Agricultural Experiment
Stations, and Soil
Science Department; and
Florida Department of
Agriculture and Consumer
Services

Soil Survey of Madison County, Florida

How To Use This Soil Survey

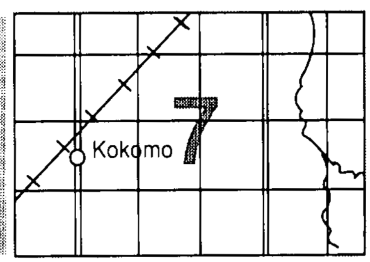
General Soil Map

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.

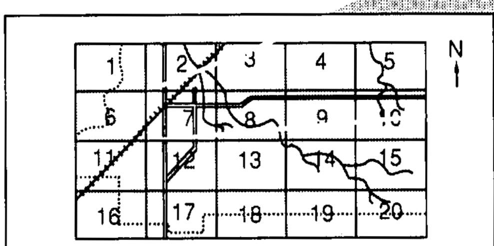
Detailed Soil Maps

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



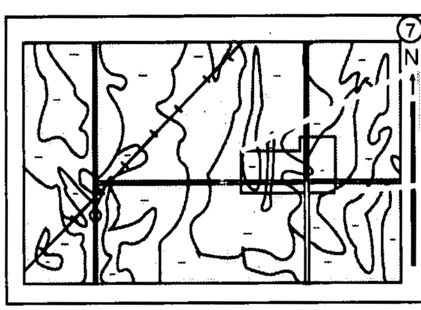
MAP SHEET

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

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.



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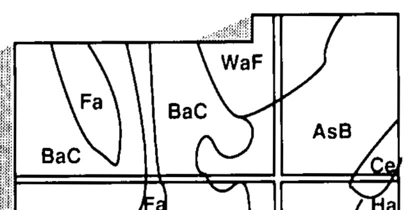

AREA OF INTEREST

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 1987. 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 University of Florida, Institute of Food and Agricultural Sciences, Agricultural Experiment Stations, and Soil Science Department; and the Florida Department of Agriculture and Consumer Services. The survey is part of the technical assistance furnished to the Madison County Soil and Water Conservation District. The Madison County Board of Commissioners contributed financially to the acceleration of this survey. Additional assistance was provided by the Florida Department of Transportation.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

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: If irrigated, deep, droughty soils, such as Troup sand, 0 to 5 percent slopes, produce optimum yields.

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Issued October 1990

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Summary of Tables

Foreword

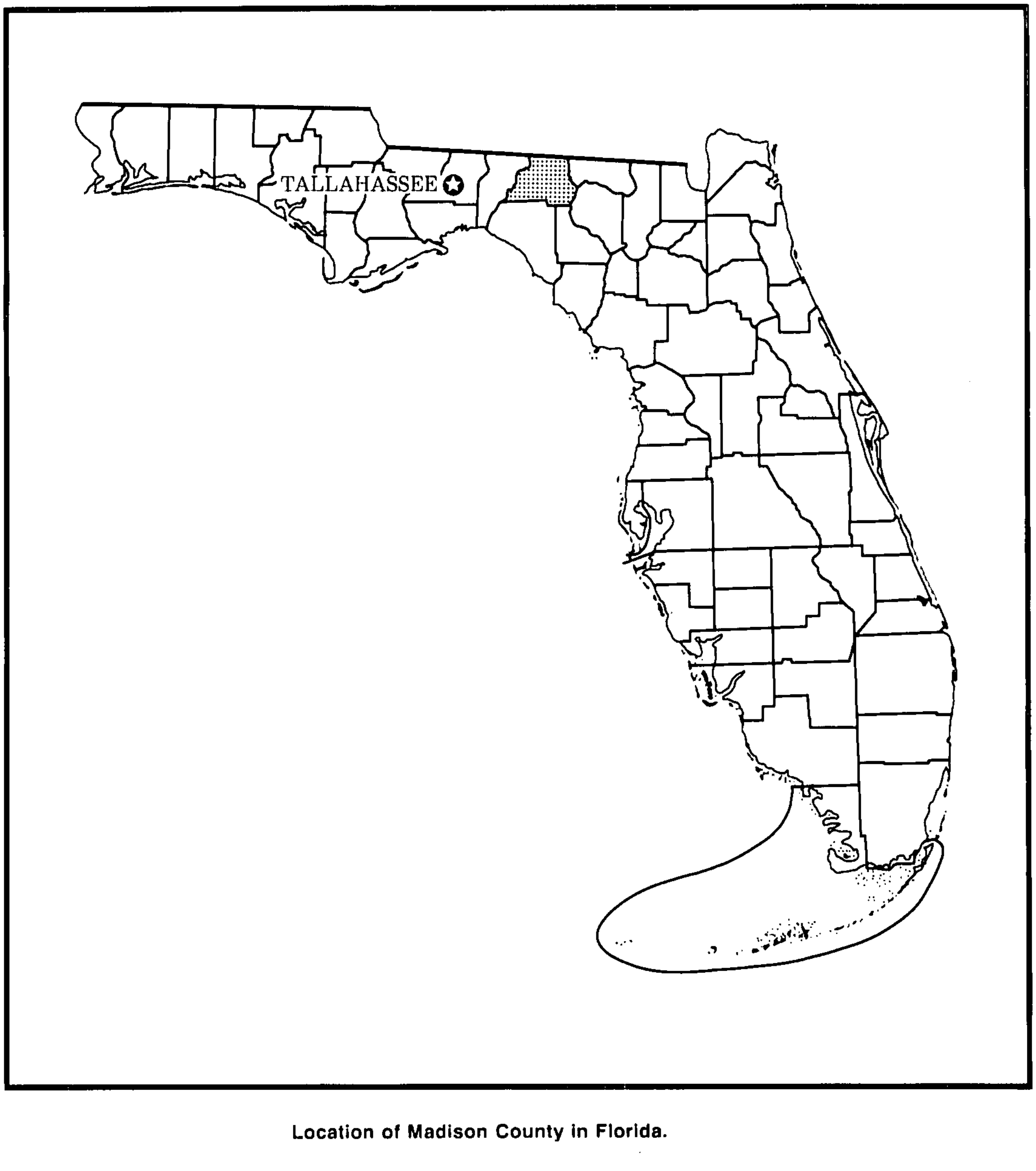
This soil survey contains information that can be used in land-planning programs in Madison County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact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

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

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 basements 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.

Niles T. Glasgow
State Conservationist
Soil Conservation Service



Location of Madison County in Florida.

Soil Survey of
Madison County, Florida

By David A. Howell and Christopher A. Williams, Soil Conservation Service

Fieldwork by Jim Grant, Robert Weatherspoon, Manley Bailey, James Bell, Steven Fisher, Edward Horn, Kenneth Liudahl, Kenneth Olsen, and Willie Terry, Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service,
in cooperation with
the University of Florida, Institute of Food and Agricultural Sciences, Agricultural Experiment Stations, and Soil Science Department; and Florida Department of Agriculture and Consumer Services

MADISON COUNTY is in the eastern part of the Florida Panhandle. The total land area is 454,618 acres, or about 710 square miles. Madison County borders the state of Georgia on the north, Hamilton and Suwannee Counties on the east, Lafayette and Taylor Counties on the south, and Jefferson County on the west. The Withlacoochee and Suwannee Rivers form a natural boundary along the eastern part of the county, and the Aucilla River forms part of the western boundary. These rivers provide the county with about 50 miles of river frontage.

The population of the county was about 15,624 in 1986 *(7)*, an increase of 5 percent since 1980. The population of Madison, the county seat, was 3,608; Greenville's population was 1,028; and Lee's population was 270.

Agriculture and commercial woodlands are the principal businesses in the county. Madison County is mostly rural, but several light industries (including greyhound dog farms; poultry, pork, and wood product processing plants; peach packers; and a pine seedling nursery) are in the county.

General Nature of the County

In this section, environmental and cultural factors that affect the use and management of soils in the county are described. These factors are climate, history and development, geology, ground water, farming, and transportation facilities.

Climate

Madison County has a moderate climate that is favorable for the production of crops, livestock, and woodland and also for a variety of recreational activities. The summers are long, hot, and humid. Although cold air periodically moves down from the north, winters are mild because of the county's proximity to the ocean.

Precipitation is fairly heavy most of the year. Spring droughts occasionally cause crop failure and create a shortage of forage for livestock. Severe local storms, including tornadoes, strike occasionally in or near the county but seldom cause severe damage. Occasionally, a tropical depression or hurricane moves inland and causes intense, heavy rains for 1 to 3 days in the summer or fall. Measurable amounts of snowfall are rare.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Madison in the period 1951 to 1980 *(16)*. In winter the average temperature is 54 degrees F, and the average daily minimum temperature is 42 degrees. The lowest temperature on record, which occurred at Madison on December 13, 1962, is 7 degrees. In summer the average temperature is 81 degrees, and the average daily maximum temperature is 92 degrees. The highest recorded temperature, which occurred at Madison on May 27, 1953, is 102 degrees.

The total annual precipitation is about 52 inches. Of this, 30 inches, or about 58 percent, usually falls in April through September. The growing season for most crops falls within this period. The heaviest 1-day rainfall during the period of record was 8.9 inches at Madison on March 31, 1962. Thunderstorms occur on about 40 days each year, and most occur in July.

History and Development

In 1528, Panfilo Narvaez crossed the Suwannee River near what is now Dowling Park and became the first of the early Spaniards to explore the area now known as Madison County. When the Spaniards arrived, the Timucuan Indians were inhabiting the area. Their range extended from the Atlantic Ocean to the Aucilla River, which is now the western boundary of Madison County. These Indians were well established in the area before the Spaniards arrived. Their source of livelihood was from hunting, fishing, and growing corn.

Exploration in this area increased after the Spanish explorer, Hernando De Soto, arrived in 1539. By 1675, Spanish missions were established, and the Spaniards tried to educate the local Indians in the Christian religion. The Timucuans lost their tribal identity after being conquered and converted by the Spanish. The last remnants of the tribe were absorbed by the Seminole Indian tribe.

The missions were built along what is now known as the Old Spanish Trail, a road that linked the two largest Spanish settlements in Florida at that time. These settlements are now known as Pensacola and St. Augustine. The sites of two of the old missions have been discovered in Madison County.

Between 1815 and 1827, the early settlers of Madison County began to arrive from the Carolinas and Georgia. These new settlers were looking for a fresh start and new land to farm. On December 16, 1827, Madison County, named for President James Madison, became the 14th county to be established by the Legislative Council of Florida. It was formed from part of Jefferson County, and at the time of its establishment, it was made up of its present area and what is now Taylor, Lafayette, and Dixie Counties.

During this period, the area supported a large population of Seminole Indians, whom the settlers considered a constant source of peril. One of the more famous Seminoles was the Indian Chief John Hicks, who with his followers lived in Madison County in an area later known as Hixtown. This area was about halfway between the present towns of Madison and Greenville.

The Seminole Indian War of 1835-1842 did little to slow the growth of Madison County. Between 1830 and 1840, the population increased by 400 percent. Farming on large plantations was the major source of livelihood, but as the population grew, industry also began to develop. In 1851, the second cotton mill in Florida was built in Madison County. Sawmills were built to process the limitless supply of virgin timber. In 1852, the first shoe factory in the state was built just east of the town of Madison.

The citizens of Madison County supported the Confederate effort during the Civil War. The Wardlaw-Smith mansion, built in the late 1850's, was used as a Confederate hospital after the battle of Olustee and is listed in the National Register of Historic Places. Confederate soldiers were also supplied with shoes produced by the shoe factory in the county.

During the resurgence following the Civil War, the Florida Manufacturing Company, a large processing plant for sea island cotton, was established in Madison. During this time, Madison County was known as "King Cotton" because of the large cotton crop that was produced. The cotton industry thrived until 1916 when the Mexican boll weevil all but wiped out cotton production in the area. Farming became more diversified and continued to be a major source of livelihood in the county along with commercial woodland production.

Madison County has grown slowly over the years. It has mostly remained a rural county, dependent upon agriculture and commercial woodland production *(9)*.

Geology

Ronald W. Hoenstine and Steven M. Spencer, Department of Natural Resources, Florida Geological Survey, Bureau of Geology, prepared this section.

Madison County is made up of a transitional geologic area that separates the thick Tertiary carbonate sediments characteristic of the Florida Peninsula from the predominant age-equivalent clastic sediments of western Florida. This area is underlain by thick limestone deposits of Oligocene and Eocene ages, which in turn are covered by younger limestone, dolomite, sand, and clay in the northern half of the county.

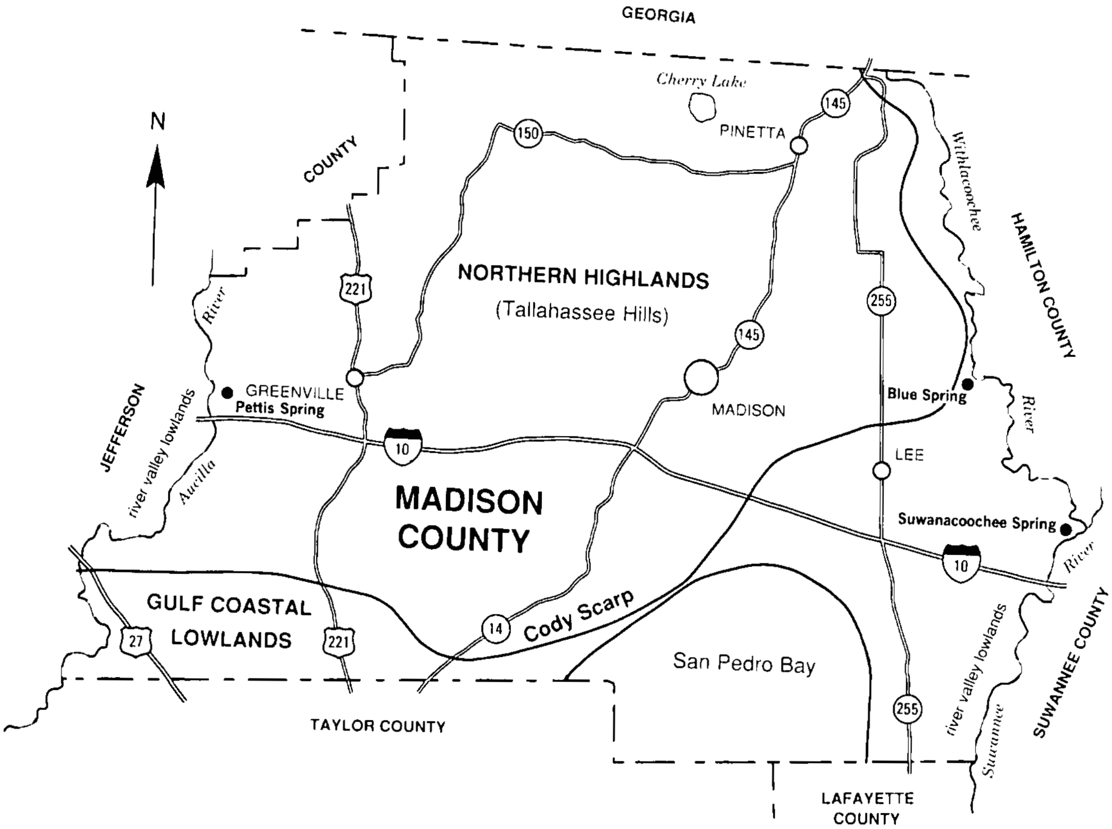


Figure 1.—Physiographic map of Madison County.

Two major physiographic regions occur in Madison County. As proposed by Puri and Vernon *(11)*, these regions are the Northern Highlands and Coastal Lowlands (fig. 1). The Northern Highlands region extends over the northern two-thirds of the county, and the Coastal Lowlands occupy the remaining third of the county.

The boundary between these divisions occurs at a southward-facing escarpment, the Cody Scarp *(11)*. This escarpment is considered to be one of the most persistent topographic breaks in Florida. The Cody Scarp is easily observed to the west in Jefferson County, but in Madison County, it is irregular and frequently difficult to observe. However, a series of north-south topographic profiles shows a distinct break at the 100-foot contour. This 100-foot elevation, which was used by Crane *(5)* and by Cooke *(4)*, is also used in this survey to define the Cody Scarp in Madison County.

The Northern Highlands region in Madison County extends over parts of several counties in Florida and into Georgia. It includes the area north of the Cody Scarp (see fig. 1). This physiographic region includes the Tallahassee Hills. In the study area, the Tallahassee Hills are between the Florida-Georgia state line on the north and the Gulf Coastal Lowlands on the south (see fig. 1). The Tallahassee Hills are erosional remnant hills and ridges that have elevations as high as 230 feet in Madison County. These hills and ridges occur extensively throughout the northern two-thirds of Madison County and are characterized by gentle slopes and rounded tops. Although the Tallahassee Hills in this area have been highly dissected by stream erosion and subsurface solution, they probably once represented a nearly flat Miocene delta plain that covered all of northern Madison County.

The other major physiographic region, the Gulf Coastal Lowlands, has markedly lower elevations. This region in Madison County is in an area bounded on the north by the Cody Scarp and on the south by Taylor and Lafayette Counties. Features in the Gulf Coastal Lowlands include the Wicomico Terrace, which coincides with the top of the Cody Scarp in Madison County at an elevation of 100 feet above mean sea level (m.s.l.). Additionally, the San Pedro Bay and the River Valley Lowlands, which are associated with the Suwannee, Withlacoochee, and Aucilla Rivers, are in the Gulf Coastal Lowlands. Numerous tributaries, such as small streams and creeks, originate in the Tallahassee Hills and flow into these rivers. Although these river valley lowlands extend into the Northern Highlands, they are placed in the Gulf Coastal Lowlands province on the basis of their lowest elevation *(3)*.

The sediments that are in Madison County range from Paleozoic to Recent. The deepest penetration of subsurface sediments in the study area was at a depth of 10,150 feet below m.s.l. These sediments, obtained from an oil test well W-15017, permit number P-1033 *(10)*, were identified as Paleozoic quartzitic sandstone deposited hundreds of millions of years ago. In contrast, surface and near-surface occurrences include unconsolidated sand, limestone, and highly indurated dolomite ranging in age from the Eocene epoch, about 36 to 58 million years ago, to the Recent. The oldest surface outcrops are dolomite and limestone belonging to the Eocene epoch of 40 to 38 million years ago.

Ocala Group

The Ocala Group limestones were deposited during the Eocene epoch about 40 to 38 million years ago and represent the oldest sediments exposed in Madison County. These limestones form an integral part of the Floridan aquifer system and occur at varying depths throughout the county. The Ocala Group limestones generally are pale orange, poorly indurated or moderately indurated, moderately porous or highly porous, fossiliferous, partly dolomitized, and partly recrystallized. The occurrence of the distinctive foraminifera Lepidocyclina is common to abundant and is often used as an aid in distinguishing this formation from the overlying, younger Suwannee Formation.

Few wells in the county penetrate the Ocala Group sediments. The top of these sediments occur about 100 feet below m.s.l., near the city of Madison. Varying in thickness throughout the county, the Ocala Group is in the interval from 200 to 385 feet below the surface, a thickness of 185 feet, in well number W-2549 near the city of Madison. These sediments unconformably are underlain by the Avon Park Limestone and are unconformably overlain by the Oligocene-age Suwannee Limestone.

Suwannee Limestone Formation

Exposure of limestone and dolomite belonging to the Suwannee Limestone, which was deposited during the Oligocene epoch, occurs along the Suwannee River at Ellaville. An unconformity separates the Suwannee Limestone from the underlying Ocala Group limestones and from the overlying St. Marks Formation and Hawthorn Group. Where the St. Marks and the Hawthorn Group are absent, the Suwannee Limestone underlies younger undifferentiated sand and clay.

The Suwannee Limestone is a partly recrystallized marine limestone. It is very pale orange, is finely crystalline, is moderately indurated or well indurated, has moderate or good porosity, and is very fossiliferous. Chemical tests indicate a composition that is nearly 97 percent calcium carbonate.

In various locations, such as along the Suwannee River at Ellaville in neighboring Swannee County, the top of the formation is silicified at the surface and near subsurface. It has been observed from well cuttings that dolomitization of the limestone has occurred in the subsurface at different depths. This process of secondary dolomitization can also be observed in the outcrop area along the Aucilla River.

Measurements of the formation's thickness are approximated because most of the information available is from wells that terminate in the Suwannee Limestone. The maximum thickness encountered in a core was in well number W-15515, located in sec. 5, T. 2 N., R. 8 E., in which 157 feet of limestone was penetrated. Fossiliferous outcrops of this formation can be observed along the Suwannee River from White Springs in Hamilton County to Ellaville in Suwannee County.

In many areas, the Suwannee Limestone is covered by a thin veneer of Pleistocene sand. Just below Lamont in Jefferson County to north of Nutall Rise, the Suwannee Limestone is almost continually exposed along the banks of the Aucilla River as silicified boulders or as massive dolomite beds. The dolomite beds and the silicified boulders often form rapids along the river.

St. Marks Formation

Early Miocene sediments unconformably overlie the Suwannee Limestone in many parts of Madison County. These sediments, which make up the St. Marks Formation, are white to very pale orange, finely crystalline, sandy, silty, and clayey limestone. The St. Marks Formation is poorly indurated or well indurated, has low or medium porosity, and contains molluscan casts and a few species of foraminifera. The limestone has been partly dolomitized and silicified in the subsurface layer.

In contrast to the Suwannee Limestone, the St.

Marks Formation does not occur in all parts of the county but occurs sporadically (fig. 2). St. Marks Formation outcrops are rare as the greater part of the deposits are covered by younger sediment.

The cross sections (see fig. 2) show the variability of the St. Marks Formation throughout the survey area. The sediment is very thin or does not occur in the central part of the county. The thickness increases to a maximum of 20 feet in a core in well number W-15537 drilled in north-central Madison County in an area west of Cherry Lake.

The St. Marks Formation is overlain by the younger Miocene sediments known as the Hawthorn Group. These sediments are in the subsurface layer throughout much of the county.

Hawthorn Group

The Hawthorn Group consists of pale olive to moderate yellow, sandy, waxy, phosphatic clay and sand. The clay contains phosphorite grains and is interbedded with very fine to medium, clayey quartz sand that also contains phosphorite. The clay and sand are frequently cherty and are often associated with stringers of sandy calcilutite.

The Hawthorn Group varies in thickness. It is thin or does not occur in areas of southern and eastern Madison County. In contrast, the Hawthorn Group sediments on the western side of the county are significantly thicker than sediments to the east and southeast of the county. The thickest observed section of Hawthorn occurred in a core in well number W-6558 near U.S. Highway 90 where a thickness of 142 feet was encountered. Surface outcrops of the Hawthorn Group occur on the northeastern side of the county along the Withlacoochee River.

The Hawthorn Group unconformably is underlain by the St. Marks Formation or the Suwannee Limestone. It is in turn overlain by the Miccosukee Formation or by Pleistocene sand.

Miccosukee Formation

The varicolored, heterogeneous complex of sediments known as the Miccosukee Formation is a prominent feature throughout Madison County. The Miccosukee Formation is underlain by the Hawthorn Group. It generally is present in Madison County except in the south and east regions.

The Miccosukee Formation is an aggregate of lenticular clayey sand and clay beds, which individually can be traced laterally only for short distances. These sediments are moderately sorted or poorly sorted and consist of coarse to fine grained, varicolored, quartz sand and clay. These frequently crossbedded sediments contain thin laminae of white to light gray clay. X-ray diffraction patterns indicate that the laminae associated with the quartz sand is kaolinite.

In many places, sediments of the Miccosukee Formation are deeply weathered laterites. The weathering process has frequently destroyed bedding that may have been present, giving exposed sediments a massive appearance. The Miccosukee Formation varies widely in thickness, a condition attributed partly to extensive weathering and associated erosion. A maximum thickness of 78 feet was encountered in the west-central part of the county in a core in well number W-6558, suggesting that the tops of some of the highest hills may represent the original depositional surface. Similar thicknesses were observed in well cuttings in the same general area along U.S. Highway 90.

The Miccosukee Formation can be observed in numerous roadcuts throughout the northern part of the county. The type locality of this formation can be seen at a roadcut on the east side of U.S. Highway 19, about 3.1 miles south of the Georgia-Florida state line in neighboring Jefferson County. The sediments in this section illustrate rapid sedimentation changes, including channel cut and fill features of a deltaic environment.

Pleistocene and Holocene Deposits

Surficial sediments of Pleistocene age form much of the land surface in the southern and southeastern parts of the county. Less widespread Holocene-age sediments are confined mainly to the present stream valleys. The Pleistocene and Holocene deposits are referred to in the cross sections as undifferentiated sand and clay.

The Pleistocene deposits that form the Gulf Coastal Lowlands south of the Cody Scarp are very fine to medium quartz sand that has bluish green to light olive clay lenses. The Holocene sediments are essentially reworked Pleistocene quartz sand and quartz sand derived from the older formations.

The Pleistocene deposits range in thickness from a feather edge in the southeastern part of the county to 35 feet in well number W-705, which is located 5 miles southeast of Lamont near the toe of the Cody Scarp. These sediments vary widely in thickness throughout the southern part of Madison County and essentially do not occur in the northern part. They unconformably are underlain by the St. Marks Formation and Suwannee Limestone in the southern part of the county.

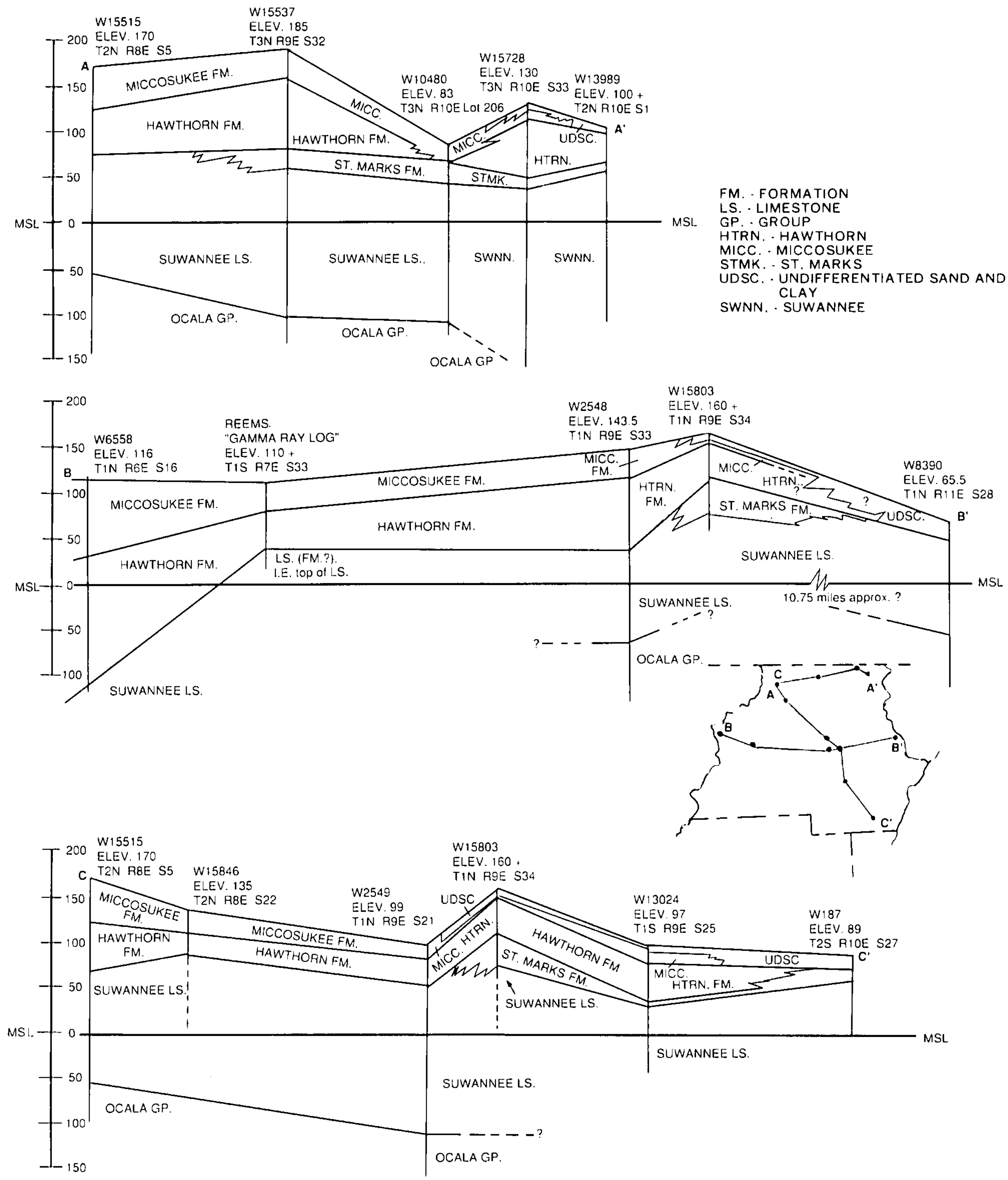


Figure 2.—Geological east to west cross sections A-A' and B-B' and northwest to southeast cross sections C-C' in Madison County. Numbers preceded by a "W" are Florida Geological Survey well accession numbers.

Geologic History

From the end of the Cretaceous period until the early Miocene, Madison County was an area of carbonate deposition. Changes in the depositional environment occurred at the beginning of the early Miocene, which resulted in deposition of siliciclastics and carbonates of the Hawthorn Group.

During this time, the Eocene Avon Park Formation, Eocene Ocala Group, Oligocene Suwannee Limestone, and early Miocene St. Marks Formation were deposited in a warm, shallow, open sea.

An influx of clastic sediments generally masked carbonate deposition during the middle Miocene. At this time the Hawthorn Group, which consisted mainly of phosphatic sand and clay, was deposited in a marine environment. At the cessation of Hawthorn deposition, the predominantly marine environment changed to a prodeltaic and deltaic environment. The Miccosukee Formation deposits formed a widespread delta complex, covering parts of Madison, Jefferson, Leon, and Gadsen Counties.

At the beginning of the Pleistocene epoch, the seas covered much of the county, resulting in the formation of the Gulf Coastal Lowlands in the southern part of the county. During this time the present drainage system of rivers and their associated tributaries were formed. Other changes may have included the erosion and subsequent removal of most of the St. Marks Formation from the Gulf Coastal Lowlands.

Sea level has been fairly stationary during the last several thousand years of the Holocene epoch. Deposition now occurring in Madison County is restricted to alluvium along the many streams and to organic deposits in the lakes and low areas.

Ground Water

The Floridan aquifer system is the principal water-bearing unit in Madison County. It includes all of the middle Eocene to early Miocene geologic units in the county.

The intermediate aquifer system present in Madison County is comprised of discontinuous units of limestone, dolomite, and sand that form the Hawthorn Group. Although the amount of water obtained from the intermediate aquifer is minimal compared to that obtained from the underlying Floridan aquifer system, it may be sufficient for small domestic supplies. The quality of the water in the intermediate aquifer system is inferior to that of the Floridan aquifer system because of the presence of a greater concentration of dissolved solids.

The surficial aquifer system occurs in the surficial sand and clayey sand deposits at higher elevations. This aquifer receives recharge mainly from rainfall runoff. Water quality in the surficial aquifer system is diminished because of the high concentration of iron and other dissolved substances.

Farming

Madison County's climate and soils attracted settlers from the southeastern states from about 1815 to the late 1820's and early 1830's. The economy was highly dependent on cotton production until about 1916. Since then farming has been a major economic boost to the county. A large variety of crops, including shade and flue-cured tobacco, corn, watermelons, peanuts, soybeans, cotton, peaches, wheat, oats, rye grains, and field peas, have been successfully produced in the county. Except for shade tobacco, most of these crops are still grown in the county; but in recent years, much of the cropland has been converted to permanent pasture or pine tree production. About 10,000 acres of cropland was converted or scheduled for conversion to woodland during 1986 and 1987. The erosiveness of the soils and a depressed agricultural economy were the major reasons for this conversion.

The Madison County Soil Conservation District was organized in 1941. Under its leadership, soil and water conservation practices, such as terraces, grassed waterways, diversions, contour farming, sediment control, and water management, have been applied to hundreds of acres in the county.

Transportation Facilities

A network of highways and secondary roads that provide access to nearby markets, towns, cities, and recreational sites meets the county's transportation needs. According to the 1987 National Resources County Base Data, the county has about 842 miles of public roads. Interstate Highway 75 provides north-south travel, Interstate Highway 10 provides east-west travel, and U.S. Highway 90 extends east-west through Lee, Madison, and Greenville. Other county and state roads and many improved dirt roads are provided for public use.

A small local airport, rail service, taxi service, and bus service are also available in the county.

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, and the kinds of crops and native plants growing on the soils. 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 considerable 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, 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 interpreted the data from these analyses and tests as well as the field-observed characteristics and the soil properties in terms of expected behavior of the soils under different uses. Interpretations for all of the soils were field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and new interpretations sometimes are developed to meet local needs. Data were assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management were assembled from farm records and from field or plot experiments on the same kinds of soil.

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 state with a fairly high degree of probability 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.

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 do not affect 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 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.

Use of Ground-Penetrating Radar

In Madison County, a ground-penetrating radar (GPR) system *(6, 8)* was used to document the type and variability of soils that occur in the detailed map units. Random transects were made with the GPR and by hand. Information from notes and ground-truth observations made in the field were used with radar data from this study to classify the soils and to determine the composition of map units. The map units described in the section "Detailed Soil Map Units" are based on this data.

Confidence Limits of Soil Survey Information

The statements about soil behavior in this survey can be thought of in terms of probability: they are predictions of soil behavior. The behavior of a soil depends not only on its own properties but on responses to such variables as climate and biological activity. Soil conditions are predictable for the long term, but predictable reliability is less for any given year. For example, while soil scientists can state that a given soil has a high water table in most years, they cannot say with certainty that the water table will be present next year.

Confidence limits are statistical expressions of the probability that the composition of a map unit or a property of the soil will vary within prescribed limits. Confidence limits can be assigned numerical values based on a random sample. In the absence of specific data to determine confidence limits, the natural variability of soils and the way soil surveys are made must be considered. The composition of map units and other information are derived largely from extrapolations made from a small sample. Also, the information relates only to the soil within 6 feet of the surface. The information presented in the soil survey is not meant to be used as a substitute for onsite investigations. Soil survey information can be used to select from among alternative practices or to select general designs that may be needed to minimize the possibility of soil-related failures. It cannot be used to interpret specific points on the landscape.

Specific confidence limits for the composition of map units in Madison County were determined by random transects made with the GPR across mapped areas. The data are statistically summarized in the description of each soil in the "Detailed Soil Map Units" section. Soil scientists made enough transects and took enough samples to characterize each map unit at a specific confidence level. This means, for example, that the resulting composition would read: In 95 percent of the areas mapped as Alpin sand, the percentage of Alpin soil will be within the range given in the map unit description. In about 5 percent of this map unit, the percentage of Alpin soil can be higher or lower than the given range.

The composition of miscellaneous areas and urban map units was based on the judgment of the soil scientist and was not determined by a statistical procedure.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, a map unit consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in other units 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 map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Soils on the Sand Hills and Ridges

The two general soil map units in this group consist of nearly level to strongly sloping, excessively drained to moderately well drained soils on ridges and slopes on the uplands. Some soils are sandy throughout, and some have thin bands of loamy lamellae below a depth of 40 inches.

1. Alpin-Lakeland-Blanton

Nearly level to sloping, excessively drained and moderately well drained soils; some have thin bands of loamy lamellae below a depth of 40 inches, some have a loamy subsoil, and some are sandy throughout

This map unit is on landscapes that are characterized mostly by broad plains interspersed with sloping landscapes without a well defined drainage pattern.

The natural vegetation is mostly longleaf pine, slash pine, turkey oak, bluejack oak, and live oak. The understory includes grasses and forbs.

This map unit makes up 8 percent of the county. It is 77 percent Alpin soils, 13 percent Lakeland soils, and 5 percent Blanton soils. The soils of minor extent, which are Alaga, Albany, Cantey, and Lovett soils, make up 5 percent of the map unit.

The Alpin soils are nearly level to gently sloping and are excessively drained. They are mainly on broad sand flats and on uplands adjacent to the flood plains. The surface layer is dark grayish brown sand about 4 inches thick. The subsurface layer, to a depth of about 60 inches, is yellowish brown and pale brown sand. The subsoil to a depth of about 80 inches is yellow sand that has thin bands of brownish yellow loamy material.

The Lakeland soils are nearly level to sloping and are excessively drained. They are on ridges and in positions similar to those of the Alpin soils. The surface layer is brown sand about 4 inches thick. The underlying material to a depth of 80 inches or more is yellow, brownish yellow, and very pale brown sand.

The Blanton soils are nearly level to sloping and are moderately well drained. They are on broad uplands and on slopes adjacent to lakes and streams and are in positions adjacent to Alpin soils. The surface layer is dark grayish brown sand about 12 inches thick. The subsurface layer, to a depth of about 69 inches, is yellowish brown to very pale brown sand. The subsoil to a depth of about 80 inches is light yellowish brown, mottled sandy loam.

These soils mostly are used for pine tree production. They are poorly suited to crops and pasture. The potential of these soils for production of certain species of pine trees is moderately high. Droughtiness and poor fertility are concerns in woodland management.

2. Alaga-Blanton-Troup

Nearly level to strongly sloping, well drained or moderately well drained soils; some are sandy throughout, and some have a loamy subsoil

This map unit is in one contiguous area. The landscape generally is undulating with occasional broad ridges.

The natural vegetation is mostly slash pine, longleaf pine, loblolly pine, live oak, and bluejack oak. The understory includes pineland threeawn, blackberry, sassafras, and winged sumac.

This map unit makes up 6 percent of the county. It is 43 percent Alaga soils, 30 percent Blanton soils, and 22 percent Troup soils. The soils of minor extent, which are Albany, Lucy, and Ocilla soils, make up 5 percent of the map unit.

The Alaga soils are nearly level to strongly sloping and are well drained and moderately well drained. They are in low positions on the uplands. The surface layer is very dark grayish brown and dark brown loamy sand about 9 inches thick. The upper part of the underlying material, to a depth of 58 inches, is dark brown and strong brown loamy sand. The lower part to a depth of about 80 inches is reddish yellow and brownish yellow sand.

The Blanton soils are nearly level to sloping and are moderately well drained. They are adjacent to Alaga soils and are in slightly lower positions on the landscape. The surface layer is dark grayish brown sand about 12 inches thick. The upper part of the subsurface layer, to a depth of 53 inches, is yellowish brown and light yellowish brown sand. The lower part, to a depth of 69 inches, is very pale brown, mottled sand. The subsoil to a depth of about 80 inches or more is light yellowish brown sandy loam that has light brownish gray mottles.

The Troup soils are nearly level to sloping and are well drained. They are in similar positions on the landscape as Alaga soils. The surface layer is dark grayish brown sand about 8 inches thick. The subsurface layer, to a depth of 68 inches, is dark yellowish brown and yellowish brown sand. The upper part of the subsoil, to a depth of 74 inches, is strong brown loamy sand. The lower part to a depth of 80 inches or more is strong brown sandy clay loam that has red mottles.

These soils mostly have been cleared and planted to soybeans, corn, pasture grasses, and pine trees. They are poorly suited to crops. These soils are moderately well suited to deep-rooted pasture grasses. The potential of these soils for pine tree production is moderately high.

Soils on the Rolling Uplands

The four general soil map units in this group consist of nearly level to strongly sloping, well drained to somewhat poorly drained, sandy soils on the uplands. Some soils in this map unit have a clayey subsoil, some have a loamy subsoil, and some have a clayey and loamy subsoil.

3. Lucy-Faceville-Orangeburg

Gently sloping to strongly sloping, well drained, sandy soils; some have a loamy subsoil, some have a clayey subsoil, and some have a loamy and clayey subsoil

This map unit consists dominantly of relatively small areas of gently undulating to rolling soils on the uplands.

The natural vegetation is mostly loblolly pine, slash pine, southern red oak, live oak, hickory, and dogwood.

This map unit makes up 3 percent of the county. It is 45 percent Lucy soils, 28 percent Faceville soils, and 20 percent Orangeburg soils. The soils of minor extent, which are Bonifay, Blanton, Esto, Lovett, Nankin, and Troup soils, make up 7 percent of the map unit.

The Lucy soils are gently sloping to sloping and are well drained. They are on the uplands. The surface layer is very dark grayish brown sand about 11 inches thick. The subsurface layer, to a depth of 24 inches, is strong brown loamy sand. The upper part of the subsoil, to a depth of about 34 inches, is yellowish red fine sandy loam. The lower part to a depth of 80 inches or more is yellowish red sandy clay loam.

The Faceville soils are mainly gently sloping to sloping and are well drained. They are on upland ridges. The surface layer is dark brown loamy fine sand about 5 inches thick. The subsoil to a depth of 80 inches or more is red sandy clay that has yellowish red and strong brown mottles below a depth of 60 inches.

The Orangeburg soils are mainly gently sloping to strongly sloping and are well drained. They are on upland ridges and in adjacent landscape positions. The surface layer is very dark grayish brown loamy sand about 6 inches thick. The subsurface layer, to a depth of about 15 inches, is dark yellowish brown loamy sand. The upper part of the subsoil, to a depth of about 26 inches, is yellowish red fine sandy loam. The lower part to a depth of 80 inches or more is yellowish red sandy clay loam.

These soils mostly have been cleared and planted to soybeans, corn, watermelons, small grains, pasture grasses, and pine trees. They are well suited to crops; however, erosion in the sloping areas is a major concern in management. These soils are well suited to pasture grasses. The potential of these soils for production of pine trees is high. Loblolly pine and slash pine are the recommended trees to plant for woodland production.

4. Nankin-Esto-Lovett

Nearly level to strongly sloping, well drained and *moderately well drained soils; some have a clayey subsoil, and some have a loamy subsoil*

The soils in this map unit are mostly on gently undulating to rolling hills on the uplands. They occur in two general areas of the county, both north of U.S. Highway 90.

The natural vegetation is mostly loblolly pine, longleaf pine, slash pine, southern red oak, live oak, laurel oak, and black cherry.

This map unit makes up 9 percent of the county. It is about 23 percent Nankin soils, 23 percent Esto soils, and 22 percent Lovett soils. The soils of minor extent, which are Albany, Blanton, Bonifay, Faceville, Fuquay, Lucy, Ocilla, and Orangeburg soils, make up 32 percent of the map unit.

The Nankin soils are gently sloping to strongly sloping and are well drained. They are on shoulder slopes and back slopes on the uplands. The surface layer is brown loamy sand about 6 inches thick. The upper part of the subsoil, to a depth of about 12 inches, is yellowish brown sandy clay loam. The next part, to a depth of about 38 inches, is yellowish brown clay. The lower part, to a depth of 58 inches, is sandy clay mottled in shades of gray, yellow, red, and brown. The substratum to a depth of about 80 inches or more is sandy clay loam mixed with lenses of sand and is mottled in shades of gray, yellow, red, and brown.

The Esto soils are gently sloping and are well drained. They are mainly on summits on the upland ridges. The surface layer is dark yellowish brown fine sandy loam about 7 inches thick. The subsoil is clay. The upper part, to a depth of 18 inches, is yellowish red. The lower part to a depth of 80 inches or more is mottled in shades of gray, yellow, red, and brown.

The Lovett soils are nearly level to sloping and are moderately well drained. They mainly are on back slopes and foot slopes on the uplands and are generally adjacent to Nankin or Esto soils. The surface layer is dark grayish brown sand about 9 inches thick. The subsurface layer, to a depth of 38 inches, is brownish yellow sand. The upper part of the subsoil, to a depth of 47 inches, is yellowish brown fine sandy loam. The lower part, to a depth of 62 inches, is yellowish brown sandy clay that is mottled in shades of brown, gray, and red. The substratum to a depth of 80 inches or more is mottled yellowish brown, red, and light gray sandy clay.

These soils mostly have been cleared and are used for soybeans, corn, pecans, peaches, pasture grasses, and pine trees. These soils are suited to crops in the nearly level to sloping areas. In the strongly sloping areas, erosion is a major concern in management. The potential of these soils for production of pine trees is moderately high. Slash pine and loblolly pine are the recommended trees to plant for woodland production.

5. Lovett-Blanton-Fuquay

Nearly level to sloping, moderately well drained and well drained soils that have a loamy subsoil

This map unit is on broad, rolling uplands.

The natural vegetation is mostly loblolly pine, slash pine, laurel oak, live oak, and water oak. The understory includes wild cherry, broomsedge bluestem, blackberry, brackenfern, winged sumac, and panicum.

This map unit makes up 9 percent of the county. It is about 35 percent Lovett soils, 33 percent Blanton soils, and 5 percent Fuquay soils. The soils of minor extent, which include Albany, Esto, Lucy, and Pelham soils, make up 27 percent of the map unit.

The Lovett soils are nearly level to sloping and are moderately well drained. They are on the uplands. The surface layer is dark grayish brown sand about 9 inches thick. The subsurface layer, to a depth of about 38 inches, is brownish yellow sand. The upper part of the subsoil, to a depth of about 47 inches, is yellowish brown fine sandy loam. The lower part, to a depth of about 62 inches, is yellowish brown sandy clay that has gray and red mottles. The substratum to a depth of more than 80 inches is sandy clay mottled in shades of brown, red, and gray.

The Blanton soils are nearly level to sloping and are moderately well drained. They are on similar landscapes as Lovett soils and also are in slightly lower positions on toe slopes. The surface layer is dark grayish brown sand about 12 inches thick. The subsurface layer, to a depth of 69 inches, is yellowish brown, light yellowish brown, and very pale brown sand. The subsoil to a depth of more than 80 inches is light yellowish brown sandy loam that has light brownish gray mottles.

The Fuquay soils are nearly level to gently sloping and are well drained. They are on the uplands. These soils are in slightly higher positions on the landscape than Lovett soils. The surface layer is brown sand about 6 inches thick. The subsurface layer, to a depth of about 30 inches, is brownish yellow sand. The subsoil to a depth of about 80 inches is, in sequence downward, yellowish brown loamy sand; yellowish brown fine sandy loam that contains about 9 percent plinthite; sandy clay loam that is mottled in shades of gray, yellow, and brown and contains about 25 percent plinthite; and sandy clay that is mottled in shades of gray, yellow, and red and contains about 35 percent plinthite.

These soils mostly have been cleared and planted to soybeans, corn, small grains, pasture grasses, or woodland. They are moderately suited to cultivated crops and are well suited to pasture grasses. The potential of these soils for production of pine trees is moderately high. Slash pine and loblolly pine are the recommended trees to plant for woodland production.

6. Blanton-Albany-Ocilla

Nearly level to sloping, moderately well drained and somewhat poorly drained soils that have a loamy subsoil

This map unit consists mostly of soils on gently undulating landscapes.

The natural vegetation is mostly live oak, water oak, laurel oak, sweetgum, slash pine, and loblolly pine. The understory includes broomsedge bluestem, pineland threeawn, blackberry, waxmyrtle, greenbrier, and various panicums.

This map unit makes up 21 percent of the county. It is 57 percent Blanton soils, 15 percent Albany soils, and 14 percent Ocilla soils. The soils of minor extent, which are Lovett, Esto, Nankin, Plummer, and Troup soils, make up 14 percent of the map unit.

The Blanton soils are nearly level to sloping and are moderately well drained. These soils are on broad uplands and on slopes. The surface layer is dark grayish brown sand about 12 inches thick. The subsurface layer to a depth of 69 inches is yellowish brown sandy clay loam that has light brownish gray mottles.

The Albany soils are nearly level to gently sloping and are somewhat poorly drained. These soils are on landscapes that generally are adjacent to and in slightly lower positions than Blanton soils. The surface layer is dark grayish brown sand about 10 inches thick. The subsurface layer, to a depth of about 50 inches, is grayish brown, very pale brown, and light gray sand that has brown mottles. The upper part of the subsoil, to a depth of about 57 inches, is pale brown fine sandy loam that has brown and gray mottles. The next part, to a depth of about 69 inches, is light gray sandy clay that has brown mottles. The lower part to a depth of more than 80 inches is light gray sandy clay loam that has brown and red mottles.

The Ocilla soils are nearly level to gently sloping and are somewhat poorly drained. They are in the same positions on the landscape as the Albany soils. The surface layer is grayish brown sand about 3 inches thick. To a depth of about 29 inches, the subsurface layer is, in sequence downward, light yellowish brown sand, very pale brown sand, very pale brown sand that has reddish yellow and white mottles, and light yellowish brown loamy sand that has brownish yellow and light gray mottles. The upper part of the subsoil, to a depth of about 34 inches, is light yellowish brown fine sandy loam that has brownish yellow and gray mottles. The lower part to a depth of more than 80 inches is light brownish gray sandy clay loam that has yellowish brown, strong brown, and red mottles.

The soils in this map unit are poorly suited to cultivated crops. Low natural fertility, periodic droughtiness, and a seasonal high water table are the main concerns in management. These soils are moderately suited to pasture. The potential of these soils for the production of pine trees is moderately high. Slash pine and loblolly pine are the recommended trees to plant for woodland production.

Soils in the Swamps and on the Flatwoods and Low Ridges

The five general soil map units in this group consist of nearly level to gently sloping, somewhat poorly drained to very poorly drained soils. Some soils in this map unit have a loamy subsoil, some have an organic-stained layer above the subsoil, and some have an organic layer that is 16 to 51 inches or more thick.

7. Albany-Plummer

Nearly level to gently sloping, poorly drained to very poorly drained soils that have a loamy subsoil

This map unit is on broad, gently undulating lowland landscapes. It is often adjacent to swamps and drainageways.

The natural vegetation consists mostly of water oak, sweetgum, red maple, and slash pine. The understory includes waxmyrtle, gallberry, pineland threeawn, broomsedge bluestem, and scattered saw palmetto.

This map unit makes up 9 percent of the county. It is 43 percent Albany soils and 42 percent Plummer soils. The soils of minor extent, which are Blanton, Lovett, Ocilla, and Goldsboro soils, make up 15 percent of the map unit.

The Albany soils are nearly level to gently sloping and are somewhat poorly drained. They are on lowland landscapes. The surface layer is very dark grayish brown sand about 10 inches thick. The subsurface layer, to a depth of about 50 inches, is grayish brown, very pale brown, and light gray sand that has strong brown and yellowish brown mottles. The upper part of the subsoil, to a depth of about 57 inches, is pale brown fine sandy loam that has yellowish brown, strong brown, and light brownish gray mottles. The lower part to a depth of 80 inches or more is light gray sandy clay loam and sandy clay that has brown and red mottles.

The Plummer soils are nearly level and are poorly drained. They are often between swamps or drainageways and Albany soils that are in slightly higher positions than Plummer soils. The surface layer is very dark gray fine sand about 7 inches thick. The upper part of the subsurface layer, to a depth of about 14 inches, is dark grayish brown fine sand. The next part, to a depth of about 22 inches, is pale brown fine sand. The lower part, to a depth of about 43 inches, is light gray fine sand that has brownish yellow mottles. The upper part of the subsoil, to a depth of 48 inches, is light gray loamy sand that has brown mottles. The lower part to a depth of more than 80 inches is light brownish gray sandy loam that has yellow, brown, and red mottles.

The soils in this map unit are poorly suited to crops because of periodic wetness and low natural fertility. They are moderately suited to pasture grásses. The potential of these soils for production of pine trees is high. Loblolly pine and slash pine are the recommended trees to plant for woodland production.

8. Plummer-Surrency

Nearly level, poorly drained to very poorly drained soils that have a loamy subsoil

This map unit is in swamps and drainageways.

The natural vegetation consists mostly of cypress, blackgum, redbay, and sweetbay. The understory includes waxmyrtle, fetterbush lyonia, and St. Johnswort.

This map unit makes up 4 percent of the county. It is 57 percent Plummer soils and 38 percent Surrency soils. The soils of minor extent, which are Cantey, Mascotte, Sapelo, Dorovan, and Pamlico soils, make up 5 percent of the map unit.

The Plummer soils are nearly level and are poorly drained or very poorly drained. They are on flats, in depressions, or along drainageways. The surface layer is black fine sand about 6 inches thick. The subsoil to a depth of 80 inches or more is gray fine sandy loam underlain by gray sandy clay loam that has brown mottles.

The Surrency soils are nearly level and are very poorly drained. They are along drainageways on the uplands and in depressions on the flatwoods. The surface layer is black loamy sand about 10 inches thick. The upper part of the subsurface layer, to a depth of about 14 inches, is dark grayish brown loamy sand. The lower part, to a depth of 32 inches, is light brownish gray sand. The subsoil to a depth of 80 inches or more is gray sandy clay loam.

The soils in this map unit are not suited to cultivated crops or pasture grasses because of the high water table and low natural fertility. The potential of these soils for production of pine trees is low, mainly because of wetness.

9. Sapelo-Plummer-Surrency

Nearly level, poorly drained to very poorly drained soils that have a loamy subsoil; some have a slowly permeable, organic-stained layer above the subsoil

This map unit is in swamps and on the flatwoods. The landscape is characterized by broad, poorly drained flats interspersed with very poorly drained depressions.

The natural vegetation consists mostly of slash pine, loblolly pine, sweetbay, redbay, cypress, blackgum, and red maple. The understory includes fetterbush lyonia, saw palmetto, waxmyrtle, titi, gallberry, blueberry, maidencane, chalky bluestem, and greenbrier.

This map unit makes up 7 percent of the county. It is 54 percent Sapelo soils, 24 percent Plummer soils, and 16 percent Surrency soils. The soils of minor extent, which are Mascotte, Ocilla, Dorovan, and Pamlico soils, make up 6 percent of the map unit.

The Sapelo soils are mainly on broad flats and are poorly drained. The surface layer is black mucky fine sand about 5 inches thick. The subsurface layer to a depth of about 50 inches is, in sequence downward, white sand, very dark grayish brown loamy sand that has dark grayish brown and black mottles, dark brown sand that has dark grayish brown mottles, yellowish brown sand that has brown mottles, very pale brown sand that has yellowish brown and brown mottles, and light gray sand. The subsoil is sandy loam. The upper part of the subsoil, to a depth of 68 inches, is light brownish gray, and the lower part to a depth of 80 inches or more is gray.

The Plummer soils are in depressional areas and are very poorly drained. The surface layer is black fine sand about 6 inches thick. The subsurface layer, to a depth of about 66 inches, is light gray fine sand. The subsoil to a depth of about 80 inches is gray sandy loam. It has brown mottles in the lower part.

The Surrency soils are along drainageways on the uplands and in depressions on the flatwoods. These soils are very poorly drained. The surface layer is black loamy sand about 10 inches thick. The upper part of the subsurface layer, to a depth of about 14 inches, is dark grayish brown loamy sand. The lower part, to a depth of 32 inches, is light brownish gray sand. The subsoil to a depth of 80 inches or more is gray sandy clay loam.

The soils in this map unit are poorly suited to crops and pasture because of wetness. The potential of these soils for production of slash pine and loblolly pine is moderate. Large areas of this map map unit are managed for pulp and timber production.

10. Dorovan-Pamlico

Nearly level and very poorly drained, organic soils

This map unit is in concave positions on the landscape.

The natural vegetation consists mostly of cypress, sweetbay, red maple, blackgum, scattered pond pine, and slash pine. The understory includes titi, gallberry, fetterbush lyonia, St. Johnswort, greenbrier, wetland grasses, sedges, and rushes.

This map unit makes up 16 percent of the county. It is 56 percent Dorovan soils and 42 percent Pamlico soils. The soils of minor extent, which are Plummer, Sapelo, and Surrency soils, make up 2 percent of the map unit.

The Dorovan soils have a surface layer of very dark brown muck about 14 inches thick. Below that layer, to a depth of about 64 inches, is dark reddish brown muck. The underlying material to a depth of 80 inches or more is very dark gray sand.

The upper part of the surface layer of the Pamlico soils is black muck about 15 inches thick. The lower part, to a depth of about 33 inches, is dusky red muck. The upper part of the underlying material, to a depth of about 60 inches, is yellowish brown sand. The lower part to a depth of 80 inches or more is grayish brown sandy clay loam.

The soils in this map unit are not suited to cultivated crops, pasture grasses, or pine tree production, mainly because of wetness.

11. Dorovan-Pamlico-Albany

Nearly level to gently sloping, very poorly drained to somewhat poorly drained soils; some are organic, and some are sandy and have a loamy subsoil

This map unit is predominantly in the southwestern part of the county, southwest of Alligator Creek.

The natural vegetation in the very poorly drained areas consists of cypress, sweetbay, redbay, blackgum, and red maple. The understory includes titi, gallberry, and fetterbush lyonia. In the somewhat poorly drained areas, the natural vegetation consists of slash pine, loblolly pine, water oak, and sweetgum. The understory includes waxmyrtle, broomsedge bluestem, and pineland threeawn.

This map unit makes up 5 percent of the county. It is 33 percent Dorovan soils, 24 percent Pamlico soils, and 20 percent Albany soils. The soils of minor extent, which are Blanton, Chipley, and Plummer soils, make up 23 percent of the map unit.

The Dorovan soils are nearly level and are very poorly drained. They are in concave positions on the landscape. The upper part of the surface layer is very dark brown muck about 14 inches thick. The lower part, to a depth of about 64 inches, is dark reddish brown muck. The underlying material to a depth of about 80 inches or more is very dark gray sand.

The Pamlico soils are nearly level and are very poorly drained. The upper part of the surface layer is black muck about 15 inches thick. The lower part, to a depth of about 33 inches, is dusky red muck. The upper part of the underlying material, to a depth of about 60 inches, is yellowish brown sand. The lower part to a depth of about 80 inches or more is sandy clay loam.

The Albany soils are nearly level to gently sloping and are somewhat poorly drained. The surface layer is very dark grayish brown sand about 10 inches thick. The upper part of the subsurface layer, to a depth of about 26 inches, is grayish brown sand that has strong brown mottles. The lower part, to a depth of about 39 inches, is light gray sand that has yellowish brown mottles. The upper part of the subsoil, to a depth of about 46 inches, is pale brown fine sandy loam that has brown and gray mottles. The next part, to a depth of about 58 inches, is light gray sandy clay that has brown mottles. The lower part to a depth of 80 inches or more is light gray sandy clay that has brown and red mottles.

The Dorovan and Pamlico soils are not suited to cultivated crops, pasture grasses, or pine tree production mainly because of wetness. The Albany soils are poorly suited to cultivated crops because of low natural fertility, periodic droughtiness, and a seasonal high water table. These soils are moderately suited to pasture grasses. The potential of the soils in this map unit for production of pine trees is moderately high. Slash pine, longleaf pine, and loblolly pine are the recommended trees to plant for woodland production.

Soils on the Flood Plains

The two general soil map units in this group consist of nearly level to gently sloping, excessively drained to very poorly drained soils. Some soils in this map unit are sandy throughout and have thin bands of loamy lamellae below a depth of 40 inches, some have a loamy subsoil, and some have a clayey subsoil.

12. Alpin-Eunola-Kenansville

Nearly level to gently sloping, excessively drained to somewhat poorly drained soils; some are sandy throughout and have thin bands of lamellae below a depth of 40 inches, and some have a loamy subsoil

This map unit is on the flood plains of the Withlacoochee and Suwannee Rivers. These soils are occasionally flooded for long periods following rains of prolonged high intensity.

The natural vegetation consists mostly of slash pine, longleaf pine, live oak, water oak, turkey oak, bluejack oak, sweetgum, and blackgum. The understory includes American holly, cabbage palm, saw palmetto, yaupon, hawthorn, huckleberry, sparkleberry, saltbush, and bluestar.

This map unit makes up 2 percent of the county. It is 35 percent Alpin soils, 32 percent Eunola soils, and 30 percent Kenansville soils. The soils of minor extent, which are Chipley, Blanton, and Troop soils, make up 3 percent of the map unit.

The Alpin soils are excessively drained and are in broad areas in higher positions on the river terrace than the Eunola and Kenansville soils. The surface layer is dark brown fine sand about 4 inches thick. The subsurface layer, to a depth of about 55 inches, is light yellowish brown fine sand in the upper part and in the lower part is very pale brown fine sand that has light yellowish brown mottles. The subsoil to a depth of 80 inches or more is white sand that has thin horizontal bands of yellowish brown sand.

The Eunola soils are somewhat poorly drained and are in low river terrace positions that are interspersed with sinkholes. The surface layer is dark grayish brown fine sand about 7 inches thick. The subsurface layer, to a depth of 12 inches, is pale brown loamy fine sand. To a depth of about 65 inches, the subsoil is, in sequence downward, yellowish brown and strong brown sandy clay loam; strong brown sandy clay that has gray, red, and brown mottles; strong brown sandy clay loam that has gray, red, and brown mottles; and brownish yellow loamy fine sand. The substratum to a depth of about 80 inches or more is white fine sand that has brown mottles.

The Kenansville soils are well drained and are in slightly higher positions on the river terrace. The surface layer is dark gray loamy fine sand about 4 inches thick. The subsurface layer, to a depth of 22 inches, is loamy fine sand. It is pale brown in the upper part and pale yellow in the lower part. To a depth of about 56 inches, the subsoil is, in sequence downward, brownish yellow fine sandy loam, yellowish brown sandy clay loam, and brownish yellow fine sandy loam. The upper part of the substratum, to a depth of 69 inches, is pale yellow fine sand with yellowish brown bands of loamy material. The lower part to a depth of 80 inches is white fine sand with yellowish brown streaks.

The soils in this map unit are used mostly for pine tree production or as habitat for wildlife. These soils are unsuited to most other uses because of the hazard of occasional flooding. The potential of these soils for production of pine trees is moderately high.

13. Surrency-Plummer-Cantey

Nearly level, very poorly drained and poorly drained soils; some have a loamy subsoil, and some have a clay subsoil

This map unit is predominantly along the Aucilla River and its tributaries. These soils are frequently flooded.

The natural vegetation consists of cypress, blackgum, sweetgum, ironwood, sweetbay, water oak, and slash pine. The understory includes gallberry, fetterbush lyonia, and waxmyrtle.

This map unit makes up 1 percent of the county. It is 33 percent Surrency soils, 32 percent Plummer soils, and 25 percent Cantey soils. The soils of minor extent, which are Sapelo soils, make up 10 percent of the map unit.

The Surrency soils are very poorly drained. The surface layer is black loamy sand about 10 inches thick. The subsurface layer, to a depth of about 32 inches, is light brownish gray sand. The upper part of the subsoil is dark gray sandy clay loam. The lower part to a depth of about 80 inches or more is gray sandy clay. Other soils occur in areas of the Surrency soils. These soils are similar to Surrency soils, but they have an organic surface layer that is more than 16 inches thick.

The Plummer soils are poorly drained or very poorly drained. The surface layer is black fine sand about 4 inches thick. The subsurface layer, to a depth of about 58 inches, is very pale brown fine sand in the upper part and light brownish gray fine sand in the lower part. The subsoil to a depth of 80 inches or more is light brownish gray sandy clay loam.

The Cantey soils are poorly drained. The upper part of the surface layer is very dark gray fine sandy loam about 5 inches thick. The lower part, to a depth of about 10 inches, is dark gray fine sandy loam. The subsurface layer, to a depth of about 19 inches, is light brownish gray fine sandy loam. The subsoil to a depth of about 80 inches or more is light brownish gray sandy clay in the upper part and gray, mottled sandy clay in the lower part.

The soils in this map unit are used mainly as habitat for wildlife. These soils are not suited to cultivated crops, pasture, or pine trees.

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 underlying material, 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 underlying material. 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, Orangeburg loamy sand, 5 to 8 percent slopes, is one of several phases in the Orangeburg series.

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

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. Dorovan and Pamlico soils, depressional, 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.

Table 2 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.

2—Albany sand, 0 to 5 percent slopes. This soil is nearly level and gently sloping and is somewhat poorly drained. It is adjacent to swamps and drainageways on the uplands. The mapped areas are irregular in shape and range from 3 to 75 acres.

In 95 percent of areas mapped as Albany sand, 0 to 5 percent slopes, Albany and similar soils make up 82 to 99 percent of the map unit. Dissimilar soils make up 1 to 18 percent.

Typically, the surface layer is dark grayish brown sand about 10 inches thick. The subsurface layer extends to a depth of about 50 inches. It is grayish brown, mottled sand in the upper part; very pale brown, mottled sand in the next part; and light gray, mottled sand in the lower part. The subsoil extends to a depth of about 80 inches or more. It is pale brown, mottled fine sandy loam in the upper part; light gray, mottled sandy clay in the next part; and light gray, mottled sandy clay loam in the lower part.

Dissimilar soils included in mapping are small areas of Blanton and Plummer soils. Blanton soils are in higher positions on the landscape than the Albany soil and are moderately well drained. Plummer soils are in lower positions and are poorly drained.

Important soil properties:

Seasonal high water table: At a depth of 12 to 30 inches
Permeability: Rapid over moderate
Available water capacity: Low

The natural vegetation consists of water oak, loblolly pine, slash pine, and live oak. The understory includes fetterbush lyonia and broomsedge bluestem. Pineland threeawn is the dominant grass.

This soil is poorly suited to cultivated crops. Crop residue management, such as conservation tillage, is needed to conserve moisture during dry periods and reduce soil blowing and erosion. Seasonal wetness and low fertility are limitations affecting cropland use and management. Water control, such as a proper drainage system, is needed to prevent crop failure caused by excessive wetness. Irrigation is needed in dry periods. Applications of lime and fertilizer are needed to compensate for low fertility.

This soil is moderately suited to improved pasture grasses. Coastal bermudagrass and improved bahiagrass produce moderate yields when properly managed. Controlled grazing, proper lime and fertilizer amendments, and control of surface wetness are needed to gain optimum returns from pasture grasses.

The potential productivity of this soil for pine trees is high. Equipment use, seedling mortality, and plant competition are the main concerns in management. Slash pine and loblolly pine are the recommended trees to plant for woodland production. Soil compaction reduces the productivity of this soil. The sandy surface layer restricts the use of wheeled equipment, especially when the soil is saturated or very dry. The seasonal high water table restricts the use of equipment during wet periods. Intensive site preparation and maintenance can keep undesirable plants from restricting adequate natural or artificial reforestation. Site preparation, such as chopping, applying herbicides, and bedding, reduces debris, controls immediate plant competition, and facilitates mechanical planting. Hardwood understory can be reduced by controlled burning, applying herbicides, girdling, or cutting unwanted trees. Bedding of rows helps to minimize the effects of wetness. Bedding should not block natural surface drainage. Because of the risk of erosion and the wetness, road construction, logging, and site preparation should be avoided in streambeds and nearby areas.

This soil is poorly suited to urban development. Fill material and drainage are needed for most urban uses. Subsurface drainage will reduce excessive wetness. If the density of housing is moderate or high, a community sewage system is needed to prevent contamination of the water supplies as a result of seepage. Access roads must be designed to control surface runoff and to help stabilize cut slopes.

The land capability classification is IIIe, and the woodland ordination symbol is 9W.

3—Alpin sand. This soil is nearly level and excessively drained. It is on broad sand flats. The mapped areas range from 4 to 500 acres. Slopes are 0 to 2 percent.

In 95 percent of areas mapped as Alpin sand, Alpin and similar soils make up 80 to 99 percent of the map unit. Dissimilar soils make up 1 to 20 percent.

Typically, the surface layer is brown sand about 3 inches thick. The upper part of the subsurface layer, to a depth of about 34 inches, is brownish yellow sand. The next part, to a depth of about 55 inches, is very pale brown sand. The lower part to a depth of 80 inches or more is very pale brown sand that has horizontal bands of strong brown loamy sand. Some soils occurring in areas of this map unit are similar to the Alpin soil but have a loamy subsoil below a depth of 60 inches.

Dissimilar soils included in mapping are small areas of Blanton, Chipley, and Albany soils. Blanton soils are in similar positions on the landscape as the Alpin soil and have a loamy subsoil. Chipley and Albany soils are in slightly lower positions and are somewhat poorly drained. Albany soils have a loamy subsoil.

Important soil properties:

Seasonal high water table: Not within 72 inches of the surface
Permeability: Rapid or moderately rapid
Available water capacity: Low

The natural vegetation consists of scattered slash pine, longleaf pine, turkey oak, post oak, and blackjack oak. The understory vegetation includes bluestem, low panicums, fringeleaf paspalum, and native annual forbs. Most areas are planted to pine trees.

This soil is poorly suited to cultivated crops. A very low content of organic matter, excessive nutrient leaching, and low available water capacity are limitations affecting crop production. Intensive soil management practices are needed if this soil is cultivated. Row crops should be planted in alternate strips with close-growing cover crops to reduce soil blowing. In areas without adequate windbreaks, blowing sand can damage young plants. A crop rotation system that keeps the soil covered with close-growing, soil-improving crops at least three-fourths of the time is needed. Planting soil-improving crops and leaving all crop residue on the soil help to maintain the content of organic matter and control erosion. Only a few crops produce fair yields without irrigation. Irrigation generally is economically feasible if well water is readily available. Regular applications of fertilizer are needed. Conservation tillage will help control erosion and conserve moisture.

This soil is moderately suited to pasture and hay crops. Deep-rooted plants, such as improved bermudagrass and bahiagrass, can be grown with intensive management, but yields are reduced because of periodic drought. Regular applications of fertilizer and lime are needed. Grazing should be controlled to maintain plant vigor and ensure optimum yields.

The potential productivity of this soil for pine trees is moderately high. Equipment use and seedling mortality are the main concerns in management. The very low available water capacity adversely affects seedling survival in areas where understory plants are numerous. The sandy surface layer restricts the use of wheeled equipment, especially when the soil is saturated or very dry. Droughtiness increases the rate of seedling mortality. Undesirable plants can restrict adequate natural or artificial reforestation. Intensive site preparation and maintenance generally are not needed. Site preparation, such as chopping, applying herbicides, and bedding, reduces debris, controls immediate plant competition, and facilitates mechanical planting. This soil commonly is very low in content of organic matter, and harvesting operations that remove all tree biomass on the site will reduce the fertility of the soil. Preferred harvesting methods leave residual biomass distributed over the site. Slash pine and longleaf pine are the recommended trees to plant for woodland production. Sand pine also grows well on this soil.

This soil is moderately well suited to building site development. It is poorly suited to most sanitary facilities because seepage of effluent can contaminate the underground freshwater supplies and because of the sandy texture of the soil but is moderately well suited to septic tank absorption fields. If the density of housing is moderate or high, a community sewage system is needed to prevent contamination of the ground water supplies. Lawn or pasture grasses should be planted during construction or installation of sanitary facilities, building sites, and roads and streets to stabilize the soil surface and reduce the hazard of erosion.

The land capability classification is IVs, and the woodland ordination symbol is 10S.

5—Blanton sand, 0 to 5 percent slopes. This soil is nearly level and gently sloping and is moderately well drained. It is on ridges and slopes throughout the county. The mapped areas range from 5 to 150 acres.

In 95 percent of areas mapped as Blanton sand, 0 to 5 percent slopes, Blanton and similar soils make up 85 to 99 percent of the map unit. Dissimilar soils make up 1 to 15 percent.

Typically, the surface layer is dark grayish brown sand about 12 inches thick. The upper part of the subsurface layer, to a depth of 37 inches, is yellowish brown sand. The next part, to a depth of 53 inches, is light yellowish brown sand. The lower part, to a depth of 69 inches, is very pale brown sand. The subsoil to a depth of 80 inches or more is light yellowish brown, mottled sandy loam. Some soils occurring in areas of this map unit are similar to the Blanton soil, but they have a subsoil that contains more than 5 percent plinthite, have a sandy surface layer less than 40 inches thick, or are sandy throughout.

Dissimilar soils included in mapping are Albany, Alpin, and Ocilla soils. Albany and Ocilla soils are in lower positions on the landscape than the Blanton soil and are somewhat poorly drained. Alpin soils are in slightly higher positions, do not have a continuous subsoil, and are excessively drained.

Important soil properties:

Seasonal high water table: Perched at a depth of 48 to 72 inches
Permeability: Moderate or moderately rapid
Available water capacity: Low

The natural vegetation consists of slash pine, longleaf pine, and live oak. The understory vegetation includes blackberry, sassafras, winged sumac, brackenfern, and pineland threeawn.

This soil is poorly suited to the commonly cultivated crops in this county. Droughtiness and rapid leaching of nutrients are limitations affecting crop production, and intensive management is needed. Yields are reduced and choice of plants is limited unless corrective measures, such as irrigation, applications of fertilizer and lime, and conservation tillage, are used to conserve moisture and reduce the risk of erosion. A crop rotation system that keeps cover crops on the soil at least two-

Figure 3.—Strips of rye were planted in this area of Blanton sand, 0 to 5 percent slopes, to help reduce crop damage caused by blowing sand.

thirds of the time is needed. Planting soil-improving cover crops and leaving crop residue on the soil increase the content of organic matter, control erosion, and conserve moisture. Strip crops are often used to reduce crop damage caused by soil blowing (fig. 3).

This soil is moderately well suited to pasture and hay crops. Improved bermudagrass and bahiagrass are well adapted to this soil, but yields are reduced because of periodic droughts. Regular applications of fertilizer and lime are needed. Grazing should be controlled to maintain plant vigor and a good ground cover. Overseeding the pasture with rye, clover, or other recommended winter forage will produce the extra tonnage needed to allow grazing through the winter.

The potential productivity of this soil for pine trees is moderately high. Equipment use and seedling mortality are moderate concerns in management. The low available water capacity adversely affects seedling survival in areas where understory plants are numerous. This soil commonly is very low in content of organic matter, and harvesting operations that remove all tree biomass on the site will reduce the fertility of the soil. Preferred harvesting methods leave residual biomass distributed over the site. Organic matter can be conserved by restricting burning and leaving slash well distributed. Competing vegetation can be controlled by site preparation. Spraying, cutting, or girdling controls unwanted weeds, brush, or trees. Using special harvesting equipment with large tires or tracks reduces the equipment use limitation, minimizes root damage, and reduces soil compaction during thinning operations.

This soil is moderately suited to most sanitary facilities and is well suited to building site development. The sandy texture is a limitation affecting sanitary facilities because seepage of effluent can contaminate underground freshwater supplies. Lawn or pasture grasses should be planted to stabilize the exposed soil surface during the construction or installation of sanitary facilities, buildings, and roads to reduce the hazard of erosion.

The land capability classification is IIIs, and the woodland ordination symbol is 11S.

6—Blanton sand, 5 to 8 percent slopes. This soil is gently sloping and is moderately well drained. It is on side slopes and narrow ridges. The mapped areas are irregular in shape and range from 5 to 15 acres.

In 80 percent of areas mapped as Blanton sand, 5 to 8 percent slopes, Blanton and similar soils make up 80 to 99 percent of the map unit. Dissimilar soils make up 1 to 20 percent.

Typically, the surface layer is grayish brown sand about 6 inches thick. The subsurface layer, to a depth of about 57 inches, is yellowish brown sand. The upper part of the subsoil is pale brown sandy loam. The lower part to a depth of about 80 inches is pale brown sandy clay loam that has gray mottles.

Dissimilar soils included in mapping are Alpin soils. These soils are in slightly higher positions on the landscape than the Blanton soil and do not have a continuous subsoil.

Important soil properties:

Seasonal high water table: Perched at a depth of 48 to 72 inches
Permeability: Moderate or moderately rapid
Available water capacity: Low

The natural vegetation consists of slash pine, live oak, water oak, and laurel oak. The understory vegetation includes blackberry, greenbrier, wild cherry, panicum, and bluestem.

This soil is poorly suited to cultivated crops. Droughtiness, rapid leaching of nutrients, and steepness of slope are the main limitations affecting cropland use. The irregular slopes hinder tillage operations. Maintaining crop residue on or near the surface reduces runoff, helps to maintain soil tilth, and increases the content of organic matter in the soil. Most crops and pasture plants respond well to regular applications of fertilizer, and lime generally is needed on this soil.

This soil is moderately suited to pasture. The main limitations are droughtiness and low natural fertility. Pasture grasses can be grown to help control erosion. Suitable pasture plants are bahiagrass and improved bermudagrass. Fertilizer and lime are needed for optimum growth of grasses and legumes.

The potential productivity of this soil for slash pine is moderately high. The low available water capacity adversely affects seedling survival in areas where understory plants are numerous. This soil commonly is very low in content of organic matter, and harvesting operations that remove all tree biomass on the site will reduce the fertility of the soil. Preferred harvesting methods leave residual biomass distributed over the site. Organic matter can be conserved by restricting burning and leaving slash well distributed. Competing vegetation can be controlled by site preparation. Spraying, cutting, or girdling controls unwanted weeds, brush, or trees. Using special harvesting equipment with large tires or tracks reduces the equipment use limitation, minimizes root damage, and reduces soil compaction during thinning operations.

This soil is moderately suited to most sanitary facilities and is well suited to building site development (fig. 4). The sandy texture is a limitation affecting sanitary facilities because seepage of effluent can contaminate the underground freshwater supplies. Lawn or pasture grasses should be planted during construction and installation of sanitary facilities, buildings, and roads to stabilize the exposed soil surface and to reduce the hazard of erosion.

The land capability classification is IVs, and the woodland ordination symbol is 11S.

10—Lakeland sand, 0 to 5 percent slopes. This soil is nearly level to gently sloping and is excessively drained. It is in broad upland areas on the Lower Coastal Plain. The mapped areas range from 10 to 80 acres.

In 80 percent of areas mapped as Lakeland sand, 0 to 5 percent slopes, Lakeland and similar soils make up 80 to 99 percent of the map unit. Dissimilar soils make up 1 to 20 percent.

Typically, the surface layer is brown sand about 4 inches thick. The upper part of the underlying material, to a depth of about 35 inches, is yellow sand. The next part, to a depth of about 63 inches, is brownish yellow sand. The lower part to a depth of about 80 inches is very pale brown sand.

Dissimilar soils included in mapping are small areas of Blanton soils. These soils are in slightly lower positions on the landscape than the Lakeland soil and have a loamy subsoil.

Important soil properties:

Seasonal high water table: Not within 72 inches of the surface
Permeability: Very rapid
Available water capacity: Very low

Figure 4.—This housing development is on Cherry Lake, which is an attractive setting for urban development. The soil is Blanton sand, 5 to 8 percent slopes.

The natural vegetation consists of turkey oak, blackjack oak, longleaf pine, and slash pine. The understory vegetation includes sumac and Florida bluestem. In many areas, this soil has been cleared and planted to slash pine.

This soil is poorly suited to cultivated crops because of droughtiness and rapid leaching of plant nutrients. Frequent applications of fertilizer and an irrigation system are necessary for good crop production.

This soil is moderately suited to pasture. Deep-rooted plants, such as improved bermudagrass and bahiagrass, are adapted to this soil. Regular applications of fertilizer and lime are needed.

The potential productivity of this soil for slash pine is moderate. Slash pine and longleaf pine are the recommended trees to plant for woodland production. Equipment use and seedling mortality are moderate concerns in management. Droughtiness increases the rate of seedling mortality. Hardwood understory can be reduced by controlled burning, applying herbicides, girdling, or cutting unwanted trees. The sandy surface layer restricts the use of wheeled equipment, especially when the soil is very dry.

This soil is well suited to building site development except for shallow excavations, which are subject to caving. It is poorly suited to most sanitary facilities because of its sandy texture and because of seepage, but it is well suited to septic tank absorption fields. If the density of housing is moderate or high, a community sewage system is needed to prevent contamination of the ground water supplies as a result of seepage. Because of the sandy texture of this soil, it is poorly suited to recreational development.

The land capability classification is IVs, and the woodland ordination symbol is 10S.

11—Lakeland sand, 5 to 8 percent slopes. This soil is gently sloping to sloping and is excessively drained. It is on broad ridges on the uplands and in low depositional positions. The mapped areas are irregular in shape and range from 5 to 20 acres.

In 80 percent of areas mapped as Lakeland sand, 5 to 8 percent slopes, Lakeland and similar soils make up 80 to 99 percent of the map unit. Dissimilar soils make up 1 to 20 percent.

Typically, the surface layer is very dark grayish brown sand about 4 inches thick. The underlying material to a depth of about 80 inches is yellowish brown sand and brownish yellow sand. Some soils occurring in areas of this map unit are similar to the Lakeland soil, but they have more than 10 percent silt and clay in the 10- to 40-inch control section or they have lamellae.

Dissimilar soils included in mapping are small areas of Blanton and Troup soils. These soils have a loamy subsoil. Blanton soils are moderately well drained, and Troup soils are well drained.

Important soil properties:

Seasonal high water table: Not within 72 inches of the surface
Permeability: Very rapid
Available water capacity: Very low

The natural vegetation consists of bluejack oak, turkey oak, longleaf pine, and slash pine. The understory vegetation includes sumac and Florida bluestem.

This soil is not suited to cultivated crops. The main limitations affecting irrigated crops are rapid leaching of nutrients, droughtiness, and very low natural fertility. Crop residue left on or near the surface helps to conserve moisture, maintain tilth, and control erosion. Practices that can be used to control erosion include early fall seeding, conservation tillage, and grassed waterways. Most crops and pasture plants respond moderately to fertilizer, and lime generally is needed.

This soil is moderately suited to pasture. Suitable pasture plants are bahiagrass and improved bermudagrass. Regular applications of fertilizer and lime are needed for optimum growth of grasses and legumes.

The potential productivity of this soil for slash pine is moderate. Slash pine and longleaf pine are the recommended trees to plant for woodland production. Equipment use and seedling mortality are moderate concerns in woodland management. Droughtiness increases the rate of seedling mortality. Hardwood understory can be reduced by controlled burning, applying herbicides, girdling, or cutting unwanted trees. The sandy surface layer restricts the use of wheeled equipment, especially when the soil is very dry.

This soil is well suited to most building site development except for shallow excavations, which are subject to caving. It is poorly suited to most sanitary facilities because of its sandy texture, but it is moderately suited to septic tank absorption fields. If the density of housing is moderate or high, a community sewage system is needed to prevent contamination of the ground water supplies as a result of seepage.

The land capability classification is VIs, and the woodland ordination symbol is 10S.

13—Lucy sand, 2 to 5 percent slopes. This soil is nearly level to gently sloping and is well drained. It is on broad upland ridges. The mapped areas are irregular in shape and range from 15 to 60 acres.

In 90 percent of the areas mapped as Lucy sand, 2 to 5 percent slopes, Lucy and similar soils make up 81 to 99 percent of the map unit. Dissimilar soils make up 1 to 19 percent.

Typically, the surface layer is very dark grayish brown sand about 11 inches thick. The subsurface layer, to a depth of 24 inches, is strong brown loamy sand. The upper part of the subsoil, to a depth of 34 inches, is yellowish red fine sandy loam. The lower part to a depth of about 80 inches or more is yellowish red sandy clay loam.

Dissimilar soils included in mapping are small areas of Faceville soils. These soils have a clayey subsoil.

Important soil properties:

Seasonal high water table: Not within 72 inches of the surface
Permeability: Moderate
Available water capacity: Low

The natural vegetation consists of maple, hickory, bluejack oak, and live oak. The understory vegetation includes ash, greenbrier, and pineland threeawn.

In most areas, this soil is used for cultivated crops or is planted to pasture.

This soil is moderately suited to cultivated crops. It can be cultivated if good farming methods are used, but droughtiness and rapid leaching of plant nutrients limit the choice of crops that can be grown and the potential yields of adapted crops. With proper management, corn, soybeans, peanuts, and tobacco can be grown. A crop rotation system that keeps cover crops on the soil at least half the time is needed. These cover crops and all crop residue should be left on the ground to conserve moisture and reduce the risk of erosion. Good seedbed preparation and applications of fertilizer and lime are needed to obtain maximum yields. Irrigation of some high value crops generally is feasible if water is readily available.

This soil is well suited to hay crops and pasture. Improved bermudagrass and bahiagrass produce well if fertilizer and lime are applied. Controlled grazing is necessary to maintain plant vigor and a good ground cover and to ensure maximum yields.

The potential productivity of this soil for slash pine is moderately high. Seedling mortality, equipment use, and plant competition are the main concerns in management. Slash pine and loblolly pine are the recommended trees to plant for woodland production. Intensive site preparation and maintenance can keep undesirable plants from restricting natural or artificial reforestation. Hardwood understory can be reduced by controlled burning, applying herbicides, girdling, or cutting unwanted trees.

This soil has slight limitations affecting most sanitary facilities and building site development except for shallow excavations, which are subject to caving. Lawn or pasture grasses should be planted to stabilize the exposed soil surface and reduce the hazard of erosion during construction or installation of sanitary facilities, buildings, and roads.

The land capability classification is IIs, and the woodland ordination symbol is 8S.

14—Lucy sand, 5 to 8 percent slopes. This soil is gently sloping to sloping and is well drained. It is on side slopes and narrow ridges. The mapped areas are irregular in shape and range from 15 to 40 acres.

In 80 percent of areas mapped as Lucy sand, 5 to 8 percent slopes, Lucy and similar soils make up 75 to 96 percent of the map unit. Dissimilar soils make up 4 to 25 percent.

Typically, the surface layer is very dark grayish brown sand about 11 inches thick. The subsurface layer, to a depth of about 24 inches, is strong brown loamy sand. The upper part of the subsoil, to a depth of about 34 inches, is yellowish red fine sandy loam. The lower part to a depth of 80 inches or more is sandy clay loam. Some soils occurring in areas of this map unit are similar to Lucy soil, but they have a subsoil at a depth of less than 20 inches or below a depth of 40 inches.

Dissimilar soils included in mapping are small areas of Faceville soils. These soils have a clayey subsoil.

Important soil properties:

Seasonal high water table: Not within 72 inches of the surface
Permeability: Moderate
Available water capacity: Low

The natural vegetation consists of maple, hickory, bluejack oak, and live oak. The understory includes ash, greenbrier, and pineland threeawn.

In most areas, this soil is used for cultivated crops or is planted to pasture.

This soil is moderately suited to cultivated crops. It can be cultivated if good farming methods are used, but droughtiness, a moderate erosion hazard, and rapid leaching of plant nutrients limit the choice of crops that can be grown and the potential yields of adapted crops. With proper management corn, soybeans, peanuts, and tobacco can be grown. A crop rotation system that keeps cover crops on the soil at least half the time is needed. These cover crops and all crop residue should be left on the ground to conserve moisture and reduce the risk of erosion. Good seedbed preparation and applications of fertilizer and lime are needed to obtain maximum yields. Irrigation of some high value crops generally is feasible if water is readily available. Early seeding, stubble mulching, and tilling and planting on the contour or across the slope will reduce erosion. Also, waterways should be shaped and seeded to perennial grass.

This soil is well suited to hay crops and pasture. Improved bermudagrass and bahiagrass produce well if fertilizer and lime are applied. Controlled grazing is necessary to maintain plant vigor and a good ground cover and to ensure maximum yields.

The potential productivity of this soil for slash pine is moderately high. Seedling mortality, equipment use, and plant competition are the main concerns in management. Slash pine and loblolly pine are the recommended trees to plant for woodland production. Intensive site preparation and maintenance can keep undesirable plants from restricting adequate natural or artificial reforestation. Hardwood understory can be reduced by controlled burning, applying herbicides, girdling, or cutting unwanted trees.

This soil has slight limitations for most sanitary facilities and building site development except for shallow excavations, which are subject to caving. Lawn or pasture grasses should be planted during construction and installation of sanitary facilities, buildings, and roads to stabilize the exposed soil surface and reduce the hazard of erosion.

The land capability classification is IIIs, and the woodland ordination symbol is 8S.

15—Mascotte sand. This soil is nearly level and poorly drained. It is on the flatwoods and in positions adjacent to swamps or depressions. The mapped areas are 5 to 20 acres. Slopes are 0 to 2 percent.

In 95 percent of areas mapped as Mascotte sand, Mascotte and similar soils make up 84 to 99 percent of the map unit. Dissimilar soils make up 1 to 16 percent.

Typically, the surface layer is black sand about 6 inches thick. The subsurface layer, to a depth of 14 inches, is light gray sand. The subsoil extends to a depth of 80 inches. In sequence downward, it is black sand, very dark brown sand coated with organic matter, light yellowish brown sand, and gray sandy clay loam. Some soils occurring in areas of this map unit are similar to the Mascotte soil, but they have a loamy subsoil below a depth of 40 inches.

Dissimilar soils included in mapping are small areas of Ocilla and Plummer soils. Ocilla soils are in slightly higher positions on the landscape than the Mascotte soil and do not have an organic-stained sandy subsoil. Plummer soils are in slightly lower positions than the Mascotte soil and do not have an organic-stained sandy subsoil.

Important soil properties:

Seasonal high water table: At a depth of 0 to 12 inches
Permeability: Moderate
Available water capacity: Low

The natural vegetation consists of redbay, water oak, and slash pine. The understory vegetation includes chalky bluestem, sumac, inkberry, greenbrier, titi, waxmyrtle, and saw palmetto.

This soil is poorly suited to cultivated crops because of wetness. The number of adapted crops that can be grown is very limited unless intensive water-control measures are used. With a water-control system that is designed to remove excess water during wet periods, this soil is well suited to a variety of vegetable crops. In addition to water control, proper management should include crop rotation and keeping close-growing, soil-improving crops on the land at least two-thirds of the time. Fertilizer and lime should be applied according to the needs of the crop.

This soil is fairly suited to pasture. The main limitations are seasonal wetness and very low natural fertility. Wetness limits the choice of plants that can be grown and the period of grazing. When the soil is wet, grazing causes compaction of the surface layer and damage to the plant community. Excess surface water can be removed from most areas by field drains. The main suitable pasture plants are bahiagrass and bermudagrass. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

The potential productivity of this soil for slash pine is moderate. The seasonal high water table restricts the use of equipment during wet periods. Site preparation, such as chopping, applying herbicides, and bedding, reduces debris, controls immediate plant competition, and facilitates mechanical planting. Planting trees on bedded rows minimizes the effects of wetness. Using special harvesting equipment with large tires or tracks reduces the equipment use limitation, minimizes root damage, and reduces soil compaction during thinning operations.

This soil is poorly suited to sanitary facilities and is fairly suited to building site development. The main limitations are wetness, seepage, the sandy texture, and the instability of cutbanks. Fill material is needed for most urban uses. Drainage is needed if roads and building foundations are constructed. Excess water can be removed by installing shallow ditches and providing the proper ditch grade. Septic tank absorption fields are mounded in most areas. If the density of housing is moderate or high, a community sewage system is needed to prevent contamination of the water supplies as a result of seepage.

The land capability classification is IVw, and the woodland ordination symbol is 10W.

16—Orangeburg loamy sand, 2 to 5 percent slopes. This soil is nearly level to gently sloping and is well drained. It is on the uplands. The mapped areas range from 3 to 80 acres.

In 95 percent of areas mapped as Orangeburg loamy sand, 2 to 5 percent slopes, Orangeburg and similar soils make up 82 to 99 percent of the map unit. Dissimilar soils make up 1 to 18 percent.

Typically, the surface layer is very dark grayish brown loamy sand about 6 inches thick. The subsurface layer, to a depth of 15 inches, is dark yellowish brown loamy sand. The upper part of the subsoil, to a depth of 26 inches, is yellowish red fine sandy loam. The lower part to a depth of 80 inches or more is yellowish red sandy clay loam. Other soils occurring in areas of this map unit are similar to the Orangeburg soil, but they have a loamy subsoil below a depth of 20 inches.

Dissimilar soils included in mapping are small areas of Faceville soils. These soils are clayey.

Important soil properties:

Seasonal high water table: Not within 72 inches of the surface
Permeability: Moderate
Available water capacity: Moderate

The natural vegetation consists of slash pine, loblolly pine, and southern red oak. The understory vegetation includes blackberry and wild cherry.

This soil is well suited to crops. The hazard of erosion is the main concern in management if this soil is cultivated. Conservation tillage is needed to minimize soil blowing and erosion. Fertilizer and lime are needed to provide essential and minor nutrients for the selected plants.

This soil is also well suited to improved pasture. Improved bermudagrass and bahiagrass are well adapted to this soil. Regular applications of fertilizer and lime are needed.

The potential productivity of this soil for slash pine is moderately high. There are no major management concerns; however, caution should be exercised during site preparation to minimize soil loss caused by erosion. Undesirable plants can restrict adequate natural or artificial reforestation. Intensive site preparation and maintenance generally are not needed. Hardwood understory can be reduced by controlled burning, applying herbicides, girdling, or cutting unwanted trees. This soil commonly is very low in content of organic matter, and harvesting operations that remove all tree biomass on the site will reduce the fertility of the soil. Preferred harvesting methods leave residual biomass distributed over the site. Slash pine and loblolly pine are the recommended trees to plant for woodland production.

This soil is well suited to sanitary facilities and building site development.

The land capability classification is IIe, and the woodland ordination symbol is 8A.

17—Orangeburg loamy sand, 5 to 8 percent slopes. This soil is gently sloping to sloping and is well drained. It is on the uplands. The mapped areas range from 5 to 50 acres.

In 90 percent of areas mapped as Orangeburg loamy sand, 5 to 8 percent slopes, Orangeburg and similar soils make up 80 to 99 percent of the map unit. Dissimilar soils make up 1 to 20 percent.

Typically, the surface layer is dark brown loamy sand about 8 inches thick. The subsurface layer, to a depth of 15 inches, is yellowish brown loamy sand. The upper part of the subsoil, to a depth of 18 inches, is strong brown sandy loam. The next part, to a depth of 35 inches, is yellowish red sandy clay loam. The lower part to a depth of 80 inches or more is strong brown sandy clay loam. Some soils occurring in areas of this map unit are similar to the Orangeburg soil, but they have a loamy subsoil below a depth of 20 inches.

Dissimilar soils included in mapping are small areas of Troup soils. These soils have a loamy subsoil below a depth of 40 inches.

Important soil properties:

Seasonal high water table: Not within 72 inches of the surface
Permeability: Moderate
Available water capacity: Low

The natural vegetation consists of slash pine, loblolly pine, and southern red oak. The understory vegetation includes wild cherry, blackberry, and redcedar.

This soil is moderately well suited to cultivated crops. The hazard of erosion is the main concern in management if this soil is cultivated. Conservation tillage, contour farming, stripcropping, or a combination of these practices is needed to reduce soil loss caused by water erosion. Fertilizer and lime should be applied according to the needs of the crop for optimum yields. Growing cover crops and leaving all crop residue on the soil reduce the risk of erosion and conserve moisture.

This soil is well suited to improved pasture. Improved bermudagrass and bahiagrass are well adapted to this soil if properly managed. Permanent pasture is preferred in cropland areas that are subject to severe erodibility. Fertilizer and lime should be applied according to the needs of the crop.

The potential productivity of this soil for slash pine is moderately high. The hazard of erosion is the main concern in management. Undesirable plants can restrict adequate natural or artificial reforestation. Intensive site preparation and maintenance generally are not needed.

Slash pine and loblolly pine are the recommended trees to plant for woodland production.

This soil is well suited to building site development. It is well suited to most sanitary facilities except sewage lagoons. Special design and proper site selection are needed when planning the installation of a sewage lagoon on this soil. The main limitation affecting sanitary facilities is seepage of effluent. Steepness of slope and seepage are moderate limitations affecting sewage lagoons. If the density of housing is moderate or high, a community sewage system is needed to prevent contamination of the ground water supplies as a result of seepage.

The land capability classification is IIIe, and the woodland ordination symbol is 8A.

18—Orangeburg loamy sand, 8 to 12 percent slopes. This soil is sloping to strongly sloping and is well drained. It is on the uplands. The mapped areas range from 5 to 50 acres.

In 80 percent of areas mapped as Orangeburg loamy sand, 8 to 12 percent slopes, Orangeburg and similar soils make up 79 to 99 percent of the map unit. Dissimilar soils make up 1 to 21 percent.

Typically, the surface layer is yellowish brown loamy sand about 5 inches thick. The subsurface layer, to a depth of about 17 inches, is yellowish brown loamy sand. The upper part of the subsoil, to a depth of 60 inches, is yellowish red sandy clay loam. The lower part to a depth of 80 inches or more is strong brown sandy clay loam. Some soils occurring in areas of this map symbol are similar to the Orangeburg soil, but they have a loamy subsoil below a depth of 20 inches.

Dissimilar soils included in mapping are small areas of Troup soils. These soils have a loamy subsoil below a depth of 40 inches. Also included are small areas of soils that have a clayey texture.

Important soil properties:

Seasonal high water table: Not within 72 inches of the surface
Permeability: Moderate
Available water capacity: Low

The natural vegetation consists of slash pine, loblolly pine, and southern red oak. The understory vegetation includes wild cherry, blackberry, and redcedar.

This soil is poorly suited to cultivated crops. The hazard of erosion is the main concern in management if this soil is cultivated. Conservation tillage, contour farming, stripcropping, or a combination of these practices is needed to reduce soil loss caused by water erosion. Fertilizer and lime should be applied according to the needs of the crop for optimum yields. Growing cover crops and leaving all crop residue on the soil reduce the risk of erosion and conserve moisture.

This soil is well suited to improved pasture. Improved bermudagrass and bahiagrass are well adapted to this soil if properly managed. Permanent pasture is preferred in cropland areas that are subject to severe erodibility. Fertilizer and lime should be applied according to the needs of the crop.

The potential productivity of this soil for slash pine is moderately high. The hazard of erosion is the main concern in management. Undesirable plants can reduce adequate natural or artificial reforestation. Intensive site preparation and maintenance generally are not needed. Hardwood understory can be reduced by controlled burning, applying herbicides, girdling, or cutting unwanted trees. This soil commonly is very low in content of organic matter, and harvesting operations that remove all tree biomass on the site will reduce the fertility of the soil. Preferred harvesting methods leave residual biomass distributed over the site. Slash pine and loblolly pine are the recommended trees to plant for woodland production.

This soil is moderately suited to building site development. It is also moderately suited to most sanitary facilities except sewage lagoons. The main limitations affecting sanitary facilities is seepage of effluent. Steepness of slope and seepage are severe limitations affecting sewage lagoons. Special design and proper site selection are needed when planning the installation of a sewage lagoon on this soil. If the density of housing is moderate or high, a community sewage system is needed to prevent contamination of the ground water supplies as a result of seepage.

The land capability classification is IVe, and the woodland ordination symbol is 8A.

21—Cantey fine sandy loam. This soil is nearly level and poorly drained. It is in low-lying, flat areas where excess water ponds for long periods after heavy rainfall. Slopes are 0 to 2 percent.

In 95 percent of areas mapped as Cantey fine sandy loam, Cantey and similar soils make up 80 to 99 percent of the map unit. Dissimilar soils make up 1 to 20 percent.

Typically, the upper part of the surface layer is very dark gray fine sandy loam about 5 inches thick. The upper part of the subsurface layer, to a depth of about 10 inches, is dark gray fine sandy loam. The lower part, to a depth of about 19 inches, is light brownish gray fine sandy loam. The subsoil extends to a depth of 80 inches or more. The upper part of the subsoil is light brownish gray sandy clay that has strong brown mottles. The next part is gray sandy clay that has yellowish brown and red mottles. The lower part is gray sandy clay that has brownish gray mottles. Some soils occurring in areas of this map unit are similar to the Cantey soil, but they have a loamy surface layer more than 20 inches thick or a slope of as much as 10 percent.

Dissimilar soils included in mapping are small areas of Albany, Ocilla, Plummer, and Surrency soils. These soils are sandy below a depth of 20 inches. Albany and Ocilla soils are somewhat poorly drained, have a loamy subsoil, and are in higher positions on the landscape than the Cantey soil. Plummer soils are in similar positions as the Cantey soil and have a loamy subsoil. Surrency soils are very poorly drained.

Important soil properties:

Seasonal high water table: At a depth of 0 to 12 inches
Permeability: Slow
Available water capacity: Moderate

The natural vegetation consists of laurel oak, water oak, sweetgum, blackgum, cypress, red maple, loblolly pine, and slash pine. The understory vegetation includes bluestem and water-tolerant grasses.

This soil is used mostly as woodland. A few areas are used as pasture.

This soil is poorly suited to cultivated crops. It is limited mainly because of wetness and ponding. Generally, this soil is not suited to cultivation. If water control is maintained through a system of dikes, ditches, and pumps, however, this soil is suited to truck crops. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water.

This soil is poorly suited to pasture, but with water control management, it is fairly suited to this use. The main limitations are wetness and ponding. Wetness limits the choice of plants that can be grown and the period of grazing. Suitable pasture plants are bahiagrass and improved bermudagrass.

The potential productivity of this soil for slash pine and loblolly pine, if drained, is moderately low. Hardwoods, if left uncontrolled, will reduce pine tree stands; therefore, hardwoods could initially be a less expensive management alternative, depending on the management objective. The main concerns in woodland management are equipment use and seedling mortality. Wetness is a limitation affecting the use of equipment on this soil. After harvesting, reforestation must be carefully managed to reduce competition from undesirable understory plants. Water-tolerant trees should be planted, and harvesting operations should be scheduled during dry periods. Because the clayey soil is sticky when wet, most planting and harvesting equipment can be used only during dry periods. Bedding of rows helps to minimize the effects of excessive wetness.

This soil is poorly suited to sanitary facilities and building site development. The main limitations are wetness, the clayey texture, and slow permeability. Fill material and drainage are needed for most urban uses. Selection of vegetation adapted to this soil is critical for the establishment of lawns, shrubs, trees, and vegetable gardens. The slow permeability and the high water table increase the possibility that septic tank absorption fields will not function properly on this soil.

The land capability classification is VIw, and the woodland ordination symbol is 8W.

22—Pelham sand. This soil is nearly level and is poorly drained. It is on flats and in depressions. The mapped areas range from 5 to 30 acres. Slopes are 0 to 2 percent.

In 80 percent of areas mapped as Pelham sand, Pelham and similar soils make up 80 to 94 percent of the map unit. Dissimilar soils make up 6 to 20 percent.

Typically, the upper part of the surface layer is very dark gray sand about 7 inches thick. The lower part, to a depth of 13 inches, is dark grayish brown sand. The subsurface layer, to a depth of 24 inches, is very pale brown loamy sand. The subsoil extends to a depth of 80 inches or more. In sequence downward, it is light brownish gray sandy loam that has yellowish red and yellowish brown mottles; light brownish gray sandy clay loam that has yellowish red and yellowish brown mottles; gray sandy clay that has dark red, yellow, pale brown, and gray mottles; and gray clay that has dark red, yellow, pale brown, and gray mottles. Some soils occurring in areas of this map unit are similar to the Pelham soil, but some have a loamy subsoil below a depth of 40 inches, some have an organic-stained subsurface layer, and others are somewhat poorly drained.

Dissimilar soils included in mapping are small areas of Cantey soils. These soils are clayey within 20 inches of the surface.

Important soil properties:

Seasonal high water table: At a depth of 0 to 12 inches
Permeability: Slow
Available water capacity: Low

The natural vegetation consists of laurel oak, water oak, and slash pine. The understory vegetation includes waxmyrtle, inkberry, fetterbush lyonia, scattered saw palmetto, chalky bluestem, and pineland threeawn.

This soil is poorly suited to cultivated crops. It is limited by wetness after periods of heavy rainfall and by the low available water capacity in the sandy surface and subsurface layers during dry periods. A water control system designed to remove excess water is needed before these soils are suitable for cultivated crops. Seedbed preparation should include bedding of rows. Row crops should be planted in alternate strips with close-growing crops at least three-fourths of the time. Leaving all crop residue on the soil and growing cover crops reduce the risk of erosion and conserve moisture. Regular applications of fertilizer and lime are needed.

This soil is moderately suited to improved pasture grasses. Proper management practices, such as water control, controlled grazing, and applications of fertilizer and lime, are needed.

The potential productivity of this soil for pine trees is moderately high. A water-control system is needed, and bedding of rows is desirable. Site preparation, such as chopping, applying herbicides, and bedding, reduces debris, controls immediate plant competition, and facilitates mechanical planting. Planting trees on bedded rows minimizes the effects of wetness. Using special harvesting equipment with large tires or tracks reduces the equipment use limitation, minimizes root damage, and reduces soil compaction during thinning operations.

This soil is poorly suited to sanitary facilities, building site development, and recreational development because of wetness.

The land capability classification is Vw, and the woodland ordination symbol is 11W.

23—Plummer sand. This soil is nearly level and poorly drained. It is in broad, flat areas or along drainageways. The mapped areas are irregular in shape and range from 5 to 200 acres. Slopes are 0 to 2 percent.

In 95 percent of the areas mapped as Plummer sand, Plummer and similar soils make up 83 to 99 percent of the map unit. Dissimilar soils make up 1 to 17 percent.

Typically, the upper part of the surface layer is very dark gray sand about 7 inches thick. The lower part, to a depth of 14 inches, is dark grayish brown sand. The upper part of the subsurface layer, to a depth of about 22 inches, is light brownish gray sand. The next part, to a depth of 43 inches, is light gray sand that has gray and brownish yellow mottles. The lower part, to a depth of 52 inches, is white sand. The upper part of the subsoil, to a depth of 57 inches, is light gray loamy sand that has brown mottles. The lower part to a depth of 80 inches or more is light brownish gray fine sandy loam that has mottles in shades of red, yellow, and brown. Some soils occurring in areas of this map unit are similar to the Plummer soil, but they are sandy to a depth of less than 40 inches and are somewhat poorly drained.

Dissimilar soils included in mapping are Chipley and Surrency soils. Chipley soils are in slightly higher positions on the landscape than the Plummer soils and do not have a loamy subsoil. Surrency soils are in slightly lower positions and have a black surface layer about 10 inches or more thick.

Important soil properties:

Seasonal high water table: At a depth of 0 to 12 inches
Permeability: Moderate
Available water capacity: Low

The natural vegetation consists of slash pine and longleaf pine. The understory vegetation includes waxmyrtle, inkberry, fetterbush lyonia, brackenfern, scattered saw palmetto, and pineland threeawn.

This soil is poorly suited to cultivated crops mainly because of wetness after heavy rainfall and low available water capacity during dry periods. A water control system designed to remove excess surface and subsurface water is needed before these soils are suitable for cultivated crops. Seedbed preparation should include bedding of rows. Row crops should be planted in alternate strips with close-growing crops at least three-fourths of the time. Leaving all crop residue on the soil and growing cover crops reduce erosion and conserve moisture. Regular applications of fertilizer and lime are needed.

This soil is moderately suited to improved grasses. Proper management practices, such as water control, controlled grazing, and regular applications of fertilizer and lime, are needed.

The potential productivity of this soil for loblolly pine is moderate. The seasonal high water table restricts the use of equipment during wet periods. Wetness and strong winds increase the hazard of windthrow. Seedling mortality is very severe because of the high water table that is at or near the soil surface for about 6 months of the year. Site preparation, such as chopping, applying herbicides, and bedding, reduces debris, controls immediate plant competition, and facilitates mechanical planting. Hardwood understory can be reduced by controlled burning, applying herbicides, girdling, or cutting unwanted trees. Using special planting stock that is larger than usual or that is containerized will reduce the rate of seedling mortality.

This soil is poorly suited to sanitary facilities or building site development because of the seasonal high water table.

The land capability classification is IVw, and the woodland ordination symbol is 11W.

26—Troup sand, 0 to 5 percent slopes. This soil is nearly level to gently sloping and is well drained. It is on the Coastal Plain uplands. The mapped areas range from 10 to 120 acres.

In 90 percent of areas mapped as Troup sand, 0 to 5 percent slopes, Troup and similar soils make up 78 to 99 percent of the map unit. Dissimilar soils make up 1 to 22 percent.

Typically, the surface layer is dark grayish brown sand about 8 inches thick. The upper part of the subsurface layer, to a depth of 18 inches, is dark yellowish brown sand. The lower part, to a depth of 68 inches, is yellowish brown sand. The upper part of the subsoil, to a depth of 74 inches, is strong brown loamy sand. The lower part to a depth of 80 inches or more is strong brown sandy clay loam. Some soils occurring in areas of this map unit are similar to the Troup soil, but they are sandy to a depth of less than 40 inches or are sandy throughout.

Dissimilar soils included in mapping are small areas of Blanton and Lovett soils. These soils are moderately well drained.

Important soil properties:

Seasonal high water table: Not within 72 inches of the surface
Permeability: Moderate
Available water capacity: Very low

The natural vegetation consists of slash pine, longleaf pine, and bluejack oak. The understory vegetation includes pineland threeawn and other native grasses.

This soil is poorly suited to cultivated crops. Droughtiness and rapid leaching of nutrients are the major limitations affecting row crops. All crops need frequent applications of fertilizer and lime. Irrigation is feasible if water is readily available. Conservation tillage is recommended to conserve moisture and reduce the risk of erosion.

This soil is moderately well suited to hay crops and pasture. Deep-rooted plants, such as Coastal bermudagrass and improved bahiagrass, are well adapted to this soil, but yields are reduced by periodic droughts. Grazing should be controlled.

The potential productivity of this soil for pine trees is moderately high. The very low available water capacity adversely affects seedling survival in areas where understory plants are numerous. This soil commonly is very low in content of organic matter, and harvesting operations that remove all tree biomass on the site will reduce fertility of the soil. Preferred harvesting methods leave residual biomass distributed over the site. Organic matter can be conserved by restricting burning and leaving slash well distributed. Competing vegetation can be controlled by site preparation. Spraying, cutting, or girdling controls unwanted weeds, brush, or trees. Using special harvesting equipment with large tires or tracks reduces the equipment use limitation, minimizes root damage, and reduces soil compaction during thinning operations.

This soil is well suited to most building site development except for shallow excavations, which are subject to caving. It is poorly suited to most sanitary facilities, such as sewage lagoons or sanitary landfills, because of its sandy texture and because seepage of effluent can contaminate ground water supplies, but it is well suited to use as septic tank absorption fields.

The land capability classification is IIIs, and the woodland ordination symbol is 8S.

27—Troup sand, 5 to 8 percent slopes. This soil is gently sloping to sloping and is well drained. It is on broad, long side slopes adjacent to deep sand. The mapped areas are irregular in shape and range from 10 to 60 acres.

In 95 percent of areas mapped as Troup sand, 5 to 8 percent slopes, Troup and similar soils make up 90 to 99 percent of the map unit. Dissimilar soils make up 1 to 10 percent.

Typically, the surface layer is dark brown sand about 8 inches thick. The subsurface layer, to a depth of about 40 inches, is dark yellowish brown sand. The upper part of the subsoil, to a depth of 76 inches, is brownish yellow sand and yellow sand. The lower part to a depth of 80 inches is brownish yellow sandy clay loam.

Dissimilar soils included in mapping are small areas of Blanton soils. These soils are in lower positions on the landscape than the Troup soil and are moderately well drained.

Important soil properties:

Seasonal high water table: Not within 72 inches of the surface

Permeability: Moderate
Available water capacity: Very low

The natural vegetation consists of slash pine, longleaf pine, turkey oak, and hickory. The understory vegetation includes pineland threeawn.

This soil is poorly suited to cultivated crops. It is limited mainly because of the sandy texture, droughtiness, and very low natural fertility. A well designed and properly managed sprinkler irrigation system helps to maintain optimum soil moisture and ensure maximum yields. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or grass-legume mixtures help to maintain fertility and tilth. Most crops and pasture plants respond well to fertilizer. Lime generally is needed on this soil. Soil blowing is a hazard in cultivated areas, but it can be controlled with a good ground cover of close-growing plants.

This soil is moderately suited to pasture. The main limitations are droughtiness and very low fertility. Low available water capacity limits plant production, and drought-tolerant plants are most suitable for planting. The main suitable pasture plants are bahiagrass and improved bermudagrass. Grazing rotation helps to maintain forage quality. Proper grazing practices, weed control, and fertilizer are needed for maximum forage quality. Fertilizer and lime are needed for optimum growth of grasses and legumes.

The potential productivity of this soil for loblolly pine is moderately low. Loblolly pine and slash pine are suitable for planting. The main concern in management is the very low available water capacity, which causes severe seedling mortality and reduces growth. This soil is often very low in content of organic matter, and harvesting operations that remove all tree biomass on the site will reduce fertility. Preferred harvesting methods leave residual biomass distributed over the site.

This soil is poorly suited to most sanitary facilities and well suited to building site development. Seepage is the main limitation affecting sewage lagoons. Mulching, fertilizing, and irrigating are needed to establish lawn grasses and other small-seeded plants. During the rainy season, effluent from onsite sewage disposal systems can seep into points downslope. If the density of housing is moderate or high, a community sewage system is needed to prevent contamination of the water supplies as a result of seepage.

The land capability classification is IVs, and the woodland ordination symbol is 8S.

28—Chipley fine sand, 0 to 5 percent slopes. This soil is nearly level to gently sloping and is somewhat poorly drained. It is on uplands and knolls. The mapped areas are irregular in shape and range from 5 to 40 acres.

In 90 percent of areas mapped as Chipley fine sand, 0 to 5 percent slopes, Chipley and similar soils make up 81 to 99 percent of the map unit. Dissimilar soils make up 1 to 19 percent.

Typically, the surface layer is grayish brown fine sand about 6 inches thick. The upper part of the underlying material, to a depth of about 23 inches, is yellowish brown fine sand. The next part, to a depth of 47 inches, is very pale brown fine sand that has yellow, white, and yellowish brown mottles. The lower part to a depth of about 80 inches is white fine sand that has yellow and reddish yellow mottles.

Dissimilar soils included in mapping are Albany and Plummer soils. These soils have a loamy layer below a depth of 40 inches.

Important soil properties:

Seasonal high water table: At a depth of 24 to 36 inches
Permeability: Rapid
Available water capacity: Low

The natural vegetation consists of slash pine, sweetgum, and turkey oak. The understory vegetation includes blackberry, inkberry, bluestem, and pineland threeawn.

This soil is poorly suited to cultivated crops because of a low content of organic matter, excessive nutrient leaching, low available water capacity, and seasonal droughtiness. Irrigation generally is feasible in most areas if water is readily available. Maintaining crop residue on or near the surface reduces runoff and helps to maintain tilth and content of organic matter in the soil. Frequent applications of fertilizer and lime generally are needed to improve the quality of the soil.

This soil is fairly suited to pasture. It has few limitations; however, the low available water capacity limits the production of plants during extended dry periods. Deep-rooted plants, such as Coastal bermudagrass and bahiagrass, are more drought tolerant if properly fertilized and limed.

The potential productivity of this soil for slash pine is moderately high. The low available water capacity adversely affects seedling survival in areas where understory plants are numerous. This soil is often very low in content of organic matter, and harvesting operations that remove all tree biomass on the site will reduce the fertility of the soil. Preferred harvesting methods leave residual biomass distributed over the site. Organic matter can be conserved by restricting burning and leaving slash well distributed. Competing vegetation can be controlled by site preparation. Spraying, cutting, or girdling controls unwanted weeds, brush, or trees. Using special harvesting equipment with large tires or tracks reduces the equipment use limitation, minimizes root damage, and reduces soil compaction during thinning operations.

This soil is poorly suited to most sanitary facilities and building site development. Wetness and the sandy texture are limitations affecting sanitary facilities because seepage of effluent can contaminate underground freshwater supplies. During construction or installation of sanitary facilities, buildings, and roads, lawn grasses or pasture grasses should be planted to stabilize the exposed soil surface and to reduce the hazard of erosion. Fill material is needed for most urban uses.

The land capability classification is IIIs, and the woodland ordination symbol is 11S.

30—Ocilla sand, 0 to 5 percent slopes. This soil is nearly level to gently sloping and is somewhat poorly drained. It is on low uplands. The mapped areas are oval or elongated and range from 5 to 50 acres.

In 95 percent of areas mapped as Ocilla sand, 0 to 5 percent slopes, Ocilla and similar soils make up 79 to 99 percent of the map unit. Dissimilar soils make up 1 to 21 percent of.

Typically, the surface layer is grayish brown sand about 3 inches thick. The upper part of the subsurface layer, to a depth of about 24 inches, is light yellowish brown and very pale brown sand that has reddish yellow and white mottles. The lower part, to a depth of about 29 inches, is light yellowish brown loamy sand that has light gray and brownish yellow mottles. The upper part of the subsoil, to a depth of about 34 inches, is light yellowish brown fine sandy loam that has brownish yellow and light gray mottles. The lower part to a depth of about 80 inches is light brownish gray sandy clay that has red, yellowish brown, and strong brown mottles.

Dissimilar soils included in mapping are small areas of Blanton and Goldsboro soils. Blanton soils are moderately well drained and have a loamy subsoil at a depth of 40 inches or more. Goldsboro soils have a loamy subsoil within 20 inches of the surface and are in slightly higher positions on the landscape than the Ocilla soil.

Important soil properties:

Seasonal high water table: At a depth of 12 to 30 inches
Permeability: Moderate
Available water capacity: Low

The natural vegetation consists of slash pine, laurel oak, and water oak. The understory vegetation includes partridge pea, sumac, American beautyberry, waxmyrtle, blackberry, and wild grape.

This soil is poorly suited to cultivated crops. It is limited mainly because of seasonal wetness and the thick, sandy surface and subsurface layers. Soybeans, corn, and small grain are the main crops. Maintaining crop residue on or near the surface reduces runoff and helps to maintain tilth and the content of organic matter. Lime generally is needed on this soil. An adequate water control system, such as surface and subsurface drainage, is needed to attain maximum productivity.

This soil is moderately suited to pasture. The main limitations are wetness and low fertility. Wetness limits the choice of plants that can be grown and the period of grazing. Suitable pasture plants are bahiagrass and improved bermudagrass. Fertilizer and lime are needed for optimum growth of grasses and legumes.

The potential productivity of this soil for slash pine is moderately high. The main concerns in management are equipment use and seedling mortality. The sandy surface layer restricts the use of wheeled equipment, especially when the soil is saturated or very dry. Site preparation, such as chopping, applying herbicides, and bedding, reduces debris, controls immediate plant competition, and facilitates mechanical planting. This soil commonly is very low in content of organic matter, and harvesting operations that remove all tree biomass on the site will reduce the fertility of the soil. Preferred harvesting methods leave residual biomass distributed over the site. Bedding of rows helps to minimize the effects of the wetness. Bedding should not block natural surface drainage.

This soil is poorly suited to sanitary facilities and building site development. The main limitations are seepage and wetness. Drainage is needed to minimize the effects of wetness, and fill material is needed for most urban uses.

The land capability classification is IIIw, and the woodland ordination symbol is 8W.

34—Sapelo sand. This soil is nearly level and poorly drained. It is on the flatwoods and in areas bordering swamps and depressions. The mapped areas range from 10 to 200 acres. Slopes range from 0 to 2 percent.

In 95 percent of areas mapped as Sapelo sand, Sapelo and similar soils make up 82 to 99 percent of the map unit. Dissimilar soils make up 1 to 18 percent.

Typically, the surface layer is very dark gray sand about 6 inches thick. The subsurface layer, to a depth of about 11 inches, is gray sand. The subsoil extends to a depth of 80 inches or more. The subsoil is, in sequence downward, black sand, very dark brown and dark brown sand, light gray sand, and light gray sandy clay loam. Some soils occurring in areas of this map unit are similar to Sapelo soil, but they have a subsoil that is alkaline, have a loamy subsoil that is at a depth of less than 40 inches, do not have a loamy subsoil within 80 inches of the surface, or have an organic surface layer as much as 5 inches thick.

Dissimilar soils included in mapping are small areas of Albany, Ocilla, and Plummer soils. Albany and Ocilla soils do not have a dark, organic-coated subsoil and are somewhat poorly drained. These soils generally occur as small knobs that are less than 2 acres in size. Plummer soils are in small depressions and are very poorly drained.

Important soil properties:

Seasonal high water table: At a depth of 6 to 12 inches
Permeability: Moderate
Available water capacity: Low

The natural vegetation consists of slash pine. The understory vegetation includes saw palmetto, pineland threeawn, and waxmyrtle.

This soil is poorly suited to cultivated crops because of wetness. The number of adapted crops that can be grown is very limited unless water-control measures are used. With a water-control system that is designed to remove excess water during wet periods, this soil is well suited to a variety of vegetable crops. In addition to water-control, proper management should include crop rotation and keeping close-growing, soil-improving crops on the land at least two-thirds of the time. Fertilizer and lime should be applied according to the needs of the crop.

This soil is fairly suited to pasture. The main limitations are seasonal wetness and very low natural fertility. Wetness limits the choice of plants that can be grown and the period of grazing. When the soil is wet, grazing causes compaction of the surface layer and damage to the plant community. Excess surface water can be removed from most areas by field drains. The main suitable pasture plants are bahiagrass and bermudagrass. Proper stocking, pasture rotation, and restricted grazing during wet periods help to keep the pasture and the soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

The potential productivity of this soil for slash pine is moderate. The seasonal high water table restricts the use of equipment during wet periods. Site preparation, such as chopping, applying herbicides, and bedding, reduces debris, controls immediate plant competition, and facilitates mechanical planting. Planting trees on bedded rows minimizes the effects of wetness. Using special harvesting equipment with large tires or tracks reduces the equipment use limitation, minimizes root damage, and reduces soil compaction during thinning operations.

This soil is poorly suited to sanitary facilities and building site development. The main limitations are wetness, seepage, the sandy texture, and the instability of cutbanks. Fill material is needed for most urban uses. Drainage is needed if roads and building foundations are constructed. Excess water can be removed by installing shallow ditches and providing the proper ditch grade. Septic tank absorption fields are mounded in most areas. If the density of housing is moderate or high, a community sewage system is needed to prevent contamination of the water supplies as a result of seepage.

The land capability classification is IVw, and the woodland ordination symbol is 7W.

38—Goldsboro loamy sand, 2 to 5 percent slopes. This soil is nearly level to gently sloping and is somewhat poorly drained. It is in low areas on the uplands. The mapped areas are irregular in shape and range from 2 to 20 acres.

In 95 percent of areas mapped as Goldsboro loamy sand, 2 to 5 percent slopes, Goldsboro and similar soils make up 78 to 99 percent of the map unit. Dissimilar soils make up 1 to 22 percent.

Typically, the surface layer is very dark grayish brown loamy sand about 9 inches thick. The subsurface layer, to a depth of about 15 inches, is brown loamy sand. The subsoil extends to a depth of about 80 inches. The subsoil is, in sequence downward, brownish yellow, mottled sandy loam; brownish yellow sandy clay loam; yellowish brown, mottled sandy clay loam; and mottled gray, brownish yellow, and dark red sandy clay loam. Some soils occurring in areas of this map unit are similar to Goldsboro soil, but they have a sandy surface layer and subsurface layer more than 20 inches thick.

Dissimilar soils included in mapping are small areas of Orangeburg and Plummer soils. Orangeburg soils are well drained. Plummer soils are poorly drained and are sandy below a depth of 40 inches.

Important soil properties:

Seasonal high water table: At a depth of 24 to 36 inches
Permeability: Moderate
Available water capacity: Moderate

The natural vegetation consists of slash pine, water oak, and live oak. The understory vegetation includes wild cherry.

This soil is well suited to cultivated crops. It is limited mainly because of seasonal wetness and low fertility. A well designed and properly managed sprinkler irrigation system helps to maintain optimum soil moisture and ensure highest yields. Excessive cultivation can result in the formation of a plowpan. This plowpan can be broken up by subsoiling when the soil is dry. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or grass-legume mixtures help to maintain fertility and tilth. Crusting of the surface and compaction can be reduced by returning crop residue to the soil. Frequent applications of fertilizer and lime generally are needed to improve the quality of the soil. Most crops respond well to fertilizer. Conservation tillage, buffer strips, and a crop rotation system that includes close-growing cover crops can be used to control erosion.

This soil is well suited to pasture. Proper stocking, pasture rotation, and timely deferment of grazing help keep the pasture in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes. Suitable pasture plants are bahiagrass and bermudagrass.

The potential productivity of this soil for loblolly pine is moderate. Site preparation, such as chopping, applying herbicides, and bedding, reduces debris, controls immediate plant competition, and facilitates mechanical planting. This soil is often very low in content of organic matter, and harvesting operations that remove all tree biomass on the site will reduce the fertility of the soil. Preferred harvesting methods leave residual biomass distributed over the site. Bedding of rows helps to minimize the effects of the wetness. Bedding should not block natural surface drainage. Using special harvesting equipment with large tires or tracks reduces the equipment use limitation, minimizes root damage, and reduces soil compaction during thinning operations.

This soil is poorly suited to sanitary facilities and building site development. The main limitation is wetness. Generally, soils in nearby areas at higher elevations are more suited to these uses. Effluent from septic tank absorption fields can surface in downslope areas and create a health hazard. Adding suitable fill material and installing drainage systems can improve the suitability of this soil for septic tank absorption fields.

The land capability classification is IIe, and the woodland ordination symbol is 9W.

48—Plummer and Surrency soils, depressional. These soils are nearly level and are very poorly drained. They do not occur in a regular repeating pattern. Excess water ponds in low-lying areas for long periods after heavy rainfall. The mapped areas are as much as several hundred acres. Slopes are concave and are 0 to 1 percent.

In 95 percent of areas mapped as Plummer and Surrency soils, depressional, Plummer, Surrency, and similar soils make up 80 to 99 percent of the map unit. Dissimilar soils make up 1 to 20 percent.

Plummer and similar soils make up about 60 percent of the map unit and Surrency and similar soils about 31 percent. Each soil is not present in every mapped area; the relative proportion of combinations varies. The mapped areas of the individual soils are large enough to map separately; however, in considering the present and predicted use, they were mapped as one map unit.

Typically, the surface layer of the Plummer soil is black fine sand about 6 inches thick. The subsurface layer, to a depth of about 66 inches, is light gray, mottled fine sand. The upper part of the subsoil is gray fine sandy loam. The lower part to a depth of about 80 inches is gray sandy clay loam that has brown mottles.

Typically, the surface layer of the Surrency soil is black loamy sand about 10 inches thick. The upper part of the subsurface layer is dark grayish brown loamy sand. The lower part, to a depth of about 32 inches, is light brownish gray sand. The subsoil to a depth of about 80 inches is mottled, gray sandy clay loam.

Dissimilar soils included in mapping are small areas of Pamlico, Cantey, and Mascotte soils. Pamlico soils are organic and are in lower positions on the landscape than the Plummer and Surrency soils. Cantey soils have a clayey texture within 20 inches of the surface and are poorly drained. Mascotte soils have an organic-stained, sandy subsoil and are poorly drained.

Important soil properties of Plummer and Surrency soils:

Seasonal high water table: From 24 inches above the surface to a depth of 6 inches

Permeability: Moderate
Available water capacity: Low—Plummer; moderate-Surrency

The natural vegetation consists of cypress, blackgum, and redbay. The understory vegetation includes greenbrier, waxmyrtle, St. Johnswort, and fetterbush lyonia.

The soils in this map unit are used mostly as woodland.

These soils are not suited to cultivated crops or improved pasture. A seasonal high water table, ponding, low fertility, and limited drainage outlets are the main limitations.

The potential productivity of these soils for pine trees is low. These soils generally are not suited to pine trees because of the ponding. Equipment use, seedling mortality, and plant competition are severe concerns in woodland management. Water-tolerant trees should be planted. Planting and harvesting operations should be scheduled during dry periods. These soils may be suited to cypress and hardwoods.

These soils are not suited to sanitary facilities or building site development. Fill materials and drainage are needed for most urban uses.

The land capability classification for these soils is Vw, and the woodland ordination symbol is 7W.

53—Bonifay fine sand, 0 to 5 percent slopes. This soil is nearly level to gently sloping and is well drained. It is on foot slopes on the uplands. The mapped areas are irregular in shape and range from 40 to 200 acres.

In 95 percent of areas mapped as Bonifay fine sand, 0 to 5 percent slopes, Bonifay and similar soils make up 77 to 99 percent of the map unit. Dissimilar soils make up 1 to 23 percent.

Typically, the surface layer is dark grayish brown fine sand about 6 inches thick. The subsurface layer extends to a depth of about 48 inches. In sequence downward, it is yellowish brown fine sand, brownish yellow sand, brownish yellow fine sand, and yellowish brown loamy sand. The upper part of the subsoil, to a depth of 55 inches, is yellowish brown sandy clay loam that contains 15 percent plinthite. The lower part to a depth of 80 inches or more is reticulately mottled gray, brown, and red sandy clay loam that contains 10 percent plinthite. Some soils occurring in areas of this map unit are similar to the Bonifay soil, but they do not contain plinthite.

Dissimilar soils included in mapping are small areas of Goldsboro and Lucy soils. Goldsboro soils are in slightly lower positions on the landscape than the Bonifay soil and have a loamy subsoil within 20 inches of the surface. Lucy soils do not have a water table within 72 inches of the surface.

Important soil properties:

Seasonal high water table: Perched at a depth of 48 to 60 inches
Permeability: Moderate
Available water capacity: Low
Runoff: Slow

The natural vegetation consists of slash pine, longleaf pine, southern red oak, post oak, live oak, and laurel oak.

This soil is poorly suited to cultivated crops. It is limited mainly because of droughtiness, low fertility, and rapid loss of nutrients by leaching. This soil is friable, and good tilth is easily maintained. The soil can be tilled throughout a wide range of moisture content. A well designed and properly managed sprinkler irrigation system helps to maintain optimum soil moisture and ensure maximum yields. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or grass-legume mixtures help to maintain fertility and tilth. Frequent applications of fertilizer and lime generally are needed to improve the quality of the soil. Soil blowing is a hazard in cultivated areas, but it can be controlled with a good ground cover of close-growing plants.

This soil is moderately suited to pasture. The low available water capacity limits the production of plants suitable for pasture. Proper stocking, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition. Drought-tolerant plants, such as bahiagrass and bermudagrass, are most suitable for planting. Fertilizer and lime are needed for optimum growth of grasses and legumes.

The potential productivity of this soil for slash pine is moderate. The sandy surface layer restricts the use of wheeled equipment, especially when the soil is very wet or very dry. Droughtiness increases the rate of seedling mortality. Intensive site preparation and maintenance will keep undesirable plants from restricting adequate natural or artificial reforestation. Hardwood understory can be reduced by controlled burning, applying herbicides, girdling, or cutting unwanted trees. This soil commonly is very low in content of organic matter, and harvesting operations that remove all tree biomass on the site will reduce the fertility of the soil. Preferred harvesting methods leave residual biomass distributed over the site.

This soil is moderately suited to sanitary facilities and building site development. Wetness is a limitation affecting septic tank absorption fields and dwellings with basements. Seepage and the sandy texture are limitations affecting sewage lagoons, sanitary landfills, and daily cover for landfills. Subsurface drainage will reduce excessive wetness. The moderately slow permeability and the high water table increase the possibility that septic tank absorption fields will not function properly on this soil.

The land capability classification is IIIs, and the woodland ordination symbol is 10S.

55—Esto fine sandy loam, 2 to 5 percent slopes. This soil is nearly level to gently sloping. It is on knolls and ridgetops on the uplands. The mapped areas range from 5 to 160 acres.

In 95 percent of areas mapped as Esto fine sandy loam, 2 to 5 percent slopes, Esto and similar soils make up 87 to 99 percent of the map unit. Dissimilar soils make up 1 to 13 percent.

Typically, the surface layer is dark yellowish brown fine sandy loam about 7 inches thick. The upper part of the subsoil, to a depth of about 18 inches, is yellowish red clay. The lower part to a depth of 80 inches or more is mottled yellowish red, brownish yellow, dusky red, reddish brown, light gray, and dark red clay. Some soils occurring in areas of this map unit are similar to Esto soil, but they have a 20 percent or more decrease in clay content in the lower part of the subsoil or the surface layer is sandy and is more than 20 inches thick.

Dissimilar soils included in mapping are Fuquay, Goldsboro, and Orangeburg soils. Fuquay soils have a sandy surface layer more than 20 inches thick and have a loamy subsoil. Orangeburg soils are loamy, and Goldsboro soils are loamy and are somewhat poorly drained.

Important soil properties:

Seasonal high water table: Not within 72 inches of the surface
Permeability: Slow
Available water capacity: High

The natural vegetation consists of longleaf pine, slash pine, loblolly pine, southern red oak, water oak, and laurel oak. The understory vegetation includes wild cherry, waxmyrtle, and bluestem.

This soil is only fairly suited to cultivated crops because of the clayey subsoil and erodibility. Locally grown tobacco, corn, soybeans, small grain, and peaches (fig. 5) produce fair yields with proper management. Conservation management practices include crop rotation, leaving crop residue on or in the soil, conservation tillage, applications of fertilizer and lime, and irrigation.

This soil is moderately well suited to improved pasture grasses. Regular applications of lime and fertilizer produce high yields of bermudagrass, bahiagrass, and a variety of adapted deep-rooted grasses.

The potential productivity of this soil for pines is moderately low. The very low available water capacity in the surface layer adversely affects seedling survival in areas where understory plants are numerous. This soil is often very low in organic matter, and harvesting operations that remove all tree biomass on the site will reduce the fertility of the soil. Preferred harvesting methods leave residual biomass distributed over the site. Organic matter can be conserved by restricting burning and leaving slash well distributed. Competing vegetation can be controlled by site preparation. Spraying, cutting, or girdling controls unwanted weeds, brush, or trees. Using special harvesting equipment with large tires or tracks reduces the equipment use limitation, minimizes root damage, and reduces soil compaction during thinning operations.

This soil is moderately suited to most sanitary facilities because of its slow permeability. Increasing the size of the septic tank absorption field will help overcome the permeability limitation. This soil is well suited to sanitary landfills. It has fair to poor suitability for building site development because of the shrink-swell potential.

The land capability classification is IIIe, and the woodland ordination symbol is 8A.

56—Nankin loamy sand, 5 to 8 percent slopes. This soil is gently sloping to sloping and is well drained. It is on ridgetops and side slopes on the uplands. The mapped areas are irregular in shape and range from 5 to 100 acres.

In 90 percent of areas mapped as Nankin loamy sand, 5 to 8 percent slopes, Nankin and similar soils make up 77 to 99 percent of the map unit. Dissimilar soils make up 1 to 23 percent.

Typically, the surface layer is brown loamy sand about 6 inches thick. The subsoil extends to a depth of about 52 inches. It is strong brown sandy clay loam in the upper part; strong brown clay in the next part; and mottled reddish yellow, strong brown, and red sandy clay in the lower part. The substratum to a depth of about 80 inches or more is mottled gray, yellowish brown, and red sandy clay loam. Some soils occurring in areas of this map unit are similar to the Nankin soil,

Figure 5.—This peach grove in an area of Esto fine sandy loam, 2 to 5 percent slopes, is a leading contributor to Madison County's economy.

but some are clayey below a depth of 60 inches and others have a sandy surface layer more than 20 inches thick.

Dissimilar soils included in mapping are small areas of Orangeburg soils. These soils do not have a clayey subsoil. Also included are some soils that have a water table within 60 inches of the surface.

Important soil properties:

Seasonal high water table: Not within 72 inches of the surface
Permeability: Moderately slow
Available water capacity: Low
Runoff: Rapid
Hazard of water erosion: Moderate

The natural vegetation consists of longleaf pine, loblolly pine, slash pine, southern red oak, and hickory. The understory vegetation includes wild cherry, dogwood, sassafras, blackberry, brackenfern, and assorted grasses.

This soil is poorly suited to cultivated crops. The surface layer is friable; but where cultivated, the soil is somewhat difficult to keep in good tilth if some of the clayey subsoil has been mixed into the plow layer or if the soil is tilled when it is too dry. This soil is also limited by low fertility. Erosion is a moderate hazard. The main crops are soybeans, corn, peaches, and other crops adapted to the area. Irregularly shaped slopes hinder tillage operations. Sprinkler irrigation systems are fairly suited to this soil. A well designed and properly managed sprinkler irrigation system helps to maintain optimum soil moisture and ensure maximum yields. A plowpan forms easily if this soil is tilled when wet. Chiseling or subsoiling can be used to break up the plowpan. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or grass-legume mixtures help to maintain fertility and tilth. Frequent applications of fertilizer and lime generally are needed to improve the quality of the soil. Conservation practices that can control erosion include early fall seeding, conservation tillage, terraces and diversions, and grassed waterways. Gradient terraces and farming on the contour can reduce the risk of sheet and rill erosion on the steep slopes.

This soil is moderately suited to pasture. Seedbed preparation should be on the contour or across the slope where practical. When the soil is wet, grazing causes compaction of the surface layer, poor tilth, and excessive runoff. Growing pasture grasses on this soil helps to control erosion. Proper stocking, pasture rotation, and restricted grazing during wet periods help to keep the pasture and the soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes. The main suitable pasture plants are bahiagrass and bermudagrass.

The potential productivity of this soil for loblolly pine is moderately low. Intensive site preparation and maintenance will keep undesirable plants from restricting adequate natural or artificial reforestation. Hardwood understory can be reduced by controlled burning, applying herbicides, girdling, or cutting unwanted trees. This soil is often very low in organic matter, and harvesting operations that remove all tree biomass on the site will reduce the fertility of the soil. Preferred harvesting operations leave residual biomass distributed over the site.

This soil is moderately suited to sanitary facilities and is well suited to building site development. Seepage, slope, and the clayey texture are the main limitations affecting sewage lagoons, sanitary landfills, daily cover for landfills, and shallow excavations. Slow percolation is a limitation affecting septic tank absorption fields. Erosion is a hazard in the steeper areas. Excavations for roads and buildings increase the hazard of erosion on construction sites. Existing plant cover should be left on construction sites, and only that part of the site that is used for construction should be disturbed. Revegetating disturbed areas as soon as possible helps to control erosion. Plant cover can be established and maintained with proper fertilizing, seeding, mulching, and shaping of the slopes. Roads should be designed to offset the limited ability of the soil to support a heavy load.

The land capability classification is IIIe, and the woodland ordination symbol is 8A.

57—Nankin sandy loam, 8 to 12 percent slopes, eroded. This soil is sloping to strongly sloping and is well drained. It is on ridgetops and side slopes on the uplands. The mapped areas are irregular in shape and range from 5 to 40 acres.

In 95 percent of areas mapped as Nankin sandy loam, 8 to 12 percent slopes, eroded, Nankin and similar soils make up 90 to 99 percent of the map unit. Dissimilar soils make up 1 to 10 percent.

Typically, the surface layer is brown sandy loam about 5 inches thick. The subsoil, to a depth of about 27 inches, is red sandy clay. The substratum to a depth of about 80 inches or more is red sandy clay loam. Some soils occurring in areas of this map unit are similar to the Nankin soil, but some are clayey below a depth of 60 inches and others have a sandy surface layer more than 20 inches thick.

Dissimilar soils included in mapping are small areas of Troup soils. These soils are sandy to a depth of 40 inches or more. Also included are soils that have a water table within 60 inches of the surface.

Important soil properties:

Seasonal high water table: Not within 72 inches of the surface
Permeability: Moderately slow
Available water capacity: Moderate
Runoff: Rapid
Hazard of water erosion: Severe

The natural vegetation consists of longleaf pine, loblolly pine, slash pine, southern red oak, and hickory. The understory vegetation includes wild cherry, dogwood, sassafras, blackberry, brackenfern, and assorted grasses.

This soil is not suited to cultivated crops. The surface layer is friable; but where cultivated, the soil is somewhat difficult to keep in good tilth if some of the clayey subsoil has been mixed into the plow layer. Also, erosion is a hazard.

This soil is poorly suited to pasture. Seedbed preparation should be on the contour or across the slope where practical. When the soil is wet, grazing causes compaction of the surface layer, poor tilth, and excessive runoff. Growing pasture grasses on this soil helps to control erosion. Proper stocking, pasture rotation, and restricted grazing during wet periods help to keep the pasture and soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes. The main suitable pasture plants are bahiagrass and bermudagrass.

The potential productivity of this soil for loblolly pine is moderately low. Intensive site preparation and maintenance will keep undesirable plants from restricting adequate natural or artificial reforestation. Hardwood understory can be reduced by controlled burning, applying herbicides, girdling, or cutting unwanted trees. This soil commonly is very low in content of organic matter, and harvesting operations that remove all tree biomass on the site will reduce the fertility of the soil. Preferred harvesting methods leave residual biomass distributed over the site.

This soil is moderately suited to sanitary facilities and building site development. Seepage, slope, and the clayey texture are the main limitations affecting sewage lagoons, sanitary landfills, daily cover for landfills, or shallow excavations. Slow percolation is a limitation of this soil for septic tank absorption fields. Erosion is a hazard in the steeper areas. Excavations for roads and buildings increase the hazard of erosion on construction sites. Existing plant cover should be left on construction sites, and only that part of the site that is used for construction should be disturbed. Revegetating disturbed areas around construction sites as soon as possible helps to control erosion. Plant cover can be established and maintained with proper fertilizing, seeding, mulching, and shaping of the slopes. Roads should be designed to offset the limited ability of the soil to support a heavy load.

The land capability classification is VIe, and the woodland ordination symbol is 8A.

58—Fuquay sand, 2 to 5 percent slopes. This soil is nearly level to gently sloping and is well drained. It is on low ridges on the uplands. The mapped areas range from 5 to 40 acres.

In 95 percent of the areas mapped as Fuquay sand, 2 to 5 percent slopes, Fuquay and similar soils make up 80 to 99 percent of the map unit. Dissimilar soils make up 1 to 20 percent.

Typically, the surface layer is brown sand about 6 inches thick. The subsurface layer, to a depth of 30 inches, is brownish yellow sand. The subsoil to a depth of 80 inches is, in sequence downward, yellowish brown loamy sand; yellowish brown fine sandy loam that contains about 9 percent plinthite; sandy clay loam mottled in shades of gray, yellow, and brown and containing about 10 percent plinthite; and sandy clay mottled in shades of gray and red and containing about 10 percent plinthite. Some soils occurring in areas of this map unit are similar to the Fuquay soil, but they have a sandy surface layer more than 40 inches thick or have a finer textured subsoil that contains less than 5 percent plinthite.

Dissimilar soils included in mapping are Esto and Blanton soils. Esto soils do not have a perched water table. Blanton soils have a loamy subsoil below a depth of 40 inches.

Important soil properties:

Seasonal high water table: Perched at a depth of 48 to 72 inches
Permeability: Slow
Available water capacity: Low

The natural vegetation consists of loblolly pine, slash pine, live oak, laurel oak, and water oak. The understory vegetation includes wild cherry, blackberry, greenbrier, Florida bluestem, and other grasses.

This soil is moderately suited to cultivated crops commonly grown in the area. Periodic droughtiness and rapid leaching of nutrients are the main limitations. Crop yields are reduced unless crops are irrigated and fertilizer and lime are added to the soil. Returning crop residue to the soil and using a cropping system that includes grasses and legumes or a grass-legume mixture improve fertility.

This soil is well suited to pasture. Bahiagrass and improved bermudagrass are the recommended plants. Regular applications of fertilizer and lime are needed for optimum growth of grasses and legumes.

The potential productivity of this soil for slash pine is moderate. The low available water capacity adversely affects seedling survival in areas where understory plants are numerous. This soil commonly is very low in content of organic matter, and harvesting operations that remove all tree biomass on the site will reduce the fertility of the soil. Preferred harvesting methods leave residual biomass distributed over the site. Organic matter can be conserved by restricting burning and leaving slash well distributed. Competing vegetation can be controlled by site preparation. Spraying, cutting, or girdling controls unwanted weeds, brush, or trees. Using special harvesting equipment with large tires or tracks reduces the equipment use limitation, minimizes root damage, and reduces soil compaction during thinning operations.

This soil is moderately well suited to most sanitary facilities and building site development. During construction and installation of sanitary facilities, buildings, and roads, grasses should be planted to stabilize the exposed soil surface and to reduce the hazard of erosion. Wetness is a limitation affecting dwellings with basements. Slow percolation is a limitation affecting septic tank absorption fields.

The land capability classification is IIs, and the woodland ordination symbol is 8S.

61—Alaga loamy sand, 0 to 5 percent slopes. This soil is nearly level to gently sloping and is well drained. It is in broad, low areas on the uplands. The mapped areas range from 10 to 140 acres.

In 80 percent of areas mapped as Alaga loamy sand, 0 to 5 percent slopes, Alaga and similar soils make up 77 to 99 percent of the map unit. Dissimilar soils make up 1 to 23 percent.

Typically, the surface layer is very dark grayish brown and dark brown loamy sand about 9 inches thick. The upper part of the underlying material, to a depth of 58 inches, is dark brown and strong brown loamy sand. The lower part to a depth of 80 inches is reddish yellow and brownish yellow sand. Some soils occurring in areas of this map unit are similar to the Alaga soil, but they have thin, discontinuous bands of loamy material below a depth of 60 inches.

Dissimilar soils included in mapping are small areas of Blanton and Lucy soils. Blanton soils have a loamy subsoil below a depth of 40 inches and are moderately well drained. Lucy soils have a loamy subsoil at a depth of 20 to 40 inches. Also included are some soils that have a thick, dark, mineral surface in local alluvial areas.

Important soil properties:

Seasonal high water table: Not within 72 inches of the surface
Permeability: Rapid or very rapid
Available water capacity: Low

The natural vegetation consists of slash pine, longleaf pine, loblolly pine, and southern red oak. The understory vegetation includes sumac, persimmon, blackberry, and pineland threeawn.

This soil is poorly suited to cultivated crops because of droughtiness and rapid leaching of plant nutrients. Conservation management practices should include a crop rotation system that keeps close-growing cover crops on the soil at least two-thirds of the time. Planting soil-improving crops and leaving all crop residue on the soil help to control erosion, maintain the content of organic matter, and conserve moisture. All crops should be irrigated, and regular applications of fertilizer and lime are needed on this soil. Conservation tillage is also recommended to conserve moisture and reduce erosion.

This soil is moderately suited to improved pasture. Deep-rooted plants, such as improved bermudagrass and bahiagrass, are recommended. Fertilizer and lime are needed for optimum growth.

The potential productivity of this soil for pines is moderately high. The low available water capacity adversely affects seedling survival in areas where understory plants are numerous. This soil is often very low in organic matter, and harvesting operations that remove all tree biomass on the site will reduce the fertility of the soil. Preferred harvesting methods (fig. 6) leave residual biomass distributed over the site. Using special planting stock that is larger than usual or that is containerized can reduce the rate of seedling mortality. Organic matter can be conserved by restricting burning and leaving slash well distributed. Competing vegetation can be controlled by site preparation. Spraying, cutting, or girdling controls unwanted weeds, brush, or trees. Using special harvesting equipment with large tires or tracks reduces the equipment use limitation, minimizes root damage, and reduces soil compaction during thinning operations. Equipment use, plant competition, and seedling mortality are the main concerns in woodland management.

This soil is well suited to sanitary facilities and building site development except for shallow excavations, which are subject to caving. Rapid permeability is a limitation affecting septic tank absorption fields but can be overcome by increasing the size of the septic tank absorption field. If the density of housing is moderate or high, a community sewage system is needed to prevent contamination of the water supplies as a result of seepage.

The land capability classification is IIIs, and the woodland ordination symbol is 8S.

Figure 6.—The harvesting of slash pine in an area of Alaga loamy sand, 0 to 5 percent slopes, will leave residual biomass on the site and thus increase fertility of the soil.

62—Alaga loamy sand, 5 to 8 percent slopes. This soil is gently sloping to sloping and is well drained. It is on the uplands. The mapped areas range from 10 to 40 acres.

In 90 percent of areas mapped as Alaga loamy sand, 5 to 8 percent slopes, Alaga and similar soils make up 83 to 99 percent of the map unit. Dissimilar soils make up 1 to 17 percent.

Typically, the surface layer is very dark grayish brown loamy sand about 7 inches thick. The underlying material to a depth of 80 inches or more is yellowish brown loamy sand and brownish yellow sand. Some soils occurring in areas of this map unit are similar to the Alaga soil, but they have thin, discontinuous bands of sandy loam or sandy clay below a depth of 60 inches.

Dissimilar soils included in mapping are small areas of Blanton, Bonifay, and Lucy soils. Also included are some soils that have a thick, dark, mineral surface in local alluvial areas. Blanton and Bonifay soils have a loamy subsoil below a depth of 40 inches, and Blanton soils are moderately well drained. Lucy soils have a loamy subsoil at a depth of 20 to 40 inches.

Important soil properties:

Seasonal high water table: Not within 72 inches of the surface
Permeability: Rapid
Available water capacity: Low

The natural vegetation consists of slash pine, longleaf pine, loblolly pine, and southern red oak. The understory vegetation includes sumac, persimmon, blackberry, and pineland threeawn.

This soil is poorly suited to cultivated crops because of droughtiness and rapid leaching of plant nutrients. Conservation management practices should include a crop rotation system that keeps close-growing cover crops on the soil at least two-thirds of the time. Planting soil-improving crops and leaving all crop residue on the soil help to control erosion, increase the content of organic matter, and conserve moisture. All crops should be irrigated, and regular applications of fertilizer and lime are needed on this soil. Conservation tillage is also recommended to conserve moisture and reduce the risk of erosion.

This soil is moderately suited to improved pasture. Deep-rooted plants, such as improved bermudagrass and bahiagrass, are recommended. Fertilizer and lime are needed for optimum growth.

The potential productivity of this soil for pines is moderately high. The low available water capacity adversely affects seedling survival in areas where understory plants are numerous. This soil is often very low in organic matter, and harvesting operations that remove all tree biomass on the site will reduce the fertility of the soil. Using special planting stock that is larger than usual or that is containerized will reduce the rate of seedling mortality. Organic matter can be conserved by restricting burning and leaving slash well distributed. Competing vegetation can be controlled by site preparation. Spraying, cutting, or girdling controls unwanted weeds, brush, or trees. Using special harvesting equipment with large tires or tracks reduces the equipment use limitation, minimizes root damage, and reduces soil compaction during thinning operations. Equipment use, plant competition, and seedling mortality are the main concerns in woodland management.

This soil is well suited to sanitary facilities and building site development except for shallow excavations, which are subject to caving. Rapid permeability is a limitation affecting septic tank absorption fields but can be overcome by increasing the size of the septic tank absorption field. If the density of housing is moderate or high, a community sewage system is needed to prevent contamination of the water supplies as a result of seepage.

The land capability classification is IVs, and the woodland ordination symbol is 8S.

63—Alaga loamy sand, 8 to 12 percent slopes. This soil is sloping to strongly sloping and is well drained. It is on moderately broad, long side slopes on the uplands. The mapped areas are irregular in shape and range from 10 to 50 acres.

In 90 percent of areas mapped as Alaga loamy sand, 8 to 12 percent slopes, Alaga and similar soils make up 81 to 99 percent of the map unit. Dissimilar soils make up 1 to 19 percent.

Typically, the surface layer is dark grayish brown loamy sand about 5 inches thick. The underlying material to a depth of about 80 inches is yellowish brown loamy sand. Some soils occurring in areas of this map unit are similar to the Alaga soil, but they have a loamy subsoil at a depth of 40 to 80 inches.

Dissimilar soils included in mapping are small areas of Lucy soils. Lucy soils have a loamy subsoil between depths of 20 and 40 inches. Also included are soils that have a water table within 60 inches of the surface and other soils that have a slope of less than 8 percent.

Important soil properties:

Seasonal high water table: Not within 72 inches of the surface
Permeability: Rapid or very rapid
Available water capacity: Low
Natural fertility: Low

The natural vegetation consists of slash pine, longleaf pine, loblolly pine, and southern red oak. The understory vegetation includes sumac, persimmon, blackberry, and pineland threeawn.

This soil is poorly suited to cultivated crops because of droughtiness and rapid leaching of plant nutrients. Conservation management practices should include a crop rotation system that keeps close-growing cover crops on the land at least two-thirds of the time. Planting soil-improving crops and leaving all crop residue on the soil reduce erosion, increase the content of organic matter, and conserve moisture. All crops should be irrigated, and fertilizer and lime are needed on this soil. Conservation tillage is also recommended to conserve moisture and reduce the risk of erosion.

This soil is moderately suited to improved pasture. Deep-rooted plants, such as improved bermudagrass and bahiagrass, are recommended. Fertilizer and lime are needed for optimum growth.

The potential productivity of this soil for pines is moderately high. The low available water capacity adversely affects seedling survival in areas where understory plants are numerous. This soil is often very low in organic matter, and harvesting operations that remove all tree biomass on the site will reduce the fertility of the soil. Using special planting stock that is larger than usual or that is containerized will reduce the rate of seedling mortality. Organic matter can be conserved by restricting burning and leaving slash well distributed. Competing vegetation can be controlled by site preparation. Spraying, cutting, or girdling controls unwanted weeds, brush, or trees. Using special harvesting equipment with large tires or tracks reduces the equipment use limitation, minimizes root damage, and reduces soil compaction during thinning operations. Equipment use, plant competition, and seedling mortality are the main concerns in woodland management.

This soil is well suited to sanitary facilities and building site development except for shallow excavations, which are subject to caving. Rapid permeability is a limitation affecting septic tank absorption fields but can be overcome by increasing the size of the septic tank absorption field. If the density of housing is moderate or high, a community sewage system is needed to prevent contamination of the water supplies as a result of seepage.

The land capability classification is VIs, and the woodland ordination symbol is 8S.

64—Alaga loamy sand, moderately wet, 0 to 5 percent slopes. This soil is nearly level to gently sloping and is moderately well drained. It is in broad, low areas on the uplands. The mapped areas range from 10 to 80 acres.

In 90 percent of areas mapped as Alaga loamy sand, moderately wet, 0 to 5 percent slopes, Alaga and similar soils make up 82 to 99 percent of the map unit. Dissimilar soils make up 1 to 18 percent.

Typically, the surface layer is very dark grayish brown loamy sand about 7 inches thick. The upper part of the underlying material, to a depth of 36 inches, is dark brown loamy sand. The next part, to a depth of 70 inches, is strong brown loamy sand. The lower part to a depth of 80 inches or more is reddish yellow sand that contains many uncoated sand grains. Some soils occurring in areas of this map unit are similar to the Alaga soil, but they have a thick, dark, mineral surface layer and are in the local alluvial areas.

Dissimilar soils included in mapping are small areas of Lovett and Ocilla soils. These soils have a loamy and clayey subsoil within 40 inches of the surface.

Important soil properties:

Seasonal high water table: At a depth of 48 to 72 inches
Permeability: Rapid
Available water capacity: Low

The natural vegetation consists of slash pine, longleaf pine, southern red oak, and hickory. The understory vegetation includes sumac, persimmon, blackberry, and pineland threeawn.

This soil is only moderately suited to cultivated crops because of droughtiness and rapid leaching of plant nutrients. Conservation management practices should include a crop rotation system that keeps close-growing crops on the soil at least two-thirds of the time. Planting soil-improving crops and leaving all crop residue on the soil help to reduce erosion, maintain the content of organic matter, and conserve moisture. Fertilizer and lime should be added according to the needs of the crop, and the crops should be irrigated before this soil can reach its maximum productivity. Conservation tillage also helps to control erosion and conserve moisture.

This soil is moderately suited to improved pasture. Deep-rooted plants, such as improved bermudagrass and bahiagrass, perform well when properly managed. Fertilizer and lime are needed for optimum growth of grasses and legumes.

The potential productivity of this soil for slash pine is moderately high. Equipment use, plant competition, and seedling mortality are the main concerns in woodland management. Intensive site preparation and maintenance can keep undesirable plants from restricting adequate natural or artificial reforestation. Hardwood understory can be reduced by controlled burning, applying herbicides, girdling, or cutting unwanted trees. This soil generally is very low in content of organic matter, and harvesting operations that remove all tree biomass on this site reduce the fertility of the soil. Preferred harvesting methods leave residual biomass distributed over the site. Using special harvesting equipment with large tires or tracks reduces the equipment use limitation, minimizes root damage, and reduces soil compaction during thinning operations.

This soil is well suited to building site development except for shallow excavations, which are subject to caving. It is poorly suited to most sanitary facilities because of seepage of effluent, but it is well suited to septic tank absorption fields. If the density of housing is moderate or high, a community sewage system is needed to prevent contamination of the ground water supplies as a result of sewage.

The land capability classification is IIIs, and the woodland ordination symbol is 8S.

65—Lovett sand, 0 to 5 percent slopes. This soil is nearly level to gently sloping and is moderately well drained. It is on broad to narrow bands on the uplands. The mapped areas are irregular in shape and range from 5 to 80 acres.

In 80 percent of areas mapped as Lovett sand, 0 to 5 percent slopes, Lovett and similar soils make up 78 to 94 percent of the map unit. Dissimilar soils make up 6 to 22 percent.

Typically, the surface layer is dark grayish brown sand about 9 inches thick. The subsurface layer, to a depth of about 38 inches, is brownish yellow sand. The upper part of the subsoil, to a depth of about 47 inches, is yellowish brown fine sandy loam. The lower part, to a depth of 62 inches, is yellowish brown sandy clay that has light gray and red mottles. The substratum to a depth of about 80 inches is reticulately mottled yellowish brown, red, and light gray sandy clay. Some soils occurring in areas of this map unit are similar to the Lovett soil, but they have a sandy surface layer less than 20 inches thick or have more than 5 percent plinthite.

Dissimilar soils included in mapping are small areas of Bonifay soils. These soils have a loamy subsoil below a depth of 40 inches.

Important soil properties:

Seasonal high water table: Perched at a depth of 36 to 54 inches
Permeability: Slow
Available water capacity: Low

The natural vegetation consists of live oak, laurel oak, water oak, slash pine, loblolly pine, sweetgum, and blackgum. The understory vegetation includes waxmyrtle, poison ivy, sparkleberry, winged sumac, and Carolina jessamine.

This soil is moderately suited to cultivated crops. It is limited mainly because of the low available water capacity, low fertility, and seasonal wetness. The perched water table that develops during rainy periods early in the spring and summer generally limits the suitability of this soil for deep-rooted crops. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or grass-legume mixtures help to maintain fertility and tilth. Crusting of the surface and compaction can be reduced by returning crop residue to the soil. Frequent applications of fertilizer and lime generally are needed to improve the quality of the soil. Most crops and pasture plants respond well to fertilizer.

This soil is moderately suited to pasture. If this soil is used for pasture, the main limitations are seasonal droughtiness and low fertility. Seedbed preparation should be on the contour or across the slope where practical. When the soil is wet, grazing results in compaction of the surface layer, poor tilth, and excessive runoff. Growing pasture grasses on this soil helps to control erosion. The main suitable pasture plants are bahiagrass and bermudagrass. Proper stocking, pasture rotation, and restricted grazing during wet periods help to keep the pasture and soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

The potential productivity of this soil for slash pine is high. The main limitations for woodland management are equipment use, seedling mortality, and plant competition. Erosion is a slight hazard. The sandy surface layer restricts the use of wheeled equipment, especially when the soil is saturated or very dry. Intensive site preparation and maintenance will keep undesirable plants from restricting adequate natural or artificial reforestation. Site preparation, such as chopping, applying herbicides, and bedding, reduces debris, controls immediate plant competition, and facilitates mechanical planting. Hardwood understory can be reduced by controlled burning, applying herbicides, girdling, or cutting unwanted trees. This soil commonly is very low in content of organic matter, and harvesting operations that remove all tree biomass on the site reduce the fertility of the soil. Preferred harvesting methods leave residual biomass distributed over the site. Slash pine or loblolly pine are the recommended trees to plant for woodland production.

This soil is poorly suited to sanitary facilities and building site development except for dwellings without basements and small commercial buildings. The main limitations are wetness, seepage, and the sandy texture. A drainage system is needed to control wetness. Erosion is a hazard in the steeper areas. Excavations for roads and buildings increase the hazard of erosion on construction sites. Only that part of the site that is used for construction should be disturbed. Structures to divert runoff are needed if buildings and roads are constructed. Settling can be minimized by adding loamy fill material to the soil surface and by controlling the level of the water table. The slow permeability and the high water table increase the possibility that septic tank absorption fields will not function properly. Effluent can surface in downslope areas and create a health hazard. If the density of housing is moderate or high, a community sewage system is needed to prevent contamination of the water supplies as a result of seepage.

The land capability classification is IIs, and the woodland ordination symbol is 12S.

66—Lovett sand, 5 to 8 percent slopes. This soil is gently sloping to sloping and is moderately well drained. It is on short side slopes on the uplands. The mapped areas are irregular in shape and range from 5 to 30 acres.

In 95 percent of areas mapped as Lovett sand, 5 to 8 percent slopes, Lovett and similar soils make up 90 to 99 percent of the map unit. Dissimilar soils make up 1 to 10 percent.

Typically, the surface layer is dark grayish brown sand about 6 inches thick. The subsurface layer, to a depth of about 36 inches, is brownish yellow sand that has pale brown mottles. The subsoil extends to a depth of about 80 inches. It is brownish yellow sandy clay loam in the upper part and reticulately mottled red, gray, and yellowish brown clay in the lower part. Some soils occurring in areas of this map unit are similar to the Lovett soil, but they have a sandy surface layer less than 20 inches thick or have more than 5 percent plinthite.

Dissimilar soils included in mapping are small areas of Blanton soils. These soils have a loamy subsoil below a depth of 40 inches.

Important soil properties:

Seasonal high water table: Perched at a depth of 36 to 54 inches
Permeability: Moderately slow or slow
Available water capacity: Low to medium

The natural vegetation consists of live oak, water oak, laurel oak, slash pine, loblolly pine, and sweetgum. The understory vegetation includes wild cherry, American beautyberry, blueberry, greenbrier, hawthorn, waxmyrtle, winged sumac, and Carolina jessamine.

This soil is moderately suited to cultivated crops. This soil is friable, and good tilth can be easily maintained. The soil can be tilled throughout a wide range of moisture content. Irregularly shaped slopes hinder tillage operations. A well designed and properly managed sprinkler irrigation system helps to maintain optimum soil moisture and ensure maximum yields. Excessive cultivation can result in the formation of a plowpan. This plowpan can be broken up by subsoiling when the soil is dry. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or grass-legume mixtures help to conserve moisture, maintain fertility, and control erosion. Frequent applications of fertilizer and lime generally are needed to improve the quality of the soil. Conservation practices that can be used to control erosion include early fall seeding, conservation tillage, terraces and diversions, and grassed waterways. All tillage operations should be done on the contour or across the slope.

This soil is moderately well suited to pasture. If this soil is used for pasture, the main limitations are seasonal droughtiness and low fertility. Seedbed preparation should be on the contour or across the slope where practical. When the soil is wet, grazing causes compaction of the surface layer, poor tilth, and excessive runoff. Growing pasture grasses helps to control erosion. The main suitable pasture plants are bahiagrass and bermudagrass. Proper stocking, pasture rotation, and restricted grazing during wet periods help to keep the pasture and soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

The potential productivity of this soil for slash pine is high. The main limitations for woodland management are equipment use, seedling mortality, and plant competition. The sandy surface layer restricts the use of wheeled equipment, especially when the soil is saturated or very dry. Intensive site preparation and maintenance will keep undesirable plants from restricting adequate natural or artificial reforestation. Site preparation, such as chopping, applying herbicides, and bedding, reduces debris, controls immediate plant competition, and facilitates mechanical planting. Hardwood understory can be reduced by controlled burning, applying herbicides, girdling, or cutting unwanted trees. This soil commonly is very low in content of organic matter, and harvesting operations that remove all tree biomass on the site reduce the fertility of the soil. Preferred harvesting methods leave residual biomass distributed over the site. Slash pine and loblolly pine are the recommended trees to plant for woodland production.

This soil is poorly suited to sanitary facilities and building site development except for dwellings without basements and small commercial buildings. The main limitations are wetness, seepage, and the sandy texture. A drainage system is needed to control wetness. Erosion is a hazard in the steeper areas. Excavations for roads and buildings increase the hazard of erosion on construction sites. Only that part of the site that is used for construction should be disturbed. Structures to divert runoff are needed if buildings and roads are constructed. Settling can be minimized by adding loamy fill material to the soil surface and by controlling the level of the water table. The slow permeability and the high water table increase the possibility that septic tank absorption fields will not function properly. Effluent can surface in downslope areas and create a health hazard. If the density of housing is moderate or high, a community sewage system is needed to prevent contamination of the water supplies as a result of seepage.

The land capability classification is IIIe, and the woodland ordination symbol is 12S.

67—Udorthents, loamy. This map unit consists of areas that have been excavated by earth-moving equipment. Excess water ponds in low-lying areas for long periods after heavy rainfall. The mapped areas generally are square or rectangular and range from 5 to 80 acres. Slopes are highly variable, ranging from nearly level to steep.

Typically, these soils are sandy clay loam to a depth of 60 inches. The upper part is mottled strong brown, weak red, light gray, and pale yellow to a depth of about 13 inches. The next part, to a depth of about 33 inches, is dark reddish brown, strong brown, and white. The lower part is coarsely mottled dark reddish brown, strong brown, and white. Large pockets of sandy loam material are in the lower part. Some soils occurring in areas of this map unit are similar to these soils, but some are sandy throughout, some are clayey throughout, and others contain a few large boulders.

Included in mapping are soils in areas that are too small to delineate. Soil properties, including permeability, depth to the water table, available water capacity, soil reaction, natural fertility, and the hazard of erosion, are too variable to estimate.

In most areas flooding is controlled, but some areas in the Suwannee River flood plain are occasionally flooded. The surface layer of these soils is very sticky when wet and dries slowly.

The natural vegetation consists of slash pine and loblolly pine. The understory vegetation includes broomsedge bluestem and waxmyrtle.

This map unit is used mainly as habitat for wildlife and for recreational development. It is also used as pasture or woodland.

These soils generally are not suited to most cultivated crops, pasture, commercial woodland, sanitary facilities, or building site development because of irregular slopes, slow percolation, and the potential for ponding.

Some areas are suitable for pasture and pine tree production. These areas should be evaluated for these uses on an individual site basis.

No land capability classification or woodland ordination symbol is assigned.

71—Faceville loamy fine sand, 2 to 5 percent slopes. This soil is nearly level to gently sloping and is well drained. It is on the uplands. The mapped areas are irregular in shape and range from 5 to 100 acres.

In 80 percent of areas mapped as Faceville loamy fine sand, 2 to 5 percent slopes, Faceville and similar soils make up 75 to 90 percent of the map unit. Dissimilar soils make up 10 to 25 percent.

Typically, the surface layer is dark brown loamy fine sand about 6 inches thick. The upper part of the subsoil, to a depth of 17 inches, is red sandy clay. The next part, to a depth of 53 inches, is red clay that has reddish yellow mottles. The lower part to a depth of 80 inches or more is yellowish red clay that has mottles in shades of yellow and red. Some soils occurring in areas of this map unit are similar to the Faceville soil, but some are loamy and others are reticulately mottled in the upper part of the Bt horizon.

Dissimilar soils included in mapping are small areas of Lovett and Lucy soils. Lovett soils have a perched water table. Lucy soils have a loamy subsoil below a depth of 20 inches. Also included are soils that have a water table within 60 inches of the surface.

Important soil properties:

Seasonal high water table: Not within 72 inches of the surface
Permeability: Moderate
Available water capacity: Moderate
Runoff: Rapid
Hazard of water erosion: Slight

The natural vegetation consists of longleaf pine, loblolly pine, slash pine, southern red oak, and hickory. The understory vegetation includes wild cherry, dogwood, sassafras, wild persimmon, blackberry, brackenfern, and other native grasses.

This soil is well suited to cultivated crops. The main crops are soybeans, corn, peaches, and other crops adapted to the area. This soil is friable, and good tilth is easily maintained. The soil is somewhat difficult to keep in good tilth, however, if some of the clayey subsoil has been mixed into the plow layer. It can be tilled throughout a wide range of moisture content. Sprinkler irrigation systems are suited to this soil. A well designed and properly managed sprinkler irrigation system helps to maintain optimum soil moisture and ensure maximum yields. A plowpan forms easily if this soil is tilled when wet. Chiseling or subsoiling can be used to break up the plowpan. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or grass-legume mixtures help to maintain fertility and tilth. Frequent applications of fertilizer and lime generally are needed to improve the quality of the soil. Conservation practices to control erosion include early fall seeding, conservation tillage, terraces and diversions, and grassed waterways.

This soil is well suited to pasture. When the soil is wet, grazing causes compaction of the surface layer, poor tilth, and excessive runoff. Growing pasture grasses on this soil helps to control erosion. Proper stocking, pasture rotation, and restricted grazing during wet periods help to keep the pasture and soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes. The main suitable pasture plants are bahiagrass and bermudagrass.

The potential productivity of this soil for loblolly pine is moderately low. Loblolly pine and slash pine are the recommended trees to plant for woodland production. Intensive site preparation and maintenance will keep undesirable plants from restricting adequate natural or artificial reforestation. Hardwood understory can be reduced by controlled burning, applying herbicides, girdling, or cutting unwanted trees. This soil commonly is very low in content of organic matter, and harvesting operations that remove all tree biomass on the site will reduce the fertility of the soil. Preferred harvesting methods leave residual biomass distributed over the site.

This soil is moderately suited to sanitary facilities and building site development. Seepage, the clayey texture, and low soil strength are the main limitations affecting sewage lagoons, sanitary landfills, shallow excavations, and roads. Excavation for roads and buildings increases the hazard of erosion on construction sites. Existing plant cover should be left on construction sites, and revegetating disturbed areas as soon as possible helps to control erosion. Plant cover can be established and maintained with proper fertilizing, seeding, mulching, and shaping of the slopes. Roads should be designed to offset the limited ability of the soil to support a heavy load.

The land capability classification is IIe, and the woodland ordination symbol is 8A.

72—Faceville loamy fine sand, 5 to 8 percent slopes. This soil is gently sloping to sloping and is well drained. It is on ridgetops and side slopes on the uplands. The mapped areas are irregular in shape and range from 5 to 100 acres.

In 80 percent of areas mapped as Faceville loamy fine sand, 5 to 8 percent slopes, Faceville and similar soils make up 84 to 99 percent of the map unit. Dissimilar soils make up 1 to 16 percent.

Typically, the surface layer is reddish loamy fine sand about 6 inches thick. The subsoil to a depth of 80 inches or more is yellowish red and red sandy clay. Reddish yellow mottles are below a depth of 52 inches. Some soils occurring in areas of this map unit are similar to the Faceville soil, but some are loamy and others have a sandy surface layer more than 20 inches thick.

Dissimilar soils included in mapping are small areas of Lucy soils. These soils have a loamy subsoil below a depth of 20 inches.

Important soil properties:

Seasonal high water table: Not within 72 inches of the surface
Permeability: Moderate
Available water capacity: Moderate
Runoff: Rapid
Hazard of water erosion: Moderate

The natural vegetation consists of longleaf pine, loblolly pine, slash pine, southern red oak, and hickory. The understory vegetation includes wild cherry, dogwood, sassafras, blackberry, brackenfern, and assorted grasses.

This soil is moderately suited to cultivated crops. It is limited mainly because of the moderate erosion hazard. The main crops are soybeans, corn, peaches, and other crops adapted to the area. The soil is friable, and good tilth can be easily maintained. The soil is somewhat difficult to keep in good tilth, however, if some of the clayey subsoil has been mixed into the plow layer. It can be tilled throughout a wide range of moisture content. Irregular slopes hinder tillage operations. Sprinkler irrigation systems are suited to this soil. A well designed and properly managed sprinkler irrigation system helps to maintain optimum soil moisture and ensure maximum yields. A plowpan forms easily if this soil is tilled when wet. Chiseling or subsoiling can be used to break up the plowpan. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or grass-legume mixtures help to maintain fertility and tilth. Frequent applications of fertilizer and lime generally are needed to improve the quality of the soil. Conservation practices to control erosion include early fall seeding, conservation tillage, terraces and diversions, and grassed waterways. Gradient terraces and contour farming will reduce the risk of sheet and rill erosion on the steep slopes.

This soil is well suited to pasture. Seedbed preparation should be on the contour or across the slope where practical. When the soil is wet, grazing causes compaction of the surface layer, poor tilth, and excessive runoff. Growing pasture grasses on this soil helps to control erosion. Proper stocking, pasture rotation, and restricted grazing during wet periods help to keep the pasture and soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes. The main suitable pasture plants are bahiagrass and bermudagrass.

The potential productivity of this soil for loblolly pine is moderately low. Intensive site preparation and maintenance will keep undesirable plants from restricting adequate natural or artificial reforestation. Hardwood understory can be reduced by controlled burning, applying herbicides, girdling, or cutting unwanted trees. This soil commonly is very low in content of organic matter, and harvesting operations that remove all tree biomass on the site reduce the fertility of the soil. Preferred harvesting methods leave residual biomass distributed over the site.

This soil is moderately suited to sanitary facilities and building site development. Seepage, slope, the clayey texture, and low soil strength are the main limitations affecting sewage lagoon areas, sanitary landfills, daily cover for landfills, shallow excavations, and roads. Erosion is a hazard in the steeper areas. Excavations for roads and buildings increase the hazard of erosion on construction sites. Existing plant cover should be kept on construction sites, and only that part of the site that is used for construction should be disturbed. Revegetating disturbed areas as soon as possible helps to control erosion. Plant cover can be established and maintained with proper fertilizing, seeding, mulching, and shaping of the slopes. Roads should be designed to offset the limited ability of the soil to support a heavy load.

The land capability classification is IIIe, and the woodland ordination symbol is 8A.

74—Dorovan and Pamlico soils, depressional. These soils are nearly level and very poorly drained. They are in very broad, titi and bay tree swamps and in depressions on the flatwoods. Most areas are ponded for 6 to 12 months during most years. The mapped areas are irregular in shape and range from 20 to 1,800 acres. Slopes are smooth to concave and are 0 to 1 percent.

In 95 percent of areas mapped as Dorovan and Pamlico soils, depressional, Dorovan, Pamlico, and similar soils make up 85 to 99 percent of the map unit. Dissimilar soils make up 1 to 15 percent.

The Dorovan soil makes up about 58 percent of the map unit and the Pamlico soil about 31 percent. Some areas consist mostly of the Dorovan soil, and some are mostly of the Pamlico soil. Other areas contain substantial amounts of both soils. The proportion varies from one area to another. These soils do not occur in a regular repeating pattern. The mapped areas of the individual soils are large enough to map separately; however, in considering the present and predicted use, they were mapped as one map unit.

Typically, the surface layer of the Dorovan soil extends to a depth of about 70 inches. In sequence downward, it is very dark brown mucky peat, very dark brown muck, dark reddish brown muck, and dark reddish brown mucky peat. The underlying material to a depth of 80 inches or more is very dark gray sand.

Typically, the surface layer of the Pamlico soil is about 33 inches thick. The upper part, to a depth of about 6 inches, is partly decomposed roots, twigs, and leaves. The next layer, to a depth of about 15 inches, is black muck. The lower part is dark brown muck. The upper part of the underlying material, to a depth of about 60 inches, is yellowish brown fine sand. The lower part to a depth of 80 inches is grayish brown sandy clay loam that has small gray pockets of sand.

Dissimilar soils included in mapping are small areas of Surrency, Sapelo, and Plummer soils that are in depressions. These soils have a loamy subsoil below a depth of 20 inches. They are mineral soils.

Important soil properties:

Seasonal high water table: At the surface to 24 inches above the surface
Permeability: Moderate
Available water capacity: Very high

The natural vegetation consists of slash pine,

Figure 7.—Very thick vegetation consisting mostly of greenbrier in an area of Dorovan and Pamlico soils, depressional.

cypress, sweetbay, and blackgum. The understory vegetation includes white titi, black titi, and greenbrier (fig. 7).

These soils are mostly used as habitat for wetland wildlife. A few areas have been partly drained and are used for pine tree production.

These soils are not suited to cultivated crops or pasture. They are limited mainly because of wetness, ponding, and a moderate or high subsidence potential if drained.

These soils generally are not suited to the production of pines because of the wetness and the prolonged ponding. They are moderately suited to cypress and hardwoods, but harvesting and planting should be scheduled during extended dry periods. Some areas in San Pedro Bay are partly drained and can be used for pine tree production; however, seedling mortality, equipment use, plant competition, and the windthrow hazard are the main concerns in woodland management.

This map unit is not suited to sanitary facilities or building site development.

The land capability classification is VIIw. The woodland ordination symbol is 7W for Dorovan soil and 4W for Pamlico soil.

77—Surrency, Plummer, and Cantey soils, frequently flooded. These soils are nearly level and are poorly drained and very poorly drained. They are on river and creek flood plains. These soils are frequently flooded for very long periods following prolonged, high-intensity rains. The mapped areas range from 80 to 640 acres. Slopes are dominantly less than 2 percent.

In 80 percent of areas mapped as Surrency, Plummer, and Cantey soils, frequently flooded, Surrency, Plummer, Cantey, and similar soils make up 90 to 98 percent of the map unit. Dissimilar soils make up 2 to 10 percent.

Surrency and similar soils make up about 33 percent of the map unit, Plummer and similar soils make up about 32 percent, and Cantey and similar soils make up about 25 percent. Every soil is not in every mapped area; the relative proportion of combinations varies. The mapped areas of the individual soils are large enough to map separately; however, in considering the present and predicted use, they were mapped as one map unit.

The Surrency soil is very poorly drained. Typically, the surface layer is black loamy sand about 10 inches thick. The subsurface layer, to a depth of about 33 inches, is light brownish gray sand. The upper part of the subsoil is dark gray sandy clay loam. The lower part to a depth of 80 inches or more is gray sandy clay. Some soils occurring in areas of this map unit are similar to the Surrency, Plummer, and Cantey soils, but they have a surface layer that is thicker and that has a higher content of organic matter.

Plummer soils are poorly drained. Typically, the surface layer is black fine sand about 4 inches thick. The upper part of the subsurface layer is light gray fine sand. The lower part, to a depth of 58 inches, is light brownish gray fine sand. The subsoil to a depth of 80 inches or more is light brownish gray sandy clay loam.

Cantey soil is poorly drained. Typically, the surface layer is about 10 inches thick. The upper part, to a depth of about 5 inches, is very dark gray fine sandy loam. The lower part is dark gray fine sandy loam. The subsurface layer, to a depth of 19 inches, is light brownish gray fine sandy loam. The upper part of the subsoil is light brownish gray sandy clay. The lower part to a depth of about 80 inches or more is gray, mottled sandy clay.

Dissimilar soils included in mapping are small areas of Sapelo soils. These soils are on slightly higher knolls on the landscape than the major soils in this map unit.

Important soil properties of Surrency, Plummer, and Cantey soils:

Seasonal high water table: At a depth of 0 to 6 inches
Permeability: Moderate—Surrency and Plummer; slow—Cantey
Available water capacity: Low—Surrency and Plummer; moderate—Cantey

The natural vegetation consists of cypress, blackgum, sweetgum, ironwood, sweetbay, water oak, and slash pine. The understory vegetation includes gallberry, fetterbush lyonia, and waxmyrtle.

Most of the acreage in this map unit has been left in native woodland.

These soils generally are not suited to most cultivated crops because of the flooding.

These soils are poorly suited to pasture. The main limitations are low natural fertility and the seasonal high water table. Flooding is a hazard. Wetness limits the choice of plants that can be grown and the period of grazing. When the soil is wet, grazing causes compaction of the surface layer and damage to the plant community. The use of equipment is limited because of wetness and surface stickiness. Bahiagrass is a suitable pasture plant.

These soils are not suited to the production of pines because of the flooding and the extended wetness. They may be suited to cypress and hardwood production through natural regeneration.

These soils are not suited to sanitary facilities or building site development mainly because of the frequent flooding.

The land capability classification is VIw for Surrency and Cantey soils and IVw for Plummer soil. The woodland ordination symbol is 10W for Surrency soil, 11W for Plummer soil, and 8W for Cantey soil.

78—Alpin fine sand, occasionally flooded. This soil is nearly level to gently sloping and is excessively drained. It is on the uplands and is adjacent to the flood plains. The soil is occasionally flooded for brief periods following prolonged, high-intensity rains. The mapped areas are irregular in shape and range from 40 to 300 acres. Slope is 0 to 5 percent.

In 95 percent of areas mapped as Alpin fine sand, occasionally flooded, Alpin and similar soils make up about 77 to 99 percent of the map unit. Dissimilar soils make up 1 to 23 percent.

Typically, the surface layer is dark brown fine sand about 4 inches thick. The upper part of the subsurface layer is light yellowish brown fine sand. The lower part, to a depth of about 55 inches, is very pale brown fine sand. The subsoil to a depth of 80 inches or more is white fine sand that has horizontal bands of yellowish brown sand.

Dissimilar soils included in mapping are small areas of Eunola and Troup soils. Eunola soils are in slightly lower positions on the landscape than the Alpin soil and have a loamy subsoil at a depth of less than 20 inches. Troup soils have a loamy subsoil below a depth of 40 inches.

Important soil properties:

Seasonal high water table: Not within 72 inches of the surface
Permeability: Rapid
Available water capacity: Low

The natural vegetation consists of live oak, longleaf pine, slash pine, turkey oak, bluejack oak, post oak, and blackgum. The understory vegetation includes persimmon, American holly, sparkleberry, and saw palmetto.

This soil is poorly suited to cultivated crops. The main limitations are droughtiness, excessive nutrient leaching, and the low available water capacity. Flooding is a hazard. This soil is friable, and good tilth can be easily maintained. The soil can be tilled throughout a wide range of moisture content. Sprinkler irrigation systems are suited to this soil. Irrigation generally is feasible in most areas if water is readily available. A well designed and properly managed sprinkler irrigation system helps to maintain optimum soil moisture and ensure maximum yields. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or grass-legume mixtures help to maintain fertility and tilth. Crops respond to lime and fertilizer. Diversions and grassed waterways may be needed.

This soil is fairly suited to pasture. The main limitations are droughtiness, very low fertility, and the low available water capacity. Flooding is a hazard. The low available water capacity limits the production of plants during extended dry periods. Deep-rooted plants, such as Coastal bermudagrass and bahiagrass, are more drought-tolerant if properly fertilized and limed. Proper stocking, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

The potential productivity of this soil for pines is moderate. The main concern in woodland management is the low available water capacity, which increases the rate of seedling mortality and reduces plant growth. Longleaf pine, slash pine, and sand pine are the recommended trees to plant for woodland production. Site preparation, such as chopping, burning, applying herbicides, and bedding, reduces debris, controls immediate plant competition, and facilitates hand and mechanical planting. Using special planting stock that is larger than usual or that is containerized will reduce the rate of seedling mortality. Natural regeneration may be preferable. Other management practices include selecting appropriate plants and leaving debris onsite to conserve organic matter. These soils commonly are very low in content of organic matter, and harvesting operations that remove all tree biomass on the site will reduce the fertility of the soil. Preferred harvesting methods leave residual biomass distributed over the site.

This soil is poorly suited to building site development. The main limitation is seepage. Flooding is a hazard. Soils that are better suited to building site development generally are in nearby areas at higher elevations. Cutbanks are not stable and are subject to slumping. If the density of housing is moderate or high, community sewage systems are needed to prevent contamination of the water supplies as a result of seepage.

The land capability classification is IVs, and the woodland ordination symbol is 10S.

79—Eunola fine sand, occasionally flooded. This soil is nearly level to gently sloping and is somewhat poorly drained. It is on low river terraces. The soil is occasionally flooded for very brief periods following prolonged, high-intensity rains. Excess water ponds in low-lying areas for brief periods after heavy rainfall. The mapped areas range from 320 to 640 acres. Slopes range from 0 to 5 percent.

In 95 percent of areas mapped as Eunola fine sand, occasionally flooded, Eunola and similar soils make up 87 to 99 percent of the map unit. Dissimilar soils make up 1 to 13 percent.

Typically, the surface layer is dark grayish brown fine sand about 7 inches thick. The subsurface layer, to a depth of 12 inches, is pale brown loamy fine sand. The subsoil extends to a depth of about 65 inches. In sequence downward, it is yellowish brown sandy clay loam; strong brown sandy clay loam; strong brown sandy clay and sandy clay loam that have gray, red, and brown mottles; and brownish yellow loamy fine sand that has brown and red mottles. The substratum to a depth of about 80 inches is white fine sand that has brown mottles. Some soils occurring in areas of this map unit are similar to the Eunola soil, but they have a sandy surface layer more than 20 inches thick.

Dissimilar soils included in mapping are small areas of Alpin fine sand that are occasionally flooded. These soils are in slightly higher positions on the landscape than the Eunola soil and do not have a continuous subsoil. Small sinkholes occur in some areas.

Important soil properties:

Seasonal high water table: At a depth of 18 to 30 inches
Permeability: Moderate
Available water capacity: Moderate

The natural vegetation consists of slash pine, water oak, live oak, blackgum, sweetgum, yaupon, and hawthorn. The understory vegetation includes huckleberry, American holly, cabbage palm, American beautyberry, saltbush, and bluestar.

This soil is well suited to cultivated crops. It is limited mainly because of the occasional flooding. A well designed and properly managed sprinkler irrigation system helps to maintain optimum soil moisture and ensure maximum yields. Excessive cultivation can result in the formation of a plowpan. This plowpan can be broken by subsoiling when the soil is dry. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or grass-legume mixtures help to maintain fertility and tilth. Crusting of the surface and compaction can be reduced by returning crop residue to the soil. Frequent applications of fertilizer and lime generally are needed to improve, the quality of the soil. Most crops respond well to fertilizer. Conservation tillage, buffer strips, and a crop rotation system that will keep close-growing cover crops on the soil control erosion.

This soil is well suited to pasture. Grasses and legumes grow well if adequate fertilizer is added. Proper stocking, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes. The use of equipment is limited because of sinkholes. Suitable pasture plants are bahiagrass and bermudagrass.

The potential productivity of this soil for loblolly pine is moderate. Site preparation, such as chopping, applying herbicides, and bedding, reduces debris, controls immediate plant competition, and facilitates mechanical planting. This soil is often very low in organic matter, and harvesting operations that remove all tree biomass on the site will reduce the fertility of the soil. Preferred harvesting methods leave residual biomass distributed over the site. Bedding of rows helps to minimize the effects of the wetness. Bedding should not block natural surface drainage. Road construction, logging, and site preparation should be avoided in streambeds and nearby areas because of the risk of erosion and the wetness. Using special harvesting equipment with large tires or tracks reduces the equipment use limitation, minimizes root damage, and reduces soil compaction during thinning operations.

This soil is poorly suited to sanitary facilities and building site development. The main limitation is wetness. Flooding is a hazard. Soils that are better suited to these uses generally are in nearby areas at higher elevations. Roads and streets should be constructed above flood level. Septic tank absorption field effluent can surface in downslope areas and create a health hazard.

The land capability classification is IIw, and the woodland ordination symbol is 9W.

80—Kenansville loamy fine sand, occasionally flooded. This soil is nearly level to gently sloping and is well drained. It is on river terraces. The soil is occasionally flooded for long periods following prolonged, high-intensity rains. Excess water ponds in low-lying areas for brief periods after heavy rainfall. The mapped areas range from 80 to 320 acres. Slopes range from 0 to 5 percent.

In 80 percent of areas mapped as Kenansville loamy fine sand, occasionally flooded, Kenansville and similar soils make up 82 to 99 percent of the map unit. Dissimilar soils make up 1 to 18 percent.

Typically, the surface layer is dark gray loamy fine sand about 4 inches thick. The subsurface layer, to a depth of about 22 inches, is pale brown and pale yellow loamy fine sand. The upper part of the subsoil, to a depth of 26 inches, is brownish yellow fine sandy loam. The next part, to a depth of 49 inches, is yellowish brown sandy clay loam. The lower part, to a depth of 56 inches, is brownish yellow fine sandy loam. The upper part of the substratum, to a depth of 69 inches, is pale yellow fine sand. The lower part to a depth of about 80 inches or more is white fine sand. Some soils occurring in areas of this map unit are similar to the Kenansville soil, but they have a loamy subsoil within 20 inches of the surface and have a seasonal high water table within 80 inches of the surface.

Dissimilar soils included in mapping are small areas of Alpin fine sand that are occasionally flooded. Alpin soils are in slightly higher positions on the landscape than the Kenansville soil and do not have a continuous subsoil. Small sinkholes occur in some areas.

Important soil properties:

Seasonal high water table: Not within 72 inches of the surface
Permeability: Moderate
Available water capacity: Low

The surface layer of this soil remains wet for long periods after heavy rains.

The natural vegetation consists of slash pine, water oak, sweetgum, live oak, and hickory. The understory vegetation includes wild persimmon, poison ivy, sparkleberry, Virginia creeper, brackenfern, indigo, and low panicum.

This soil is fairly suited to cultivated crops. The main limitations are droughtiness and low natural fertility. The occasional flooding is a hazard. Sprinkler irrigation systems are suited to this soil. Irrigation generally is feasible in most areas if water is readily available. A well designed and properly managed sprinkler irrigation system helps to maintain optimum soil moisture and ensure maximum yields. Excessive cultivation can result in the formation of a plowpan. This plowpan can be broken up by subsoiling when the soil is dry. Subsoiling increases the effective rooting depth. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or grass-legume mixtures help to conserve moisture, maintain fertility, and control erosion. Crusting of the surface layer and compaction can be reduced by returning crop residue to the soil. Most crops respond well to fertilizer. Soil blowing is a hazard in cultivated areas but can be controlled with a good ground cover of close-growing plants.

This soil is moderately well suited to pasture. Grasses and legumes grow well if adequate fertilizer is added. When the soil is wet, grazing causes compaction of the surface layer, poor tilth, and excessive runoff. Excess surface water can be removed from most areas by field drains. Low available water capacity limits the production of plants suitable for pasture. Drought-tolerant plants are most suitable for planting. Suitable pasture plants are bahiagrass and bermudagrass. Proper stocking, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

The potential production of this soil for loblolly pine and slash pine is moderate. The sandy surface layer restricts the use of wheeled equipment, especially when the soil is very dry. Droughtiness increases the rate of seedling mortality. Site preparation, such as chopping, applying herbicides, and bedding, reduces debris, controls immediate plant competition, and facilitates mechanical planting. This soil is often very low in organic matter, and harvesting operations that remove all tree biomass on the site will reduce the fertility of the soil. Preferred harvesting methods leave residual biomass distributed over the site. Bedding of rows helps to minimize the effects of the wetness. Bedding should not block natural surface drainage. Road construction, logging, and site preparation should be avoided in streambeds and nearby areas because of the risk of erosion and the wetness. Using special harvesting equipment with large tires or tracks reduces the equipment use limitation, minimizes root damage, and reduces soil compaction during thinning operations.

This soil is poorly suited to building site development. The occasional flooding is a hazard. Dikes and channels that have outlets to bypass floodwater can be used to protect buildings and onsite sewage disposal systems from flooding. Generally, soils in nearby areas that are at higher elevations are better suited to building site development and septic tank absorption fields. Roads and streets should be constructed above flood level. Selection of vegetation adapted to this soil is critical for the establishment of lawns, shrubs, trees, and vegetable gardens. Mulching, fertilizing, and irrigation are needed to establish lawn grasses and other small seeded plants. If the density of housing is moderate or high, a community sewage system is needed to prevent contamination of the water supplies as a result of seepage.

The land capability classification is IIs, and the woodland ordination symbol is 8S.

Prime Farmland

In this section, prime farmland is defined and discussed, and the prime farmland soils in Madison County 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. The acreage of high-quality farmland is limited, and the U.S. Department of Agriculture recognizes that government at local, state, and federal levels, as well as individuals, must encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland soils, as defined by the U.S. Department of Agriculture, are soils that are best suited to producing food, feed, forage, fiber, and oilseed crops. Such soils have properties that are favorable for the economic production of sustained high yields of crops. The soils need only to be treated and managed using acceptable farming methods. The moisture supply, of course, must be adequate, and the growing season has to be sufficiently long. Prime farmland soils produce the highest yields with minimal inputs of energy and economic resources. Farming these soils results in the least damage to the environment.

Prime farmland soils may presently be in use as cropland, pasture, or woodland, or they may be in other uses. They are used for producing food or fiber or are available for these uses. 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 reservations, and state parks.

Prime farmland soils usually get an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The acidity or alkalinity level of the soils is acceptable. The soils have few or no rocks and are permeable to water and air. They are not excessively erodible or saturated with water for long periods and are not subject to frequent flooding during the growing season. The slope ranges mainly from 0 to 5 percent.

The following map units make up prime farmland in Madison County. 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 2. The soil qualities that affect use and management are described in the section "Detailed Soil Map Units." This list does not constitute a recommendation for a particular land use.

55	Esto fine sandy loam, 2 to 5 percent slopes
79	Eunola fine sand, occasionally flooded
71	Faceville loamy fine sand, 2 to 5 percent slopes
72	Faceville loamy fine sand, 5 to 8 percent slopes
38	Goldsboro loamy sand, 2 to 5 percent slopes
16	Orangeburg loamy sand, 2 to 5 percent slopes
17	Orangeburg loamy sand, 5 to 8 percent slopes

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 for 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, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the 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 can cause difficulty in excavation.

Health officials, 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, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

William F. Kuenstler, agronomist, Soil Conservation Service, helped to prepare this section.

The major concerns in managing soils for crops and pasture are described in this section. In addition, the crops or pasture plants best suited to the soils, including some not commonly grown in the county, are discussed. The system of land capability classification used by the Soil Conservation Service is explained, and the estimated yields of the main crops and hay and pasture plants are presented for each soil.

This section provides information about the overall agricultural potential of the county and about the management practices that are needed. The information is useful to farmers, equipment dealers, land improvement contractors, fertilizer companies, processing companies, planners, conservationists, and others. For each kind of soil, information about management is presented in the section "Detailed Soil Map Units." Planners of management systems for individual fields or farms should also consider the detailed information given in the description of each soil.

Over 80,000 acres in Madison County was used for crops and pasture in 1986, according to agriculture census data and Soil Conservation Service data. Of this total, about 44,000 acres was in row crops, mainly corn, soybeans, tobacco, and watermelons; about 12,000 acres was in close-grown crops, such as wheat and rye; and about 25,000 acres was in permanent pasture. About 12,000 acres of the row cropland was seeded to rye for winter grazing.

The acreage in crops has been decreasing slightly as the economics of crop production have changed. The land that was used mostly for crops is being planted to pine trees. Population growth in the county has been slow, and only a small acreage is being used for urban development.

Soil erosion caused by water is a major problem in Madison County on cropland that has slope of more than 2 percent. Alaga, Blanton, and Faceville soils have slopes that are as much as 8 percent and are very susceptible to erosion under intensive cropping systems.

Loss of the surface layer through erosion is damaging because productivity is reduced as the surface layer is lost and part of the subsoil is incorporated into the plow layer. The loss of the surface layer is damaging on soils that have a clayey subsoil, such as Nankin and Faceville soils. Soil erosion on farmland also results in sediment entering streams. If erosion is controlled, sediment pollution can be reduced and the quality of water for municipal use, for recreation, and for fish and wildlife can be improved.

Conservation practices, such as maintaining a vegetative cover on the surface layer, reducing runoff, and increasing infiltration, will help to control erosion. A cropping system that maintains a plant cover on the soil for extended periods can hold soil erosion losses to amounts that do not reduce the productive capacity of the soils. On livestock farms, legumes and grasses should be included in the cropping system to reduce erosion on sloping land, provide nitrogen, and improve tilth for the next crop.

Conservation tillage is an excellent erosion control method. The crop residue that is left on the soil surface intercepts falling rain so it cannot dislodge soil particles. The residue also slows water that is flowing across the soil surface, so it has less energy to cause erosion. Conservation tillage is adapted to Nankin, Lovett, and other soils that are moderately well drained or well drained. Conservation tillage also reduces soil moisture loss by evaporation from the soil surface. The extra moisture that is saved can carry a crop that might otherwise go into stress through a short period of drought.

Terraces and diversions are practices that reduce runoff, thereby reducing the risk of erosion. Terraces are suitable on soils with long, regular slopes, such as Lucy and Orangeburg soils. Terraces are not suited or not needed on soils with short, irregular slopes.

Contour farming is an erosion control practice that has been applied on only a few farms in Madison County, but it has a great potential for use. Contouring is an effective practice that costs little to apply but can reduce erosion by as much as 50 percent on many soils. Contouring and contour stripcropping are also suited to Lucy and Orangeburg soils.

Soil blowing is a hazard on the sandy Albany and Blanton soils. Soil blowing is seldom so serious that it damages the soil as much as water erosion; however, soil blowing can damage or destroy tender young crops in a few hours. Leaving crop residue on the soil surface, planting permanent windbreaks of trees and shrubs, or planting annual windbreaks of small grain will effectively reduce soil blowing.

Information on the design of erosion control practices for each kind of soil can be obtained from the local office of the Soil Conservation Service.

Soil fertility is naturally low on most of the cropland in the county. The soils are moderately acid to very strongly acid. For successful crop production, agricultural limestone must be applied to raise the pH, and nitrogen, phosphorus, and potash must also be applied. Lime and fertilizer applications should be based on soil tests, the needs of the crop, and the planned yield level.

Soil tilth is an important factor in the germination of seed and the infiltration of water into the soil. Soils that have good tilth have granular structure, are porous, and are easily tilled.

Most of the cropland in the county has a sandy or sandy loam surface layer that is light in color and low in content of organic matter. A thin crust can form on the surface after an intense, heavy rainfall. This crust reduces infiltration of subsequent rainfall and slows crop seedling emergence. Returning crop residue to the soil, spreading manure, and planting cover and green manure crops will increase the content of organic matter, improve soil structure, and increase the available water capacity of the soil.

The hazard of erosion will increase if cropland is tilled in the fall and left bare during the winter. If cropland is disked or plowed in the fall, a cover crop of wheat, rye, or ryegrass should be planted to control erosion.

The soils and climate of Madison County are suited to the production of many different field crops. The main crops are corn, soybeans, wheat, and grain sorghum. Some tobacco, cotton, peanuts, and watermelons are also grown.

Growing hay for sale has good potential in the county. Demand is growing for good quality grass or legume hay. With a good fertility program, 8 to 10 tons per acre of excellent quality bermudagrass hay can be produced. Florigraze, a perennial forage peanut, is adapted to conditions in north Florida. It is suited to well drained soils and can be cut for hay. Any forage crop provides excellent erosion control on sloping land.

Some specialty crops, such as sweet corn, snap beans, and potatoes, are grown on a small acreage in the county. Some nursery and foliage plants are also grown. The latest information and suggestions on growing special crops can be obtained from the local office of the Soil Conservation Service and the Cooperative Extension Service.

Pastures in Madison County produce forage for beef and dairy cattle. On livestock farms, beef cattle and cow-calf operations are the most common. Bahiagrass and improved bermudagrass are the main pasture plants grown. Many farmers seed small grain in the fall for winter and spring grazing. Excess grass is harvested during the summer to use as feed during the winter. The well drained soils that have a loamy surface layer, such as Esto and Faceville soils, are well suited to legumes planted along with bahiagrass and improved bermudagrass. If adequate lime and fertilizer are added, legumes, such as white, crimson, and arrowleaf clovers, are well suited to these soils.

The potential of the soils in the county for increasing pasture production is high. Much of the pasture is not producing to its potential because of poor management, overgrazing, and improper applications of fertilizer and lime, but by adjusting stocking rates, implementing rotational grazing plans, and fertilizing for the planned production, pasture-carrying capacities can often be doubled. Planting legumes in pastures provides free nitrogen for the grass and increases the protein content of the forage.

Fields planted to pines often produce significant amounts of grazing for 3 to 6 years after planting. These areas should be closely monitored to ensure that livestock do not damage the pine seedlings. Another woodland grazing system involves changing the tree spacing in pine plantings. Instead of planting trees on an 8 by 12 foot spacing, they are planted in double rows on a 4 by 8 foot spacing with a 40-foot space between the double rows. This planting pattern provides significant forage production for 8 to 12 years after planting. Timber production is equivalent to that obtained from the common planting patterns. The latest information and suggestions for pasture management can be obtained from the local office of the Soil Conservation Service and the Cooperative Extension Service.

Yields Per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 3. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

For yields of irrigated crops, it is assumed that the irrigation system is adapted to the soils and to the crops grown, that good quality irrigation water is uniformly applied as needed, and that tillage is kept to a minimum.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 3 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for use as cropland. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major, and generally expensive, landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey. These levels are defined in the following paragraphs.

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

Class I soils have few limitations that restrict their use. There are no class I soils in Madison County.

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

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

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode, but they have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production. There are no class VIII soils in Madison County.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e*, *w*, or *s*, to the class numeral, for example, IIe. The letter *e* shows that the main hazard is risk of erosion unless a close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); and *s* shows that the soil is limited mainly because it is shallow or droughty.

There are no subclasses in class I because the soils of this class have few limitations. The soils in class V are subject to little or no erosion, but they have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation. Class V contains only the subclasses indicated by *w* or *s*.

The capability classification of each map unit is given in the section "Detailed Soil Map Units."

Woodland Management and Productivity

Ernie Ash, forester, Florida Division of Forestry, helped to prepare this section.

Although Madison County's economy is primarily agricultural, commercial woodlands have also contributed to the economy for many years. These commercial woodlands are mainly owned by large timber and wood product industries. The rest of the woodland acreage is small, privately owned tracts.

The main commercial trees are slash pine, longleaf pine, and loblolly pine. The most common hardwoods are laurel oak, water oak, sweetgum, black cherry, and various hickory trees.

An excellent market for woodland products is in Madison County, which has a large sawmill, a plywood mill, a hardwood pallet mill, and a few small pine, hardwood, and cypress sawmills that produce most of the timber and other woodland products. Two paper mills and a large treating facility are in the surrounding counties.

Large parts of the county were once covered by native longleaf pine that supported an active turpentine industry for many years. Turpentine is no longer produced in the county, and the longleaf pine acreage is declining steadily.

For many years, individuals and the woodland industries have planted and grown pines for profit. Recently, many farmers have been planting pines in idle fields because of declining profits in agriculture. Slash pine is by far the most common tree planted because of its fast growth on a wide variety of soils. It can be easily transplanted. Longleaf pine is the recommended tree to plant on the dry sandy soils that are mostly in the northern part of the county. Loblolly pine grows exceptionally well.

On a properly managed pine plantation, production of 1½ cords per acre, per year, is not unusual *(12)*. Some recommended woodland management practices are annual fireline plowing to protect the stand from wildfire, periodic selective thinning to reduce excessive competition, and regular prescribed burning to control undesirable hardwoods and improve wildlife habitat.

Soils vary in their ability to support trees. Depth of the soil, fertility, texture, and the available water capacity influence tree growth. Available water capacity and depth of the root zone are major influences of tree growth.

This soil survey can be used by woodland managers planning ways to increase the productivity of forest land. Some soils respond better to fertilization than others, and some are more susceptible to erosion after roads are built and timber is harvested. Some soils require special efforts to reforest. For each map unit in the survey area suitable for producing timber, the section "Detailed Soil Map Units" presents information about productivity, limitations for harvesting timber, and management concerns for producing timber. The common forest understory plants are also listed. Table 4 summarizes this forestry information and rates the soils for a number of factors to be considered in management. *Slight, moderate*, and *severe* are used to indicate the degree of the major soil limitations to be considered in forest management.

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 4 lists the *ordination symbol* for each soil. The first part of the ordination symbol, a number, indicates the potential productivity of a soil for the indicator species in cubic meters per hectare. 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.

The second part of the ordination symbol, a letter, indicates the major kind of soil limitation for use and management. The letter *W* indicates a soil in which excessive water, either seasonal or year round, causes a significant limitation. The letter *S* indicates a dry sandy soil. The letter *A* indicates a soil that has no significant restrictions or limitations for forest use and management. If a soil has more than one limitation, the priority is W and then S.

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 of harvesting and reforestation operations, or use of specialized equipment.

Ratings of the *equipment limitation* indicate limits on the use of forest management equipment, year round or seasonal, because of such soil characteristics as slope, wetness, or susceptibility of the surface layer to compaction. As slope gradient and length increase, it becomes more difficult to use wheeled equipment. On the steeper slopes, tracked equipment must be used. On the steepest slopes, even tracked equipment cannot be operated; 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 steep enough that wheeled equipment cannot be operated safely across the slope, if soil wetness restricts equipment use from 2 to 6 months per year, or if special equipment is needed to avoid or reduce soil compaction. The rating is *severe* if slopes are steep enough that tracked equipment cannot be operated safely across the slope, if soil wetness restricts equipment use for more than 6 months per year, or if special equipment is needed to avoid or reduce soil compaction. Ratings of *moderate* or *severe* indicate a need to choose the most suitable equipment and to carefully plan the timing of harvesting and other management operations.

Ratings of *seedling mortality* refer to the probability of 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 and duration of the water table, rooting depth, and the aspect of the 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, or installing surface drainage. Reinforcement planting is often needed if the risk is *moderate* or *severe*.

Ratings of the *windthrow hazard* indicate the likelihood of trees being uprooted by the wind. Restricted rooting depth is the main reason for windthrow. Rooting depth can be restricted by a high water table or by such factors as soil wetness, texture, structure, and depth. The risk is *slight* if strong winds cause trees to break but do not uproot them; *moderate* if strong winds cause an occasional tree to be blown over and many trees to break; and *severe* if moderate or strong winds commonly blow trees over. Ratings of *moderate* or *severe* indicate the need for care in thinning or possibly not thinning. Specialized equipment may be needed to avoid damage to shallow root systems in partial cutting operations. A plan for periodic salvage 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 becomes more 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 inhibits adequate natural or artificial reforestation but does not necessitate intensive site preparation and maintenance. The risk is *moderate* if competition from undesirable plants inhibits 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.

For the soils that are commonly used to produce timber the yield is predicted in cubic meters. It is predicted at the point where mean annual increment culminates.

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 *productivity class* represents an expected volume produced by the most important trees, expressed in cubic meters per hectare per year. Cubic meters per hectare can be converted to cubic feet per acre by multiplying by 14.3. Cubic feet can be converted to board feet by multiplying by a factor of about 5. For example, a productivity class of 8 means the soil can be expected to produce 114 cubic feet per acre per year at the point where mean annual increment culminates, or about 570 board feet per acre per year.

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

Recreation

Recreation in Madison County includes a variety of activities. Hunting for deer, dove, quail, and turkey is a popular activity in the area. Fishing in the many lakes and ponds is enjoyed by many year-round residents and by visitors. Boating and canoeing on the Withlacoochee and Suwannee Rivers, swimming and scuba or skin diving in Blue Springs, and water skiing on Cherry Lake are some of the more popular water sports. A golf course, baseball fields, tennis courts, handball courts, basketball courts, and nature trails are available in Madison County.

In table 5, the soils of the survey area are rated according to the limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 5, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 5 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 8 and interpretations for dwellings without basements and for local roads and streets in table 7.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have gentle slopes and are not wet or subject to flooding during the period of use. The surface absorbs rainfall readily but remains firm and is not dusty when dry. Strong slopes can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is firm after rains and is not dusty when dry.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

John F. Vance, biologist, Soil Conservation Service, helped to prepare this section.

Wildlife is a valuable resource of Madison County. Fishing and hunting are popular sports. Large acreages of wetlands and upland soils provide habitat for a wide diversity of wildlife.

The main species include white-tailed deer, squirrel, turkey, dove, bobwhite quail, feral hogs, and waterfowl. Nongame species include raccoon, rabbit, armadillo, opossum, skunk, bobcat, gray and red fox, otter, and a variety of songbirds, wading birds, woodpeckers, predatory birds, reptiles, and amphibians. Some of the more important habitat areas are the large wetland areas of the Hixtown Swamp and San Pedro Bay in the western and southern parts of the county and along the Suwannee River on the eastern boundary.

Numerous small lakes are in the county. Cherry Lake, the largest lake in the county, covers about 475 acres. Fishing is good throughout the county. Game and nongame fish include largemouth bass, channel catfish, bullhead, catfish, bluegill, redear, spotted sunfish, warmouth, black crappie, chain pickerel, gar, bowfin, and sucker.

A number of endangered and threatened species are in the county. These range from the seldom seen red-cockaded woodpecker to the more commonly seen southeastern kestrel. A detailed list of these species with information on range and habitat needs is available from the district conservationist at the local office of the Soil Conservation Service.

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

The potential of the soil is rated good, fair, poor, and very poor. A rating of *good* indicates that the element or kind of habitat is easily created, 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 created, 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, soybeans, wheat, browntop millet, and grain sorghum.

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 bahiagrass, lovegrass, Florida beggarweed, clover, and sesbania.

Wild herbaceous plant 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, partridge pea, and bristlegrass.

Hardwood trees and the 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, palmetto, cherry, sweetgum, wild grape, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are firethorn, wild plum, and shrub lespedeza.

Coniferous plants furnish browse, seeds, and cones. 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, cypress, 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, wildrice, pickerelweed, 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 wetness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

Habitats for various kinds of wildlife are described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include bobwhite quail, dove, 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, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, deer, and bear.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, egrets, herons, shore birds, otter, 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 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, and 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, 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 evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and 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, dwellings 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 a very firm dense layer, 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.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings 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 and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 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 a high water table, flooding, 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, the available water capacity in the upper 40 inches, and the content of sodium affect plant growth. Flooding, wetness, slope, 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 lagoons, 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 moderately 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 unfavorable for the use and if overcoming the unfavorable properties require special design, extra maintenance, or alteration.

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 that 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, and flooding affect absorption of the effluent.

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, flooding, 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 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 a water table, slope, and flooding affect both types of landfill. Texture, highly organic layers, soil reaction, and content of sodium 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 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 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 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. They have at least 5 feet of suitable material, low shrink-swell potential, 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-size particles and have a plasticity index of less than 10. They have moderate shrink-swell potential or slopes of 15 to 25 percent. 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, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They 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) and the thickness of suitable material. Kinds of 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 a layer of sand that is up to 12 percent silty fines. This material must be at least 3 feet thick. All other soils are rated as an improbable source.

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 slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They 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, 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 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 releases a variety of nutrients as it decomposes.

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; embankments, dikes, and levees; and aquifer-fed ponds. 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 the restrictive features that affect each soil for drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. 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 organic matter or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table and permeability of the aquifer.

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 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 slope and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as sodium. 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 performance of a system is affected by the depth of the root zone, the amount of sodium, 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 and wetness 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.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Wetness and slope affect the construction of grassed waterways. A hazard of soil blowing, low available water capacity, restricted rooting depth, toxic substances such as sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

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 mechanical analyses, plasticity, and compaction characteristics. These results are reported in table 17.

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 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 is given in table 17.

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.

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, or component, 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, 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 ⅓ 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 in each major soil layer is stated in inches of water per inch of soil. 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. Losses are expressed in tons per acre per year. These 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 0.02 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 without affecting crop productivity. The rate is expressed in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to soil blowing in cultivated areas. The groups indicate the susceptibility to soil blowing. Soils are grouped according to the following distinctions:

1. Sands, coarse sands, fine sands, and very fine sands. These soils are generally not suitable for crops. They are extremely erodible, and vegetation is difficult to establish.

2. Loamy sands, loamy fine sands, and loamy very fine sands. These soils are very highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

3. Sandy loams, coarse sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

4L. Calcareous, loamy soils that are less than 35 percent clay and more than 5 percent finely divided calcium carbonate. These soils are erodible. Crops can be grown if intensive measures to control soil blowing are used.

4. Clays, silty clays, clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control soil blowing are used.

5. Loamy soils that are less than 20 percent clay and less than 5 percent finely divided calcium carbonate and sandy clay loams and sandy clays that are less than 5 percent finely divided calcium carbonate. These soils are slightly erodible. Crops can be grown if measures to control soil blowing are used.

6. Loamy soils that are 20 to 35 percent clay and less than 5 percent finely divided calcium carbonate, except silty clay loams. These soils are very slightly erodible. Crops can easily be grown.

7. Silty clay loams that are less than 35 percent clay and less than 5 percent finely divided calcium carbonate. These soils are very slightly erodible. Crops can easily be grown.

8. Other soils not subject to soil blowing.

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 of 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.

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 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 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.

In table 13, some soils are assigned to two hydrologic soil groups. Soils that have a seasonal high water table but can be drained are assigned first to a hydrologic group that denotes the drained condition of the soil and then to a hydrologic group that denotes the undrained condition, for example, B/D. Because there are different degrees of drainage and water table control, onsite investigation is needed to determine the hydrologic group of the soil in a particular location.

Flooding, the temporary covering of the soil surface by flowing water, is caused by overflowing streams, by runoff from adjacent slopes, or by inflow from high tides. Shallow water standing or flowing for short periods after rainfall or snowmelt is not considered flooding. Standing water in swamps and marshes or in a closed depression is considered ponding.

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

Frequency, duration, and probable dates of occurrence are estimated. Frequency generally is expressed as *none, rare, occasional*, or *frequent*. *None* means that flooding is not probable. *Rare* means that flooding is unlikely but possible under unusual weather conditions (there is a near 0 to 5 percent chance of flooding in any year). *Occasional* means that flooding occurs infrequently under normal weather conditions (there is a 5 to 50 percent chance of flooding in any year). *Frequent* means that flooding occurs often under normal weather conditions (there is more than a 50 percent chance of flooding in any year). Duration is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 days to 1 month), and *very long* (more than 1 month). The time of year that floods are most likely to occur is expressed in months. November-May, for example, means that flooding can occur during the period November through May. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information on flooding is based on evidence in the soil profile, namely, thin strata of 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 highest. 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.

Physical, Chemical, and Mineralogical Analyses of Selected Soils

Dr. Victor W. Carlisle, professor, and Dr. Mary E. Collins, associate professor, Soil Science Department, University of Florida, helped to prepare this section.

Parameters for physical, chemical, and mineralogical properties of representative pedons sampled in Madison County are presented in tables 14, 15, and 16. The analyses were conducted and coordinated by the Soil Characterization Laboratory at the University of Florida. Detailed profile descriptions of the analyzed soils are given in alphabetical order in the section "Classification of the Soils." Laboratory data and profile information for additional soils in Madison County, as well as for other counties in Florida, are on file at the University of Florida, Soil Science Department.

Typifying pedons were sampled from pits at carefully selected locations. Samples were air dried, crushed, and sieved through a 2-millimeter screen. Most analytical methods used are outlined in Soil Survey Investigations Report No. 1 *(15)*.

Particle-size distribution was determined using a modified pipette method with sodium hexametaphosphate dispersion. Hydraulic conductivity and bulk density were determined on undisturbed soil cores. Water retention parameters were obtained from duplicate undisturbed soil cores placed in tempe pressure cells. Weight percentages of water retained at 100 centimeters water (1/10 bar) and 345 centimeters water (1/3 bar) were calculated from volumetric water percentages divided by bulk density. Samples were oven dried and ground to pass a 2-millimeter sieve, and the 15-bar water retention was determined. Organic carbon was determined by a modification of the Walkley-Black wet combustion method.

Extractable bases were obtained by leaching soils with normal ammonium acetate buffered at pH 7.0. Sodium and potassium in the extract were determined by flame emission. Calcium and magnesium were determined by atomic absorption spectrophotometry. Extractable acidity was determined by the barium chloride-triethanolamine method at pH 8.2. The sum of cations, which may be considered a measure of cation exchange capacity, was calculated by adding the values for extractable bases and extractable acidity. Base saturation is the ratio of extractable bases to cation-exchange capacity expressed in percent. The pH measurements were made with a glass electrode using a soil-water ratio of 1:1; a 0.01 molar calcium chloride solution in a 1:2 soil-solution ratio; and normal potassium chloride solution in a 1:1 soil-solution ratio.

Electrical conductivity determinations were made with a conductivity bridge on 1:1 soil to water mixtures. Iron and aluminum extractable in sodium dithionite-citrate were determined by atomic absorption spectrophotometry.

Mineralogy of the clay fraction less than 2 microns was ascertained by x-ray diffraction. Peak heights at 18-angstrom, 14-angstrom, 7.2-angstrom, and 4.31-angstrom positions represent montmorillonite, interstratified expandable vermiculite or 14-angstrom intergrades, kaolinite, and quartz, respectively. Peaks were measured, summed, and normalized to give the percent of soil minerals identified in the x-ray diffractograms. These percentage values do not indicate absolute determined quantities of soil minerals but do imply a relative distribution of minerals in a particular mineral suite. Absolute percentages would require additional knowledge of particle size, crystallinity, unit structure substitution, and matrix problems.

Physical Properties

Representative soils sampled for laboratory analyses in Madison County were inherently very sandy (table 14); however, most of these soils had an argillic horizon in the lower part of the solum. The total sand content was more than 90 percent in one horizon or more in all soils sampled except Esto, Faceville, Lucy, Orangeburg, and Pelham soils. Alpin and Chipley soils contained more than 93 percent sand to a depth of 2 meters or more. Albany, Blanton, and Troup soils contained more than 90 percent sand to a depth of slightly more than 1 meter.

The content of clay in these excessively sandy horizons was rarely more than 3.5 percent. Deeper argillic horizons in Albany, Blanton, Esto, Eunola, Faceville, Fuquay, Kenansville, Lovett, Lucy, Nankin, Ocilla, Orangeburg, Pelham, Plummer, and Troup soils contained large amounts of clay that ranged from 10.9 to 70.7 percent.

The content of silt ranged from 0.5 to 14.4 percent. The low and high content of silt was in Kenansville soils. All horizons sampled in Albany, Esto, Fuquay, Lovett, Ocilla, and Plummer soils contained more than 4.5 percent silt. All horizons sampled in Chipley soil contained less than 4 percent silt.

Fine sand dominated the sand fractions of all soils in Madison County but rarely occurred in amounts of more than 50 percent. The content of very fine sand was more than 20 percent in one horizon or more of Chipley, Esto, Eunola, Faceville, Kenansville, Lovett, Pamlico, and Plummer soils. The content of medium sand was more than 20 percent in one horizon or more in Esto, Lovett, Pamlico, and Plummer soils. The content of coarse sand was more than 7.5 percent in one horizon or more of Alaga, Albany, Alpin, Blanton, Lucy, and Troup soils. Very coarse sand generally ranged from nondetectable to about 2 percent. The excessively sandy soils, such as Chipley and Alpin soils, rapidly become very droughty during periods of low precipitation when rainfall is widely scattered. Soils with inherently poor drainage, such as Pamlico and Plummer soils, remain saturated because the ground water is close to the surface for long periods.

Hydraulic conductivity values exceeded 25 centimeters per hour in the upper sandy epipedons of Alpin and Blanton soils and in the histic horizons of Pamlico muck. Similarly high but inconsistent values were recorded for the Albany and Troup soils. Hydraulic conductivity values in the lower part of the solum of these soils and in the argillic horizon of all the other soils sampled rarely exceeded 2.0 centimeters per hour. Low hydraulic conductivity values at a shallow depth in soils, such as in Esto, Eunola, Faceville, and Pelham soils, could affect the design and function of septic tank absorption fields. Albany, Esto, Faceville, Fuquay, Nankin, Pelham, and Plummer soils had one horizon or more with hydraulic conductivity values of 0.2 centimeter per hour or less. The available water for plants can be estimated from bulk density and water content data. The excessively sandy soils, such as Alpin sand, retain very low amounts of available water. Conversely, soils that have a higher content of organic matter or fine-textured material, such as Pamlico muck and Esto fine sandy loam, retain much larger amounts of available water.

Chemical Properties

Chemical soil properties (table 15) show that soils in Madison County contain a wide range of extractable bases. Except for Lucy sand and Orangeburg loamy sand, all of the soils contained one horizon or more that had less than 1 milliequivalent per 100 grams extractable bases. Lucy soils had the highest amount of extractable bases that ranged from 1.76 to 3.62 milliequivalents per 100 grams, and Chipley fine sand had the lowest amount that ranged from 0.09 to 0.24 milliequivalents per 100 grams. Alpin, Blanton, Chipley, Eunola, and Ocilla soils contained less than 1 milliequivalent per 100 grams extractable bases. Only one horizon in the Alaga, Albany, Pelham, Plummer, and Troup soils had more than 1 milliequivalent per 100 grams extractable bases. The relatively mild, humid climate of Madison County results in the depletion of basic soil cations (calcium, magnesium, sodium, and potassium) through leaching.

Calcium was the dominant base in all of the soils sampled except Pamlico muck. Magnesium dominated Pamlico soils and the deeper horizons of Esto, Lucy, Nankin, and Orangeburg soils but was only more than 1 milliequivalent per 100 grams in one horizon or more of the Esto, Faceville, Lovett, Lucy, Orangeburg, and Pamlico soils. The highest content of magnesium was 2.22 milliequivalents per 100 grams in the surface layer of Pamlico muck, and the lowest content of 0.02 milliequivalents per 100 grams or less was in one horizon or more of Albany, Alpin, Blanton, Chipley, Eunola, Ocilla, Pamlico, Pelham, and Plummer soils. The highest content of extractable calcium and magnesium occurred in Esto, Faceville, Lucy, and Orangeburg soils. Sodium generally occurred in amounts that were much less than 0.20 milliequivalents per 100 grams. Albany and Alpin soils contained 0.05 milliequivalents or less of sodium to a depth of 2 meters or more. All of the soils sampled contained one horizon or more that had 0.02 milliequivalents per 100 grams or less extractable potassium except Fuquay soils, which contained large amounts of potassium, ranging from 0.05 to 0.29 milliequivalents per 100 grams. In one horizon or more of Alpin, Chipley, Eunola, Kenansville, and Pamlico soils that was sampled, potassium was not detected.

Values for cation-exchange capacity, an indicator of plant-nutrient capacity, were more than 10 milliequivalents per 100 grams in the surface layer of Alaga, Esto, Kenansville, Orangeburg, Pamlico, Pelham, and Plummer soils. Soils that have low cation-exchange capacity in the surface layer, such as Alpin and Troup soils, require only small amounts of lime or sulfur to significantly alter the base status and soil reaction. Generally, soils of low inherent soil fertility are associated with low values for extractable bases and low cation-exchange capacity. Fertile soils are associated with high values for extractable bases, high base saturation values, and high cation-exchange capacity.

The content of organic carbon was less than 1 percent in Alpin, Chipley, Eunola, Fuquay, Lovett, Lucy, and Ocilla soils and less than 3 percent in all soils sampled except Pamlico muck. Two horizons in Pamlico muck contained more than 50 percent organic carbon. In all soils sampled, the content of organic carbon decreased rapidly as depth increased. Since the content of organic carbon in the surface layer is directly related to the soil nutrient- and water-holding capacities of sandy soils, management practices that conserve and maintain the content of organic carbon are highly desirable.

Electrical conductivity values were less than 0.10 millimhos per centimeter in all soils except Pamlico soils, which ranged from 0.11 to 0.20 millimhos per centimeter in the histic horizons. Values of 0.01 millimhos per centimeter or less were recorded in the pedons of Alaga, Chipley, Esto, Fuquay, Lovett, Lucy, Nankin, and Orangeburg soils. These data indicate that the content of soluble salt in soils in Madison County was insufficient to detrimentally affect the growth of salt-sensitive plants.

Soil reaction in water generally was between pH 4.5 and 5.5. With few exceptions, soil reaction values were about 0.2 to 1.0 pH unit lower in calcium chloride and potassium chloride than in water. The maximum plant nutrient availability generally is attained when soil reaction is between pH 6.0 and 7.0; however, under Florida conditions, maintaining soil reaction above pH 6.0 is not economically feasible for most agricultural production purposes.

Spodosols were not sampled in Madison County; therefore, amounts of pyrophospate extractable carbon, iron, and aluminum were not determined.

Citrate-dithionite extractable iron in the Bt horizon of

Albany, Blanton, Esto, Eunola, Faceville, Fuquay, Kenansville, Lovett, Lucy, Nankin, Ocilla, Orangeburg, Pelham, Plummer, and Troup soils ranged from 0.02 to 3.48 percent and was frequently less than 1 percent. The amounts of iron and aluminum in the soils in the county were not sufficient to detrimentally affect phosphorus availability.

Mineralogical Properties

Sand fractions of 2 to 0.05 millimeters were siliceous, and quartz was overwhelmingly dominant in all pedons. Varying amounts of heavy minerals were in most horizons with the greatest concentration in the very fine sand fraction. No weatherable minerals were observed. Crystalline mineral components of the clay fraction of less than 0.002 millimeter are shown in table 16 for major horizons of the pedons sampled. The clay mineralogical suite was made up mostly of montmorillonite, a 14-angstrom intergrade, kaolinite, and quartz.

Montmorillonite occurred only in selected horizons of the Alpin, Blanton, Chipley, Pamlico, and Plummer soils. The 14-angstrom intergrade mineral occurred throughout all of the sampled soils but was not detected in the Ap and Bt horizons of Blanton sand. Kaolinite, generally the dominant clay mineral in Madison County soils, occurred in all pedons of the sampled soils. The content of mica and gibbsite was insufficient for the assignment of numerical values.

Montmorillonite in Madison County soils was generally inherited from the sediments in which these soils formed. The stability of montmorillonite is generally favored by high levels of pH in areas where the alkaline elements have not been leached by percolation of rainwater; however, montmorillonite may occur in moderate amounts regardless of drainage or chemical conditions.

The 14-angstrom intergrade, a mineral of uncertain origin, is widespread in Florida soils. It tends to be more prevalent under moderately acidic, relatively well drained conditions; although, it occurs in a variety of soil environments. This material is a major constituent of coatings of sand grains in Alaga, Alpin, and Chipley soils; however, the amount of coatings that occur in these soils is sufficient to meet taxonomic criteria established for the recognition of coated Typic Quartzipsamments.

Kaolinite was most likely inherited from the parent material, but some may have formed as a weathering product of other minerals. Kaolinite is relatively stable in the acidic environments of Madison County soils. Clay-size quartz has primarily resulted from decrements of the silt fraction.

Clay mineralogy can have a significant impact on soil properties, particularly for soils of higher clay content. Soils that contain montmorillonitic clay have a higher capacity for plant nutrient retention than soils dominated by kaolinite, 14-angstrom intergrade minerals, and quartz. None of the soils sampled in Madison County contain montmorillonitic clay in amounts that would create problems for most types of construction. The clay mineralogy influences the use and management of soils in the county less frequently than the total content of clay.

Engineering Index Test Data

Table 17 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 Florida Department of Transportation, Materials Office.

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); Plasticity index—T 90 (AASHTO), D 424 (ASTM); and Moisture density, Method A—T 99 (AASHTO), D 698 (ASTM).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(14)*. 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 on laboratory measurements. Table 18 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 Ultisol.

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 Udult (*Ud*, meaning humid, plus *ult*, from Ultisol).

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 Hapludults (*Hapl*, meaning minimal horizonation, plus *udult*, the suborder of the Ultisols that has a udic 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 *Aquic* identifies the subgroup that typifies the great group. An example is Aquic Hapludults.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly 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-loamy, siliceous, thermic, Aquic Hapludults.

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.

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 (13)*. Many of the technical terms used in the descriptions are defined in *Soil Taxonomy (14)*. Unless otherwise stated, matrix 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."

Alaga Series

The soils in the Alaga series are thermic, coated

Typic Quartzipsamments. They are well drained and moderately well drained. Permeability is rapid or very rapid. The Alaga soils formed in sandy marine sediment in smooth to rolling areas on the Coastal Plain. The seasonal high water table is below a depth of 72 inches throughout the year. Slopes range from 0 to 12 percent.

The Alaga soils are geographically associated with Alpin, Blanton, Lakeland, and Troup soils. These associated soils are in similar positions on the landscape as the Alaga soils. Alpin and Lakeland soils do not have more than 10 percent silt plus clay in the control section, and Alpin soils have lamellae below a depth of 40 inches. Blanton and Troup soils have an argillic horizon below a depth of 40 inches.

Typical pedon of Alaga loamy sand, 0 to 5 percent slopes; 2 miles north of Florida Highway 6 and 0.38 mile east of secondary road 255, SW¼SE¼SE¼NW¼ sec. 11, T. 1 N., R. 10 E.

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

A2—4 to 9 inches; dark brown (10YR 3/3) loamy sand; weak fine granular structure; very friable; strongly acid; gradual wavy boundary.

C1—9 to 29 inches; dark brown (7.5YR 4/4) loamy sand; weak fine granular structure; very friable; very strongly acid; gradual wavy boundary.

C2—29 to 58 inches; strong brown (7.5YR 5/6) loamy sand; weak fine granular structure; very friable; very strongly acid; gradual wavy boundary.

C3—58 to 72 inches; reddish yellow (7.5YR 6/8) sand; weak fine granular structure; very friable; very strongly acid; gradual wavy boundary.

C4—72 to 80 inches; brownish yellow (10YR 6/6) sand; weak fine granular structure; very friable; very strongly acid.

Reaction ranges from extremely acid to medium acid. The content of silt plus clay in the 10- to 40-inch control section ranges from 10 to 20 percent.

The A horizon is 4 to 9 inches thick. It has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. Texture is mainly loamy sand but can be fine sand.

The C horizon has hue of 10YR or 7.5YR, value of 4 to 7, and chroma of 4 to 8. Texture is loamy sand or fine sand and is sand below a depth of 40 inches.

Albany Series

The soils in the Albany series are loamy, siliceous, thermic Grossarenic Paleudults. They are somewhat poorly drained. Permeability is rapid to moderate. The Albany soils formed in sandy and loamy marine sediment on the Coastal Plain. The seasonal high water table is between depths of 12 and 30 inches for 1 to 4 months during most years. Slopes range from 0 to 5 percent.

The Albany soils are geographically associated with Ocilla, Plummer, Lovett, Sapelo, and Blanton soils. Ocilla and Lovett soils are in similar positions on the landscape as the Albany soils and have a Bt horizon within 40 inches of the surface. Plummer and Sapelo soils are in lower positions than the Albany soils and have a water table nearer the surface. Blanton soils are in higher positions on the landscape than the Albany soils and have a water table at a greater depth.

Typical pedon of Albany sand, 0 to 5 percent slopes; 2.5 miles north of U.S. Highway 90, 0.3 mile east of Florida Highway 53, NW¼SW¼ sec. 10, T. 1 N., R. 9 E.

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

E1—10 to 26 inches; grayish brown (10YR 5/2) sand; few fine prominent strong brown (7.5YR 5/8) mottles; weak fine granular structure; very friable; common medium and fine roots; very strongly acid; gradual wavy boundary.

E2—26 to 37 inches; very pale brown (10YR 7/3) sand; few fine prominent strong brown (7.5YR 5/8) mottles and few fine faint white (10YR 8/2) mottles; weak fine granular structure; very friable; few pockets of dark gray (10YR 4/1) sand; very strongly acid; gradual wavy boundary.

E3—37 to 50 inches; light gray (10YR 7/2) sand; common fine distinct yellowish brown (10YR 5/6) mottles; weak fine granular structure; very friable; very strongly acid; gradual wavy boundary.

Bt—50 to 57 inches; pale brown (10YR 6/3) fine sandy loam; common fine faint light brownish gray (10YR 6/2) and common fine prominent yellowish brown (10YR 5/8) and strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable; discontinuous clay films in some pores; very strongly acid; clear wavy boundary.

Btg1—57 to 69 inches; light gray (10YR 7/1) sandy clay; common medium prominent strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; firm; about 4 percent plinthite; sand grains coated and bridged; extremely acid; gradual wavy boundary.

Btg2—69 to 80 inches; light gray (10YR 7/2) sandy clay loam; common fine prominent red (2.5YR 4/6) and common medium prominent strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; firm; extremely acid.

Reaction is extremely acid to slightly acid.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2. The horizon is 6 to 10 inches thick. Texture is mainly sand but can be fine sand or loamy sand.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 2 to 6. This horizon is 34 to 60 inches thick. Texture is mainly sand but can be fine sand or loamy sand.

The Bt horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 to 6. Mottles are white, yellow, gray, brown, or red. In some pedons, some subhorizons contain 5 percent or less plinthite, generally, below a depth of 60 inches. Texture is fine sandy loam, sandy clay loam, or sandy clay. The weighted average clay content in the upper 20 inches of the Bt horizon is less than 35 percent.

These Albany soils are taxadjuncts to the Albany series because they are slightly higher in clay than is allowed in the series. This does not significantly affect the use and management of these soils.

Alpin Series

The soils in the Alpin series are thermic, coated Typic Quartzipsamments. They are excessively drained. Permeability is rapid or moderately rapid. The Alpin soils formed in thick marine sandy sediment. They are on broad sand flats and river terraces on the Gulf Coastal Lowlands. The water table is below a depth of 72 inches throughout the year. Slopes range from 0 to 5 percent.

The Alpin soils are geographically associated with Troup, Blanton, Chipley, and Lakeland soils. These associated soils do not have lamellae. Troup soils are well drained, and Blanton soils are moderately well drained. Troup and Blanton soils have a Bt horizon. Chipley soils are somewhat poorly drained.

Typical pedon of Alpin sand; in an area of planted pines, 1.25 miles north of the Lafayette County line, 1 mile east of secondary road 255, SE¼NE¼SE¼ sec. 25, T. 2 S., R. 10 E.

A—0 to 3 inches; brown (10YR 5/3) sand; single grained; loose; common fine and medium roots; very strongly acid; gradual wavy boundary.

E1—3 to 34 inches; brownish yellow (10YR 6/6) sand; single grained; loose; very strongly acid; gradual wavy boundary.

E2—34 to 55 inches; very pale brown (10YR 7/4) sand; few fine faint brownish yellow (10YR 6/6) mottles; single grained; loose; many uncoated sand grains; very strongly acid; gradual wavy boundary.

E/B—55 to 80 inches; very pale brown (10YR 8/3) sand; single grained; loose; common uncoated sand grains; common strong brown (7.5YR 5/6) loamy sand lamellae, 0.1 to 0.6 inch thick; individual lamellae, discontinuous in length; very strongly acid.

Reaction is slightly acid to very strongly acid. Depth to lamellae ranges from 40 to 70 inches. The lamellae have a cumulative thickness of 1 to 6 inches within 80 inches of the surface.

The A or Ap horizon is 3 to 6 inches thick. It has hue of 10YR, value of 4 or 5, and chroma of 1 to 3. Texture is sand.

The E horizon is 36 to 56 inches thick. It has hue of 10YR, value of 6 or 7, and chroma of 2 to 8 or hue of 2.5Y, value of 7, and chroma of 6. Some pedons have streaks and small to large pockets of uncoated sand grains, which have hue of 10YR, value of 7 or 8, and chroma of 1 or 2. In some pedons, a few light yellowish brown or brownish yellow mottles are in the lower part of this horizon. They generally are below a depth of 34 inches. Texture is mainly sand but can be fine sand.

The E/B horizon is 10 to 40 inches thick. The E part of this horizon has hue of 10YR, value of 7 or 8, and chroma of 3 to 6. Texture is sand or fine sand. The B part has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 6 to 8. The lamellae range from 0.1 to 0.8 inch in thickness and from 1 inch to more than 3 feet in horizontal length in the pedon. Texture of the lamellae is loamy sand and loamy fine sand.

Blanton Series

The soils in the Blanton series are loamy, siliceous, thermic Grossarenic Paleudults. They are moderately well drained. Permeability is moderate or moderately rapid. The Blanton soils formed in sandy or loamy marine sediment. They are on broad uplands and on slopes adjacent to lakes and streams. The water table is dominantly between depths of 48 and 72 inches for 1 to 4 months during most years. Slopes range from 0 to 8 percent.

The Blanton soils are geographically associated with

Albany, Alpin, Bonifay, Chipley, Lakeland, Lovett, Ocilla, and Troup soils. Albany and Ocilla soils are somewhat poorly drained. Alpin, Chipley, and Lakeland soils do not have a Bt horizon. Bonifay soils have more than 5 percent plinthite within 60 inches of the surface. Lovett soils have a sandy surface layer and subsurface layer less than 40 inches thick. Troup soils are well drained.

Typical pedon of Blanton sand, 0 to 5 percent slopes; 0.30 mile west of Florida Highway 53, 1.15 miles north of Interstate 10, SE¼SE¼NW¼NW¼ sec. 12, T. 1 S., R. 9 E.

Ap—0 to 12 inches; dark grayish brown (10YR 4/2) sand; weak fine granular structure; very friable; common fine and few medium roots; very strongly acid; clear smooth boundary.

E1—12 to 37 inches; yellowish brown (10YR 5/4) sand; weak fine granular structure; very friable; few medium roots; strongly acid; clear wavy boundary.

E2—37 to 53 inches; light yellowish brown (10YR 6/4) sand; common uncoated sand grains; weak fine granular structure; very friable; few medium roots; strongly acid; gradual wavy boundary.

E3—53 to 69 inches; very pale brown (10YR 7/3) sand; common medium distinct brownish yellow (10YR 6/6) splotches; weak fine granular structure; very friable; few medium roots; strongly acid; gradual wavy boundary.

Bt—69 to 80 inches; light yellowish brown (10YR 6/4) sandy loam; many fine distinct light brownish gray (10YR 6/2) mottles; weak fine granular structure; friable; strongly acid.

Reaction ranges from very strongly acid to medium acid. The content of ironstone pebbles and plinthite ranges from 0 to 5 percent within 60 inches of the surface.

The A1 or Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2. The thickness of this horizon ranges from 6 to 12 inches. Texture is mainly sand but can be fine sand.

The E horizon has hue of 10YR, value of 5 or 6, and chroma of 4 to 8 or hue of 10YR, value of 7, and chroma of 3 to 6. Brownish yellow or yellowish brown mottles and uncoated sand splotches are common. This horizon is 39 to 70 inches thick. Texture is sand, fine sand, or loamy sand.

The Bt horizon has hue of 10YR, value of 5 or 6, and chroma of 4 to 8. Mottles are gray, brown, and red. Texture generally is sandy loam or sandy clay loam. In some pedons, however, it is coarser or finer below a depth of 60 inches.

Bonifay Series

The soils in the Bonifay series are loamy, siliceous, thermic Grossarenic Plinthic Paleudults. They are well drained. Permeability is moderate. The Bonifay soils formed in sandy or loamy sediment on foot slopes on the Coastal Plain. The water table is below a depth of about 48 inches. Slopes range from 0 to 5 percent.

The Bonifay soils are geographically associated with Fuquay, Troup, Orangeburg, and Lucy soils. These associated soils are in similar positions on the landscape as the Bonifay soils. Fuquay soils have a Bt horizon within 40 inches of the surface. Troup, Orangeburg, and Lucy soils do not have plinthite. In addition, Orangeburg soils have a Bt horizon within 20 inches of the surface, and Lucy soils have a Bt horizon within 20 to 40 inches of the surface.

Typical pedon of Bonifay fine sand, 0 to 5 percent slopes; 1.25 miles east of Florida Highway 53, north of U.S. Highway 90, NW¼NE¼SE¼, sec. 10, T. 1 N., R. 9 E.

A1—0 to 6 inches; dark grayish brown (10YR 4/2) fine sand; weak fine granular structure; very friable; strongly acid; clear wavy boundary.

E1—6 to 14 inches; yellowish brown (10YR 5/4) fine sand; single grained; loose; strongly acid; gradual wavy boundary.

E2—14 to 32 inches; brownish yellow (10YR 6/6) sand; single grained; loose; strongly acid; gradual wavy boundary.

E3—32 to 44 inches; brownish yellow (10YR 6/6) fine sand; common medium faint yellowish brown (10YR 5/6) mottles; single grained; loose; very strongly acid; gradual wavy boundary.

E4—44 to 48 inches; yellowish brown (10YR 5/6) loamy sand; weak fine granular structure; very friable; very strongly acid; clear wavy boundary.

Bt1—48 to 55 inches; yellowish brown (10YR 5/4) sandy clay loam; weak fine subangular blocky structure; friable; about 15 percent yellowish red plinthite nodules; very strongly acid; gradual wavy boundary.

Bt2—55 to 80 inches; reticulately mottled pinkish gray (7.5YR 7/2), dark reddish brown (5YR 3/3), yellowish red (5YR 4/6 and 5/8), and reddish brown (5YR 5/4) sandy clay loam; weak fine subangular blocky structure; friable; about 10 percent yellowish red plinthite; very strongly acid.

Reaction is slightly acid to very strongly acid.

The A or Ap horizon is 4 to 8 inches thick. It has hue of 10YR, value of 3 or 4, and chroma of 2. Texture is mainly fine sand but can be sand or loamy sand.

The E horizon is 38 to 50 inches thick. It has hue of 10YR, value of 5 or 6, and chroma of 4 to 6. The mottles are strong brown, light gray, or shades of yellow in the lower part of the E horizon. Texture is sand, fine sand, or loamy sand.

The Bt1 horizon is 5 to 8 inches thick. It has hue of 10YR, value of 5, and chroma of 4 to 6. It contains about 10 to 15 percent plinthite. The Bt2 horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 6; or it is reticulately mottled gray, brown, yellow, and red and contains about 10 to 15 percent plinthite. Texture of the Bt horizon is sandy loam or sandy clay loam.

Some pedons have a C horizon, which has hue of 10YR or 7.5YR, value of 6 or 7, and chroma of 1 or 2.

Cantey Series

The soils in the Cantey series are clayey, kaolinitic, thermic Typic Albaquults. They are poorly drained and are slowly permeable. The Cantey soils formed in thick beds of marine sediment on the Coastal Plain. The water table is at a depth of 0 to 12 inches for 2 to 6 months. Slopes are 0 to 2 percent.

The Cantey soils are geographically associated with Albany, Blanton, Ocilla, Pelham, Plummer, and Surrency soils. The associated soils have sandy layers to a depth of more than 20 inches and have less than 35 percent clay in the argillic horizon. Albany and Ocilla soils are in higher landscape positions than the Cantey soils. Pelham and Plummer soils are mainly in nearly level areas adjacent to the Cantey soils. Surrency soils are in lower positions than the Cantey soils, are somewhat wetter, and commonly are ponded for longer periods.

Typical pedon of Cantey fine sandy loam; 2.6 miles west of the junction of U.S. Highway 90 and secondary road 360-A, 0.18 mile south of Captain Broad Road, NW¼SE¼ sec. 19, T. 1 N., R. 9 E.

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

AE—5 to 10 inches; dark gray (10YR 4/1) fine sandy loam; weak medium granular structure; very friable; many fine roots; very strongly acid; gradual wavy boundary.

E—10 to 19 inches; light brownish gray (10YR 6/2) fine sandy loam; many fine prominent strong brown (7.5YR 5/6) and many fine faint gray (10YR 6/1) mottles; moderate medium granular structure; friable; many fine roots; very strongly acid; clear wavy boundary.

Btg1—19 to 26 inches; light brownish gray (10YR 6/2) sandy clay; many fine prominent strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm; few fine roots; very strongly acid; gradual wavy boundary.

Btg2—26 to 37 inches; gray (10YR 6/1) sandy clay; many fine distinct yellowish brown (10YR 5/6) and common medium prominent red (2.5YR 4/6) mottles; moderate medium subangular blocky structure; firm; very strongly acid; gradual wavy boundary.

Btg3—37 to 80 inches; gray (10YR 6/1) sandy clay; common medium prominent strong brown (7.5YR 5/6), few medium prominent brownish yellow (10YR 6/6), and many fine faint light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; firm; common pockets of sand; very strongly acid.

The solum ranges from 50 to more than 80 inches in thickness. Reaction is strongly acid or very strongly acid. Texture of the A, AE, and E horizons is fine sandy loam.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1 or 2. It is 4 to 9 inches thick.

The AE horizon, if present, has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. It is as much as 5 inches thick.

The E horizon, if present, has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. It is 3 to 9 inches thick.

The Btg horizon has hue of 10YR or 5Y, value of 5 to 7, and chroma of 1 or 2. Few to many red, strong brown, yellowish brown, and gray mottles are in most pedons. Texture is sandy clay or clay.

Some pedons have BCg or Cg horizons below a depth of 50 inches. These horizons have colors that are similar to those in the Btg horizon but have varying textures of stratified sand and clay.

Chipley Series

The soils in the Chipley series are thermic, coated Aquic Quartzipsamments. They are somewhat poorly drained and are rapidly permeable. The Chipley soils formed in thick deposits of sandy marine sediment. They are on the nearly level to gently sloping uplands and on knolls on the Eastern Gulf Coastal Flatwoods on the Lower Coastal Plain. The seasonal high water table is between depths of 24 and 36 inches for 2 to 4 months during most years. Slopes range from 0 to 5 percent.

The Chipley soils are geographically associated with Alaga, Albany, Blanton, Ocilla, and Sapelo soils. Alaga and Blanton soils are in slightly higher landscape positions than the Chipley soils and have a water table below a depth of 40 inches. Blanton soils have an argillic horizon. Albany and Ocilla soils are in similar positions on the landscape as the Chipley soils but have an argillic horizon. Sapelo soils have spodic and argillic horizons and are poorly drained.

Typical pedon of Chipley fine sand, 0 to 5 percent slopes; 2.5 miles west of U.S. Highway 221, 1.5 miles north of the Taylor County line, NW¼SW¼NW¼ sec. 12, T. 2 S., R. 6 E.

Ap—0 to 6 inches; grayish brown (10YR 5/2) fine sand; weak fine granular structure; very friable; many very fine roots; very strongly acid; clear wavy boundary.

C1—6 to 23 inches; yellowish brown (10YR 5/4) fine sand; many fine and medium faint very pale brown (10YR 7/3) splotches; single grained; loose; common very fine roots; strong acid; gradual wavy boundary.

C2—23 to 47 inches; very pale brown (10YR 7/4) fine sand; many fine faint yellow (10YR 7/6), many medium distinct white (10YR 8/2), and common fine prominent yellowish brown (10YR 4/8) mottles; single grained; loose; strongly acid; gradual irregular boundary.

C3—47 to 80 inches; white (10YR 8/1) fine sand; common medium distinct yellow (10YR 8/6) and common medium prominent reddish yellow (7.5YR 6/8) mottles; strongly acid.

Reaction is strongly acid or very strongly acid. Texture is sand or fine sand.

The A or Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2. The thickness of the A horizon ranges from 5 to 10 inches.

The C horizon has hue of 10YR. It has value of 5 or 6 and chroma of 2 to 6, value of 4 and chroma of 3, value of 7 and chroma of 1 to 6, or value of 8 and chroma of 1. Few to common gray, yellowish brown, and brownish yellow mottles are at a depth of 24 to 40 inches.

Some pedons have dark reddish brown organic-stained layers below a depth of 60 inches.

Dorovan Series

The soils in the Dorovan series are dysic, thermic Typic Medisaprists. They are very poorly drained and are moderately permeable. The Dorovan soils formed in marine sediment. These organic soils are made up mostly of partly decomposed woody plants. They are in depressions. A seasonal high water table is at or above the surface for 6 to 12 months during most years. Slopes are concave and are 0 to 1 percent.

The Dorovan soils are geographically associated with Pamlico, Plummer, and Surrency soils. Pamlico soils are underlain by sandy material within 51 inches of the surface. Plummer and Surrency soils are mineral soils and have a loamy subsoil.

Typical pedon of Dorovan mucky peat, in an area of Dorovan and Pamlico soils, depressional; in San Pedro Bay, 1.1 miles north of Jeff Road, 0.55 mile east of west Boundary Road, NW¼SW¼SE¼SE¼ sec. 20, T. 2 S., R. 9 E.

Oe—0 to 6 inches; very dark brown (10YR 2/2) mucky peat; partly decomposed leaves, twigs, roots, and stems; 60 percent rubbed fiber; slightly sticky; extremely acid; gradual wavy boundary.

Oa1—6 to 20 inches; very dark brown (10YR 2/2) muck; 20 percent unrubbed fiber, 10 percent rubbed; massive; sticky; common partly decomposed wood fragments; extremely acid; gradual wavy boundary.

Oa2—20 to 50 inches; dark reddish brown (5YR 2/2) muck; 25 percent unrubbed fiber, 10 percent rubbed; massive; sticky, greasy; common logs and coarse tree roots; extremely acid; gradual wavy boundary.

Oa3—50 to 70 inches; dark reddish brown (5YR 3/2) mucky peat; woody and herbaceous plant remains; 60 percent unrubbed fiber, 15 percent rubbed; massive; extremely acid; gradual smooth boundary.

C—70 to 80 inches; very dark gray (10YR 3/1) sand; weak medium granular structure; very friable; very strongly acid.

The organic layers range from 51 to more than 80 inches in thickness. Reaction is very strongly acid or extremely acid in the organic layers and strongly acid or very strongly acid in the C horizon.

The Oe layer, if present, has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. It is as much as 6 inches thick.

The Oa layers have hue of 5YR to 10YR, value of 2, and chroma of 2. The content of fiber ranges from 10 to 40 percent, unrubbed, and 5 to 15 percent, rubbed. Common logs and coarse tree and shrub roots are in these layers.

The C horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2. Texture is sand, sandy loam, or clay.

Esto Series

The soils in the Esto series are clayey, kaolinitic, thermic Typic Paleudults. They are well drained and are slowly permeable. The Esto soils formed in clayey marine sediment. They are on knolls and ridgetops on the hilly Coastal Plain uplands. The water table is below a depth of 72 inches. Slopes range from 2 to 5 percent.

The Esto soils are geographically associated with Nankin, Troup, Lovett, and Blanton soils. Nankin soils are generally on side slopes and are loamy below the clayey horizon. Troup, Lovett, and Blanton soils are in depositional positions and have a thicker sandy surface layer than the Esto soils. Blanton and Lovett soils have a water table within 72 inches of the surface.

Typical pedon of Esto fine sandy loam, 2 to 5 percent slopes; 1 mile north of county road 253 off State Highway 53, 1,400 feet east of State Highway 53, SW¼NW¼NW¼NW¼ sec. 33, T. 3 N., R. 9 E.

Ap—0 to 7 inches; dark yellowish brown (10YR 3/6) fine sandy loam; moderate medium subangular blocky structure; very friable; many very fine and fine roots; common fine and many very fine pores; strongly acid; abrupt smooth boundary.

Bt1—7 to 18 inches; yellowish red (5YR 5/6) clay; few fine distinct dusky red (10R 3/3) clay films; few medium faint light red (10R 6/6) mottles; moderate medium subangular blocky structure; friable; few very fine and many fine roots; few fine and common very fine pores; patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt2—18 to 24 inches; mottled yellowish red (5YR 5/6), brownish yellow (10YR 6/6), dusky red (10R 3/4), and reddish brown (2.5YR 4/4) clay; moderate medium prismatic structure parting to strong coarse subangular blocky; friable; few fine and many very fine roots; few fine pores; patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt3—24 to 31 inches; mottled dark reddish brown (2.5YR 3/4), light gray (10YR 7/2), brownish yellow (10YR 6/6), and dark red (10R 3/6) clay; strong coarse subangular blocky structure; friable; few fine and common very fine roots; patchy clay films on faces of peds; extremely acid; gradual wavy boundary.

Bt4—31 to 44 inches; mottled light gray (10YR 7/2), brownish yellow (10YR 6/6), and dark red (10R 3/6) clay; strong coarse subangular blocky structure; friable; few fine roots; patchy clay films on faces of peds; extremely acid; gradual wavy boundary.

Bt5—44 to 80 inches; mottled light gray (10YR 7/2) and (5Y 7/2), brownish yellow (10YR 6/6), dark red (10R 3/6), reddish yellow (7.5YR 6/8), and weak red (7.5R 4/2) clay; moderate medium prismatic structure parting to strong coarse subangular blocky; friable; patchy clay films on faces of peds; extremely acid.

The solum is more than 60 inches thick. Reaction is strongly acid or very strongly acid in the A, E, and upper part of the Bt horizon and is strongly acid to extremely acid in the lower part of the Bt horizon. Nodules of ironstone and phosphate-enriched pebbles, if present, are few or common in the solum.

The Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 2 or 3. It is 1 to 7 inches thick. Texture is loamy sand or sandy loam.

The E horizon, if present, has hue of 10YR, value of 5, and chroma of 3 to 8. It is as much as 12 inches thick. Texture is loamy sand or fine sandy loam.

The upper part of the Bt horizon has hue of 5YR, 7.5YR, or 10YR, value of 4 to 6, and chroma of 4 to 8. The lower part is reticulately mottled in shades of gray, red, brown, and yellow. Texture is sandy clay or clay. In some pedons, the boundary between the unmottled upper part of the Bt horizon and the reticulately mottled lower layer is abrupt and is considered a lithologic discontinuity.

Eunola Series

The soils in the Eunola series are fine-loamy, siliceous, thermic Aquic Hapludults. They are somewhat poorly drained and are moderately permeable. The Eunola soils formed in marine deposits. They are on low river terraces and are subject to flooding. Slopes range from 0 to 5 percent.

The Eunola soils are geographically associated with Alpin and Kenansville soils. These associated soils are in higher positions on the landscape than the Eunola soils. Alpin soils are sandy and excessively drained. Kenansville soils have a loamy Bt horizon within 20 to 40 inches of the surface.

Typical pedon of Eunola fine sand, occasionally flooded; 0.5 mile north of Interstate 10, 0.8 mile east of River Road, NE¼SE¼SE¼ sec. 27, T. 1 S., R. 11 E.

A—0 to 7 inches; dark grayish brown (10YR 4/2) fine sand; weak fine granular structure; very friable; very strongly acid; clear smooth boundary.

E—7 to 12 inches; pale brown (10YR 6/3) loamy fine sand; weak fine granular structure; very friable; very strongly acid; clear wavy boundary.

Bt1—12 to 20 inches; yellowish brown (10YR 5/6) sandy clay loam; weak fine subangular blocky structure; friable; very strongly acid; gradual wavy boundary.

Bt2—20 to 29 inches; strong brown (7.5YR 5/6) sandy clay loam; moderate fine subangular blocky structure; firm; very strongly acid; gradual wavy boundary.

Bt3—29 to 46 inches; strong brown (7.5YR 5/6) sandy clay; many fine distinct light brownish gray (10YR 6/2), many medium prominent red (2.5YR 4/8), and common fine faint yellowish brown (10YR 5/4) mottles; weak medium subangular blocky structure; firm; few clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt4—46 to 56 inches; strong brown (7.5YR 5/6) sandy clay loam; many medium distinct light brownish gray (10YR 6/2), many medium prominent red (2.5YR 4/8), and common medium distinct reddish brown (5YR 5/4) mottles; moderate fine subangular blocky structure; firm; very strongly acid; gradual wavy boundary.

BC—56 to 65 inches; brownish yellow (10YR 6/6) loamy fine sand; many medium distinct dark brown (7.5YR 4/4), yellowish red (5YR 5/6), and pale brown (10YR 6/3) mottles; weak fine subangular blocky structure; friable; very strongly acid; gradual wavy boundary.

2C—65 to 80 inches; white (10YR 8/2) fine sand; few medium prominent yellowish brown (10YR 5/6) mottles; weak fine granular structure; friable; extremely acid.

The solum ranges from 40 to 60 inches in thickness. Reaction is strongly acid or very strongly acid.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 1 or 2. It is 4 to 7 inches thick. If the value is less than 3.5, this horizon is less than 6 inches thick. Texture is fine sand or loamy fine sand.

The E horizon has hue 10YR. It has value of 5 and chroma of 4 or value of 6 and chroma of 3 or 4. It is 4 to 10 inches thick. Texture is fine sand or loamy fine sand.

The Bt1 horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 or 6. It is 6 to 35 inches thick. Texture is fine sandy loam or sandy clay loam. The Bt2 horizon has hue of 7.5YR or 10YR, value of 5, and chroma of 6 to 8. It is 7 to 29 inches thick. Texture is sandy clay loam or sandy clay. The average clay content, by weight, in the upper 20 inches of the Bt horizon is less than 35 percent. The Bt3 and Bt4 horizons have hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 6. Mottles have chroma of 1 to 8. Texture is sandy clay or sandy clay loam. The BC horizon is at a depth of less than 60 inches. It has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 6. Texture is loamy fine sand, sandy loam, or sandy clay loam. In some pedons, the BC horizon has stratified bands of sandy loam and sand.

The C horizon has hue of 10YR. It has value of 6 or 7 and chroma of 6 to 8 or value of 8 and chroma of 1 or 2. Texture ranges from sand to sandy loam.

Faceville Series

The soils in the Faceville series are clayey, kaolinitic, thermic Typic Paleudults. They are well drained and are moderately permeable. The Faceville soils formed in clayey marine sediment. They are on rolling uplands. The water table is below a depth of 72 inches. Slopes range from 2 to 8 percent.

The Faceville soils are geographically associated with Esto, Nankin, Orangeburg, Lucy, and Lovett soils. Esto soils are less permeable than the Faceville soils. Nankin soils have stratified sediment to a depth of 60 inches. Orangeburg and Lucy soils have less than 35 percent clay. Lucy and Lovett soils have a sandy surface layer more than 20 inches thick.

Typical pedon of Faceville loamy fine sand, 2 to 5 percent slopes; in a pasture, about 1 mile south of the Georgia-Florida state line on Florida Highway 53, 0.25 mile west of Florida Highway 53 on an unpaved road, 50 yards south of road in the western part of sec. 20, T. 3 N., R. 9 E.

Ap—0 to 6 inches; dark brown (10YR 4/3) loamy fine sand; weak fine granular structure; very friable; many fine roots; strongly acid; clear smooth boundary.

Bt1—6 to 17 inches; red (2.5YR 4/6) sandy clay; moderate medium subangular blocky structure; firm; common fine and very fine roots; strongly acid; gradual wavy boundary.

Bt2—17 to 32 inches; red (2.5YR 4/6) clay; moderate medium subangular blocky structure; firm; common fine and very fine roots; few patchy clay films; strongly acid; diffuse wavy boundary.

Bt3—32 to 45 inches; red (2.5YR 4/6) clay; few fine distinct reddish yellow (7.5YR 6/8) mottles; moderate medium subangular blocky structure; firm; few fine and very fine roots; few patchy clay films;

strongly acid; diffuse wavy boundary.

Bt4—45 to 53 inches; red (2.5YR 4/6) clay; common medium distinct reddish yellow (7.5YR 6/8) and common medium faint red (2.5YR 3/6) mottles; moderate medium subangular blocky structure; firm; few patchy clay films; strongly acid; diffuse wavy boundary.

Bt5—53 to 80 inches; yellowish red (5YR 5/8) clay; common medium faint red (2.5YR 3/6) and brownish yellow (10YR 6/8) mottles; moderate medium subangular blocky structure; firm; few patchy clay films; very strongly acid.

The solum is more than 60 inches thick. Reaction is very strongly acid or strongly acid.

The A horizon ranges from 4 to 10 inches in thickness except in areas where the surface layer has been removed by erosion. The A horizon has hue of 10YR, value of 3 to 5, and chroma of 2 or 3. Texture is mainly loamy fine sand but can be loamy sand or fine sandy loam.

Some pedons have a BA horizon that has hue of 2.5YR or 5YR, value of 4, and chroma of 6. Texture is fine sandy loam or sandy clay loam.

The Bt horizon has hue of 2.5YR or 5YR, value of 3 to 5, and chroma of 4 to 8. In some pedons, mottles of red, brown, or yellow are in the lower part of this horizon. The texture of the upper part of the Bt horizon is sandy clay and that of the lower part is sandy clay or clay. Some pedons have ironstone nodules ranging from 1 to 10 percent in the upper part of the Bt horizon.

Some pedons have a BC horizon that has color similar to that in the Bt horizon but also has gray, pinkish gray, and white mottles below a depth of 60 inches. This horizon is stratified in some pedons. Texture is sandy clay loam or sandy clay.

Fuquay Series

The soils in the Fuquay series are loamy, siliceous, thermic Arenic Plinthic Kandiudults. They are well drained. The permeability is slow to moderate. The Fuquay soils formed in loamy marine sediment on ridges on the Coastal Plain uplands. They are on low ridges and side slopes. The perched water table is at a depth of 48 to 72 inches for 1 to 2 months during most years. Slopes range from 2 to 5 percent.

The Fuquay soils are geographically associated with Blanton, Bonifay, and Lovett soils. Blanton and Bonifay soils have a Bt horizon at a depth of more than 40 inches. Blanton and Lovett soils do not have a horizon that contains more than 5 percent plinthite and have a water table nearer the surface than the Fuquay soils.

Typical pedon of Fuquay sand, 2 to 5 percent slopes; 530 feet north of U.S. Highway 90, 130 feet east of Pickle Lane, SW¼NW¼NW¼ sec. 21, T. 1 N., R. 9 E.

Ap—0 to 6 inches; brown (10YR 5/3) sand; weak fine granular structure; very friable; many fine and very fine roots; medium acid; clear smooth boundary.

E—6 to 30 inches; brownish yellow (10YR 6/6) sand; many fine and medium distinct grayish brown (10YR 5/2) splotches; weak fine granular structure; very friable; few 3-inch-diameter krotavinas; many fine and very fine roots; medium acid; gradual wavy boundary.

BE—30 to 35 inches; yellowish brown (10YR 6/6) loamy sand; moderate medium granular structure; friable; about 2 percent plinthite; strongly acid; gradual wavy boundary.

Btv1—35 to 41 inches; yellowish brown (10YR 5/8) fine sandy loam; weak medium subangular blocky structure; friable; about 9 percent plinthite; very strongly acid; clear wavy boundary.

Btv2—41 to 54 inches; mottled gray (10YR 5/1), brownish yellow (10YR 6/8), and strong brown (7.5YR 5/6) sandy clay loam; moderate medium subangular blocky structure; firm; about 10 percent plinthite; thin clay films on faces of peds; extremely acid; gradual wavy boundary.

Btv3—54 to 80 inches; mottled light brownish gray (10YR 6/2), gray (N 5/0), pale red (2.5YR 6/2), and yellowish red (5YR 4/6) sandy clay; strong medium angular blocky structure; firm; thin clay films on faces of peds; about 10 percent plinthite below 60 inches; extremely acid.

Reaction in the A and E horizons and in the upper part of the Bt horizon ranges from medium acid to very strongly acid. In the lower part of the Bt horizon, the reaction ranges from medium acid to extremely acid. Depth to the horizons that contain 5 percent or more plinthite ranges from 35 to 60 inches.

The Ap or A horizon has hue of 10YR, value of 4 or 5, and chroma of 1 to 3. It is 5 to 9 inches thick. Texture is mainly sand but can be loamy sand or loamy fine sand.

The E horizon has hue of 10YR, value of 5 or 6, and chroma of 4 to 6. It is 9 to 30 inches thick. Texture is loamy sand, loamy fine sand, or sand.

The BE horizon, if present, has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 6 to 8. It is as much as 14 inches thick. Texture is sandy loam or loamy sand.

The upper part of the Btv horizon has hue of 7.5YR or 10YR, value of 5, and chroma of 6 to 8. In some pedons, it has brown or red mottles. Texture is fine sandy loam, sandy loam, or sandy clay loam. The lower part of the Btv horizon has hue of 10YR, value of 5 to 7, and chroma of 2 to 8. It is reticulately mottled or has red, yellow, and gray mottles. Bodies of red and strong brown plinthite range from 5 to 25 percent within 60 inches of the surface. Texture is sandy clay loam or sandy clay.

Some pedons have a BC or C horizon, which is reticulately mottled in shades of red, brown, gray, and yellow. Texture is sandy clay loam, sandy clay, or clay and can include pockets of sandy loam or loamy sand.

The Fuquay soils are taxadjuncts to the Fuquay series because they have a slightly higher content of clay in the lower part of the Bt horizon and in the BC or C horizon than is allowed in the Fuquay series. This does not significantly affect the behavior, use, and management of these Fuquay soils.

Goldsboro Series

The soils in the Goldsboro series are fine-loamy, siliceous, thermic Aquic Paleudults. They are somewhat poorly drained. Permeability is moderate. The Goldsboro soils formed in loamy marine sediment on the Coastal Plain uplands. They are on low, nearly level landscapes adjacent to swamps and depressions. The water table is at a depth of 24 to 36 inches for 2 to 4 months during most years. Slopes range from 2 to 5 percent.

The Goldsboro soils are geographically associated with Albany, Blanton, Lovett, and Plummer soils. Albany, Blanton, and Plummer soils have a Bt horizon below a depth of 40 inches. Albany soils are somewhat poorly drained, and Plummer soils are poorly drained. Lovett soils have a Bt horizon below a depth of 20 inches.

Typical pedon of Goldsboro loamy sand, 2 to 5 percent slopes; 0.25 mile north of secondary road 150, 1.2 miles west of Southern Railway tracks, NW¼NW¼SW¼ sec. 31, T. 7 E., R. 1 N.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) loamy sand; weak medium granular structure; very friable; many fine roots; strongly acid; gradual smooth boundary.

E—9 to 15 inches; brown (10YR 5/3) loamy sand; few fine distinct yellowish brown (10YR 5/6) mottles; weak medium granular structure; very friable; few distinct very dark grayish brown (10YR 3/2) stains; common fine roots; strongly acid; gradual wavy boundary.

Bt1—15 to 25 inches; brownish yellow (10YR 6/6) sandy loam; weak fine subangular blocky structure; friable; many medium distinct very dark grayish brown (10YR 3/2) stains; common fine roots; thin patchy clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt2—25 to 38 inches; brownish yellow (10YR 6/6) sandy clay loam; few fine distinct grayish brown (10YR 5/2) and brownish yellow (10YR 5/8) mottles; weak fine subangular blocky structure; friable, slightly sticky; few fine roots; strongly acid; gradual wavy boundary.

Bt3—38 to 45 inches; yellowish brown (10YR 5/4) sandy clay loam; common medium distinct pinkish gray (7.5YR 7/2) and yellowish red (5YR 4/8) and few medium distinct brownish yellow (10YR 5/8) mottles; weak fine subangular blocky structure; friable, slightly sticky; thin patchy clay films on faces of peds; strongly acid; gradual wavy boundary.

Bt4—45 to 80 inches; mottled gray (N 6/0), brownish yellow (10YR 5/8), and dark red (2.5YR 3/6) sandy clay loam; moderate fine subangular blocky structure; friable; few thin strata of light gray (10YR 7/2) sandy loam and pockets of gray (N 6/0) clay; patchy clay films on faces of peds; strongly acid.

Reaction is strongly acid or very strongly acid except where lime has been added to the soil.

The A horizon has hue of 10YR, value of 2 to 5, and chroma of 1 or 2. It is 6 to 10 inches thick. Texture is loamy sand or sandy loam.

The E horizon, where present, has hue of 10YR, value of 5 to 7, and chroma of 2 to 6. It is as much as 10 inches thick. Texture is loamy sand or sandy loam.

The upper part of the Bt horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 3 to 8. The lower part has colors that are similar to those in the upper part of the horizon. Mottles are gray, brown, and red, or the horizon is mottled with these colors without a matrix color. Few to many mottles with chroma of 2 or less are between depths of 24 and 30 inches. Texture is sandy clay loam but can be sandy clay below the control section.

Kenansville Series

The soils in the Kenansville series are loamy, siliceous, thermic Arenic Hapludults. They are well drained and are moderately permeable. The Kenansville soils formed in sandy and loamy marine deposits. They are on flood plains. A seasonal high water table is below a depth of 72 inches. Slopes range from 0 to 5 percent.

The Kenansville soils are geographically associated with Alpin and Eunola soils. Alpin soils are in higher positions on the landscape than the Kenansville soils, and they have a sandy layer at a depth of more than 80 inches. Eunola soils are mainly in lower positions on the landscape, and they have a Bt horizon within 20 inches of the surface.

Typical pedon of Kenansville loamy fine sand, occasionally flooded; 600 feet south of U.S. Highway 90, 0.87 mile east of River Road, adjoining south side of borrow pit, NE¼NE¼ sec. 23, T. 1 S., R. 11 E.

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

E1—4 to 15 inches; pale brown (10YR 6/3) loamy fine sand; many fine distinct light gray (10YR 7/1) and yellow (10YR 7/6) splotches; moderate fine granular structure; very friable; many fine and very fine roots; strongly acid; clear wavy boundary.

E2—15 to 22 inches; pale yellow (2.5Y 7/4) loamy fine sand; common clean sand grains; few fine prominent yellowish brown (10YR 5/6) mottles; moderate fine granular structure; very friable; many fine and very fine roots; strongly acid; gradual wavy boundary.

Bt1—22 to 26 inches; brownish yellow (10YR 6/6) fine sandy loam; many clean sand grains; weak fine subangular blocky structure; friable; strongly acid; gradual wavy boundary.

Bt2—26 to 38 inches; yellowish brown (10YR 5/6) sandy clay loam; moderate medium subangular blocky structure; friable; few patchy clay films; very strongly acid; gradual wavy boundary.

Bt3—38 to 49 inches; yellowish brown (10YR 5/8) sandy clay loam; moderate medium subangular blocky structure; friable; few patchy clay films; very strongly acid; gradual wavy boundary.

BC—49 to 56 inches; brownish yellow (10YR 6/6) fine sandy loam; weak fine subangular blocky structure; friable; very strongly acid; gradual wavy boundary.

CB—56 to 69 inches; pale yellow (2.5Y 8/4) fine sand; weak fine granular structure; very friable; yellowish brown (10YR 5/4) horizontal bands of lamellae, 0.25 to 1 inch in width; very strongly acid; clear wavy boundary.

2C—69 to 80 inches; white (10YR 8/2) fine sand; common coarse distinct yellowish brown (10YR 5/4) streaks; weak fine granular structure; friable; strongly acid.

The solum ranges from 40 to 60 inches in thickness. Reaction ranges from extremely acid to medium acid.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. It is 4 to 8 inches thick. Texture is fine sand or loamy fine sand.

The E horizon has hue of 10YR, value of 6 or 7, and chroma of 3 or 4 or hue of 2.5Y, value of 7, and chroma of 4. It is 17 to 28 inches thick. Texture is fine sand or loamy fine sand.

The Bt horizon has hue of 10YR, value of 5 or 6, and chroma of 6 to 8. It is 22 to 36 inches thick. Texture is fine sandy loam or sandy clay loam.

The BC horizon has hue of 10YR, value of 6 or 7, and chroma of 6.

The 2C horizon has hue of 10YR, value of 6 or 7, and chroma of 1 to 6 or hue of 2.5Y, value of 8, and chroma of 4. Bands of lamellae are in this horizon. Texture is fine sand, coarse sand, or clay. Some pedons do not have a 2C horizon.

The Kenansville soils are taxadjuncts to the Kenansville series because they have a slightly higher clay content and are more clayey in the Bt horizon than is allowed in the Kenansville series. This does not significantly affect the behavior, use, and management of these Kenansville soils.

Lakeland Series

The soils in the Lakeland series are thermic, coated Typic Quartzipsamments. They are deep and excessively drained. Permeability is very rapid. The Lakeland soils formed in beds of sandy marine sediment. They are on ridges on the uplands. The water table is below a depth of 72 inches. Slopes range from 0 to 8 percent.

The Lakeland soils are geographically associated with Alaga, Alpin, Blanton, and Troup soils. Alaga soils do not have 5 to 10 percent silt plus clay in the control section. Alpin soils have lamellae between depths of 50 and 80 inches. Blanton soils are moderately well drained and have a Bt horizon. Troup soils have a Bt horizon.

Typical pedon of Lakeland sand, 0 to 5 percent slopes; 1 mile south of Seaboard Coastline Railroad track, 0.6 mile west of improved dirt road, NE¼NE¼SW¼ sec. 22, T. 1 S., R. 11 E.

A—0 to 4 inches; brown (10YR 5/3) sand; weak fine granular structure; very friable; common fine and very fine roots; very strongly acid; clear wavy boundary.

C1—4 to 35 inches; yellow (10YR 7/6) sand; single grained; loose; common fine and very fine and few medium and coarse roots; very strongly acid; gradual wavy boundary.

C2—35 to 63 inches; brownish yellow (10YR 6/6) sand; single grained; loose; few fine and medium roots; very strongly acid; gradual wavy boundary.

C3—63 to 80 inches; very pale brown (10YR 7/4) sand; single grained; loose; many fine interstitial pores; common uncoated sand grains; very strongly acid.

The texture of the A and C horizons is sand or fine sand. Reaction is strongly acid or very strongly acid.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 2 or 3. It is 4 to 8 inches thick. It has common and many fine or medium roots.

The C horizon has a hue of 10YR, value of 5 to 7, and chroma of 3 to 6. It extends to a depth of 80 inches or more.

Lovett Series

The soils in the Lovett series are loamy, siliceous, thermic Arenic Paleudults. They are moderately well drained. Permeability is moderately slow to slow. The Lovett soils formed in sandy or loamy marine sediment. They are on nearly level to sloping uplands on the Coastal Plain. The perched water table is between depths of 36 and 54 inches for 1 to 3 months during most years. Slopes are generally 1 to 4 percent but can range from 1 to 8 percent.

The Lovett soils are geographically associated with Albany, Blanton, Esto, Nankin, and Ocilla soils. Albany and Blanton soils have a sandy surface layer more than 40 inches thick. Esto and Nankin soils have a sandy surface layer less than 20 inches thick. Ocilla soils are somewhat poorly drained.

Typical pedon of Lovett sand, 0 to 5 percent slopes; 0.5 mile north of Cherry Lake, 0.1 mile west of dirt road, 700 feet north and 600 feet west of southeast corner of Georgia Lot No. 201, lat. 30°37′45″, long. 83°25′15″.

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) sand; weak fine granular structure; very friable; few coarse and many medium, fine, and very fine roots; strongly acid; clear smooth boundary.

E—9 to 38 inches; brownish yellow (10YR 6/6) sand; weak medium granular structure; very friable; few coarse and many medium, fine, and very fine roots; strongly acid; gradual wavy boundary.

Bt1—38 to 47 inches; yellowish brown (10YR 5/6) fine sandy loam; weak medium subangular blocky structure; friable; common medium, fine, and very fine roots; very strongly acid; gradual wavy boundary.

Bt2—47 to 62 inches; yellowish brown (10YR 5/6) sandy clay; few fine distinct light gray (10YR 7/2) and common medium prominent red (10YR 4/8) mottles; moderate medium subangular blocky structure; firm; few medium, fine, and very fine roots; common clay films along root channels; very strongly acid; gradual wavy boundary.

C—62 to 80 inches; reticulately mottled yellowish brown (10YR 5/6), red (10YR 4/8), and light gray (10YR 7/2) sandy clay; massive; firm; extremely acid.

The solum ranges from 60 to more than 80 inches in thickness. Reaction is strongly acid or very strongly acid in the solum and is extremely acid in the C horizon. The average clay content, by weight, in the control section is 18 to 35 percent. The content of silt is less than 20 percent.

The A horizon has hue of 10YR, value 3 to 5, and chroma of 2 or 3. Texture is mainly sand but can be loamy fine sand or fine sand.

The E horizon has hue of 10YR, value of 4 to 6, and chroma of 3 to 6. Texture is mainly sand but can be loamy fine sand or fine sand.

The upper part of the Bt horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 6 to 8. If mottled, it has few or common red, brown, and yellow mottles that increase with depth. Mottles at a depth of more than 36 inches have chroma of 2 or less. Texture is fine sandy loam or sandy clay loam. The upper part of the Bt horizon has up to 5 percent plinthite or ironstone nodules. The lower part of the Bt horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 6 to 8. It has few to many red, brown, yellow, and gray mottles or is coarsely mottled with these colors in some pedons without a matrix color. Texture is sandy clay or clay.

The C horizon is reticulately mottled and varicolored in hues ranging from 10R to 10YR. Texture is sandy clay or clay.

Lucy Series

The soils in the Lucy series are loamy, siliceous, thermic Arenic Paleudults. They are well drained and are moderately permeable. The Lucy soils formed in loamy Coastal Plain sediment. They are on gently sloping, broad ridges and sloping hillsides on the uplands. The water table is below a depth of 72 inches. Slopes range from 2 to 8 percent.

The Lucy soils are geographically associated with Blanton, Faceville, Lovett, Orangeburg, and Troup soils. Blanton and Troup soils have a Bt horizon below a depth of 40 inches. Blanton soils are moderately well drained. Orangeburg and Faceville soils have a Bt horizon within 20 inches of the surface. Lovett soils have a clayey argillic horizon.

Typical pedon of Lucy sand, 2 to 5 percent slopes; 0.5 mile west of Florida Highway 53, 0.5 mile north of secondary road 146, SW¼NW¼ sec. 9, T. 1 N., R. 9 E.

Ap—0 to 11 inches; very dark grayish brown (10YR 3/2) sand; weak fine granular structure; very friable; many very fine, fine, and medium roots; many fine pores; strongly acid; abrupt smooth boundary.

E—11 to 24 inches; strong brown (7.5YR 5/6) loamy sand; weak medium subangular blocky structure; very friable; many very fine, fine, and medium roots; many fine pores; strongly acid; gradual smooth boundary.

Bt1—24 to 34 inches; yellowish red (5YR 5/6) fine sandy loam; weak medium subangular blocky structure; friable; many very fine, fine, and medium roots; many fine pores; strongly acid; gradual smooth boundary.

Bt2—34 to 48 inches; yellowish red (5YR 5/6) sandy clay loam; moderate medium subangular blocky structure; friable; common very fine and fine roots; common fine pores; very strongly acid; gradual smooth boundary.

Bt3—48 to 80 inches; yellowish red (5YR 5/8) sandy clay loam; moderate medium subangular blocky structure; friable; common very fine and fine roots; common fine pores; very strongly acid.

Reaction is strongly acid or very strongly acid except where lime has been added to the surface layer.

The A1 or Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. It is 4 to 12 inches thick. Texture is loamy sand, fine sand, or sand.

The E horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. It is 12 to 29 inches thick. Texture is loamy sand, fine sand, or sand.

The Bt horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 to 8. Some pedons have hue of 7.5YR in the upper part of the Bt horizon. Texture is fine sandy loam or sandy clay loam. Yellow or brown mottles are below a depth of 40 inches in some pedons.

Mascotte Series

The soils in the Mascotte series are sandy, siliceous, thermic Ultic Haplaquods. They are poorly drained and are moderately permeable. The Mascotte soils formed in marine deposits of sandy or loamy sediment. They are in nearly level flatwood areas and areas bordering swamps or depressions. The water table is at the surface to a depth of 12 inches for 1 to 4 months during most years. It is above the surface for brief periods in some places, and it recedes to a depth of more than 40 inches during dry periods in most years. Slopes are 0 to 2 percent.

The Mascotte soils are geographically associated with Pelham, Albany, Ocilla, and Surrency soils. These associated soils do not have a spodic horizon. Pelham soils are in similar positions on the landscape as the Mascotte soils. Albany and Ocilla soils are in somewhat higher positions, have a water table at a greater depth than that of the Mascotte soils, and are between the Mascotte soils and the upland soils. Albany soils also have an argillic horizon at a depth of more than 40 inches. Surrency soils are in depressions. They have a water table at the surface for longer periods and are commonly ponded.

Typical pedon of Mascotte sand; 2 miles south of secondary road 158, 3.8 miles east of U.S. Highway 221, 10 feet east of graded road, SE¼SE¼SW¼SE¼ sec. 14, T. 1 S., R. 7 E.

A—0 to 6 inches; black (10YR 2/1) sand; weak fine granular structure; very friable; many fine roots; common medium roots; very strongly acid; clear smooth boundary.

E—6 to 14 inches; light gray (10YR 7/2) sand; weak fine granular structure; very friable; many fine and medium roots; very strongly acid; abrupt wavy boundary.

Bh1—14 to 20 inches; black (10YR 2/1) sand; moderate medium granular structure; friable; common fine roots; very strongly acid; gradual wavy boundary.

Bh2—20 to 24 inches; very dark brown (10YR 2/2) sand; pockets of common coarse black (10YR 2/1) sand; weak medium granular structure; very friable; few fine roots; very strongly acid; gradual wavy boundary.

E'—24 to 37 inches; light yellowish brown (10YR 6/4) sand; weak fine granular structure; very friable; very strongly acid; clear wavy boundary.

Btg—37 to 80 inches; gray (10YR 6/1) sandy clay loam; common medium prominent strong brown (7.5YR 5/6) streaks along decayed root channels; weak medium subangular blocky structure; firm; slightly sticky; very strongly acid.

Reaction ranges from extremely acid to strongly acid.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1. It is 3 to 6 inches thick. Texture is sand or fine sand.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. It is 6 to 16 inches thick. Texture is sand or fine sand.

The Bh horizon has hue of 10YR, value of 2, and chroma of 1 or 2 or hue of 7.5YR, value of 3, and chroma of 2 to 4. It is 6 to 12 inches thick. Texture is sand, fine sand, or loamy sand. Most sand grains in this horizon are coated with organic matter.

The E horizon, if present, has hue 10YR, value of 5 to 7, and chroma of 2 to 4. It is as much as 13 inches thick. Texture is fine sand or sand.

The Bt horizon has hue 10YR, value of 5 to 7, and chroma of 1 or 2. It extends to a depth of more than 80 inches. Mottles are yellow, brown, or red. Texture is sandy loam or sandy clay loam.

Nankin Series

The soils in the Nankin series are clayey, kaolinitic, thermic Typic Hapludults. They are well drained and are moderately slowly permeable. The Nankin soils formed in loamy or clayey stratified marine sediment. They are on ridgetops and side slopes of undulating to hilly Coastal Plain uplands. The water table is below a depth of 72 inches. Slopes range from 5 to 12 percent.

The Nankin soils are geographically associated with Esto, Lovett, and Bonifay soils. Esto soils generally are on ridgetops and are clayey to a depth of more than 60 inches. Lovett soils have a Bt horizon at a depth of more than 20 inches. Bonifay soils are at the base of slopes in depositional positions and have a sandy layer more than 40 inches thick underlain by a loamy subsoil. Bonifay soils have plinthite.

Typical pedon of Nankin loamy sand, 5 to 8 percent slopes; 0.7 mile south of Seaboard System Railroad, 500 feet west of secondary road 14, SW¼SE¼SE¼ sec. 28, T. 1 N., R. 9 E.

A—0 to 6 inches; brown (10YR 5/3) loamy sand; weak fine granular structure; very friable; many fine and very fine roots; strongly acid; clear wavy boundary.

BA—6 to 12 inches; strong brown (7.5YR 5/6) sandy clay loam; weak fine subangular blocky structure; friable; many fine and common medium roots; very strongly acid; gradual wavy boundary.

Bt1—12 to 38 inches; strong brown (7.5YR 5/6) clay; moderate medium subangular blocky structure; firm; many fine and common medium roots; many clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt2—38 to 58 inches; mottled reddish yellow (7.5YR 6/8), strong brown (7.5YR 5/8), and red (2.5YR 4/6) sandy clay; strong medium subangular blocky structure; firm; common medium and fine roots; few patchy clay films on faces of peds; very strongly acid; gradual irregular boundary.

C—58 to 80 inches; mottled gray (10YR 6/1), yellowish brown (10YR 5/6 and 5/8), brownish yellow (10YR 6/6/), and red (2.5YR 5/6) sandy clay loam; moderate medium subangular blocky structure; friable; very strongly acid.

The solum ranges from 40 to 60 inches or more in thickness. Reaction is strongly acid or very strongly acid. Nodules of ironstone and phosphate-enriched pebbles, if present, range from few to common in the A and B horizons.

The A horizon has hue of 5YR to 10YR, value of 5 or 6, and chroma of 3 to 5. It is 5 to 7 inches thick. Texture is loamy sand or sandy loam.

Some pedons have an E horizon, which has hue of 10YR, value of 5 or 6, and chroma of 2 to 4. If the soil is eroded, chroma can be 6 to 8. The horizon is as much as 8 inches thick. Texture is loamy sand or sandy loam.

The BA horizon, if present, has hue of 5YR to 10YR, value of 5 or 6, and chroma of 6 to 8. It is as much as 8 inches thick. Texture is sandy loam or sandy clay loam.

Some pedons have a BE horizon, which has colors, texture, and thickness that are similar to those of the BA horizon.

The Bt horizon has hue of 2.5YR to 10YR, value of 4 to 6, and chroma of 6 to 8. It ranges from 20 to 40 inches in thickness. Texture is sandy clay or clay. In some pedons, the upper part of the Bt horizon has hue of 10YR. The lower part has brown, yellow, red, or gray mottles.

The C horizon is mottled in hues of 2.5YR to 10YR, values of 5 to 7, and chromas of 1 to 8. It is stratified with 1/16- to ½-inch-thick bands and streaks of white clay with streaks of red and brown loamy sand and sandy clay loam. Texture is sandy loam or sandy clay loam. In places this horizon has few or common pockets or strata of quartz pebbles and coarse sand grains.

Ocilla Series

The soils in the Ocilla series are loamy, siliceous, thermic Aquic Arenic Paleudults. They are somewhat poorly drained and are moderately permeable. The Ocilla soils formed in deposits of sandy or loamy marine sediment on the Coastal Plain. The water table is between depths of 12 and 30 inches for 2 to 5 months during most years. Slopes range from 0 to 5 percent.

The Ocilla soils are geographically associated with Albany, Blanton, Lovett, Pelham, and Sapelo soils. Albany and Blanton soils have a Bt horizon between depths of 40 and 80 inches. Lovett soils have a water table below a depth of 36 inches. Pelham and Sapelo soils have a water table within 15 inches of the surface, and Sapelo soils have a spodic horizon.

Typical pedon of Ocilla sand, 0 to 5 percent slopes; 0.5 mile south of Interstate 10, 2.5 miles west of the intersection of Florida Highway 53 and Interstate 10, SW¼NE¼SW¼ sec. 14, T. 1 S., R. 9 E.

A—0 to 3 inches; grayish brown (10YR 5/2) sand; weak fine granular structure; very friable; many fine and very fine roots; very strongly acid; clear smooth boundary.

E1—3 to 13 inches; light yellowish brown (10YR 6/4) sand; weak fine granular structure; very friable; many very fine and fine roots; strongly acid; gradual wavy boundary.

E2—13 to 19 inches; very pale brown (10YR 7/4) sand; weak fine granular structure; very friable; common fine roots; strongly acid; gradual wavy boundary.

E3—19 to 24 inches; very pale brown (10YR 7/4) sand; many fine prominent reddish yellow (7.5YR 6/8) and common medium distinct white (10YR 8/1) mottles; weak fine granular structure; very friable; very strongly acid; clear wavy boundary.

E4—24 to 29 inches; light yellowish brown (2.5Y 6/4) loamy sand; common fine distinct light gray (10YR 7/2) and common medium distinct brownish yellow (10YR 6/8) mottles; weak fine subangular blocky structure; friable; very strongly acid; gradual wavy boundary.

Bt—29 to 34 inches; light yellowish brown (2.5Y 6/4) fine sandy loam; common medium distinct brownish yellow (10YR 6/6) and common coarse distinct light gray (10YR 7/2) mottles; weak fine subangular blocky structure; friable; sand grains coated and bridged with clay; very strongly acid; gradual wavy boundary.

Btg—34 to 80 inches; light brownish gray (10YR 6/2) sandy clay loam; common coarse prominent red (2.5YR 4/6), few medium distinct yellowish brown (10YR 5/8), and common medium prominent strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; firm; very strongly acid.

The solum ranges from 60 to more than 80 inches in thickness. Reaction is very strongly acid or strongly acid. The depth to horizons that have more than 35 percent silt plus clay ranges from 36 to 80 inches. The average clay content, by weight, in the upper 20 inches of the argillic horizon ranges from 20 to 35 percent. In some pedons the upper part of the Bt horizon contains as much as 5 percent plinthite.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 0 to 2. It is 3 to 10 inches thick. Texture is mainly sand but can be fine sand or loamy sand.

The E horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 2 to 4. It is 16 to 30 inches thick. Texture is mainly sand but can be fine sand or loamy sand.

Some pedons have a BE horizon, which has hue of 10YR, value of 6, and chroma of 3 to 6. If present, mottles range from few to many and are gray or strong brown. This horizon is as much as 6 inches thick. Texture is sandy loam.

The Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2 to 8. Mottles are gray, yellow, brown, or red. Texture is sandy loam, fine sandy loam, or sandy clay loam. The Btg horizon has hue of 10YR, value of 6 or 7, and chroma of 1 or 2. Mottles are in shades of red, yellow, or brown. Texture is mainly sandy clay loam but can be sandy clay in the lower part of the Btg horizon.

Some pedons have a BC or C horizon, which has the same colors as those in the Btg horizon. Texture ranges from sandy clay loam to sandy clay.

Orangeburg Series

The soils in the Orangeburg series are fine-loamy, siliceous, thermic Typic Paleudults. They are well drained and are moderately permeable. The Orangeburg soils formed in loamy sediment on the Coastal Plain uplands. The water table is below a depth of 72 inches. Slopes range from 2 to 12 percent.

The Orangeburg soils are geographically associated with Lucy, Nankin, Troup, and Bonifay soils. The associated soils are in similar positions on the landscape as the Orangeburg soils, and they have a Bt horizon at a greater depth. Nankin soils have clay within 60 inches of the surface. Bonifay soils have plinthite.

Typical pedon of Orangeburg loamy sand, 2 to 5 percent slopes; 1,600 feet east of secondary road 145, 1 mile south of secondary road 254, SE¼SW¼SE¼SW¼ sec. 12, T. 1 N., R. 9 E.

A—0 to 6 inches; very dark grayish brown (10YR 3/2) loamy sand; weak fine granular structure; very friable; many fine and medium and common coarse roots; very strongly acid; clear wavy boundary.

E—6 to 15 inches; dark yellowish brown (10YR 5/4) loamy sand; weak fine granular structure; very friable; common fine and medium and few coarse roots; strongly acid; gradual wavy boundary.

Bt1—15 to 26 inches; yellowish red (5YR 4/6) fine sandy loam; weak fine subangular blocky structure; very friable; many fine and common medium roots; thin patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt2—26 to 80 inches; yellowish red (5YR 4/6) sandy clay loam; moderate medium subangular blocky structure; friable; patchy clay films on faces of peds; very strongly acid.

Reaction is very strongly acid or strongly acid.

The A1 or Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 to 4. It is 4 to 8 inches thick. Texture is mainly loamy sand but can be loamy fine sand.

The E horizon, if present, has hue of 10YR, value of 5 or 6, and chroma of 4 to 6. It is as much as 14 inches thick. Texture is loamy sand or loamy fine sand.

The Bt horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 to 8. The lower part of the Bt horizon has brown or red mottles in some pedons, and it has gray mottles below a depth of 60 inches in other pedons. This gray color is in reticulately mottled, deep horizons and is not considered indicative of wetness. The Bt horizon is sandy loam, fine sandy loam, sandy clay loam, or sandy clay. In some pedons, plinthite nodules generally are less than 5 percent within 60 inches of the surface.

Some pedons have a BC horizon, which has hue of 7.5YR, value of 5, and chroma of 6 to 8 or hue of 5YR, value of 4 or 5, and chroma of 6. Texture is the same as that in the Bt horizon.

Pamlico Series

The soils in the Pamlico series are sandy or sandy-skeletal, siliceous, dysic, thermic Terric Medisaprists. They are very poorly drained. Permeability is moderate or moderately rapid. These soils are made up of partially decomposed leaves, roots, and stems and are underlain by deposits of sandy material. The Pamlico soils formed in marine sediment. They are in depressions. The seasonal high water table is at the surface or as much as 2 feet above the surface for 3 to 6 months during most years. It recedes 1 foot below the surface during dry periods. Slopes are 0 to 1 percent.

The Pamlico soils are geographically associated with Surrency, Pelham, and Plummer soils. The associated soils are mineral soils. Surrency and Pelham soils have a Bt horizon at a depth of 20 to 40 inches. Plummer soils are poorly drained.

Typical pedon of Pamlico muck, in an area of Dorovan and Pamlico soils, depressional; 1.25 miles north of Lafayette-Madison County line, 0.5 mile west of Fendig Road on Lake City Road, in San Pedro Bay, SE¼NE¼SE¼ sec. 28, T. 2 S., R. 9 E.

Oi—6 inches to 0; organic mat of mostly undecomposed leaves and roots.

Oa1—0 to 6 inches; black (10YR 2/1) sapric muck; 20 percent unrubbed fiber, 5 percent rubbed; many medium and common coarse live roots; extremely acid; diffuse irregular boundary.

Oa2—6 to 15 inches; black (N 2/0) sapric muck; 15 percent unrubbed fiber, 5 percent rubbed; common coarse titi shrub roots; extremely acid; gradual irregular boundary.

Oa3—15 to 33 inches; dark brown (7.5YR 3/2) sapric muck; 25 percent unrubbed fiber, 5 percent rubbed; common coarse cypress roots; extremely acid; clear wavy boundary.

C1—33 to 43 inches; yellowish brown (10YR 5/4) fine sand; single grained; loose; very friable; common fine and very fine roots; extremely acid; gradual wavy boundary.

C2—43 to 60 inches; yellowish brown (10YR 5/6) fine sand; single grained; loose; very strongly acid; abrupt wavy boundary.

C3—60 to 80 inches; grayish brown (10YR 5/2) sandy clay loam; massive; common light gray (10YR 7/1) pockets of sand; few fine roots; very strongly acid.

Depth to the underlying material ranges from 16 to 50 inches.

The Oi horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. It is 1 to 6 inches thick. The content of rubbed fiber ranges from 60 to 90 percent.

The Oa horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2 or hue of 7.5YR, value of 2 or 3, and chroma of 2. It is 16 to 35 inches thick. The content of rubbed fiber ranges from 5 to 16 percent.

The C horizon has hue of 10YR, value of 4 or 5, and chroma of 2. It extends to a depth of 80 inches or more. Texture is sand, fine sand, or loamy sand. In some pedons, it is loamy or clayey below a depth of 60 inches.

Pelham Series

The soils in the Pelham series are loamy, siliceous, thermic Arenic Paleaquults. They are poorly drained and are moderately permeable to slowly permeable. The Pelham soils formed in sandy marine sediment underlain by loamy marine sediment. These soils are on flats or in depressions. The water table is at the surface to a depth 12 inches from 2 to 4 months during most years. Slopes are 0 to 2 percent.

The Pelham soils are geographically associated with Albany, Blanton, Ocilla, Plummer, and Surrency soils. Albany, Blanton, and Ocilla soils have a water table at a greater depth than the Pelham soils. Albany, Blanton, and Plummer soils have a sandy layer more than 40 inches thick. Surrency soils are only in depressions and swamps and have a water table nearer the surface than the Pelham soils.

Typical pedon of Pelham sand; 0.6 mile south of Interstate 10, 0.6 mile east of secondary road 360, SE¼NE¼NW¼ sec. 16, T. 1 S., R. 9 E.

Ap—0 to 7 inches; very dark gray (10YR 3/1) sand; weak fine granular structure; very friable; many fine interstitial pores; few coarse and many medium and fine roots; very strongly acid; clear smooth boundary.

A—7 to 13 inches; dark grayish brown (10YR 4/2) sand; weak fine granular structure; very friable; common medium and fine roots; very strongly acid; abrupt smooth boundary.

E—13 to 24 inches; very pale brown (10YR 7/3) loamy sand; many medium prominent yellowish red (5YR 5/8) and many medium faint light brownish gray (10YR 6/2) mottles; weak fine granular structure; very friable; common medium, fine, and very fine roots; few ironstone pebbles; very strongly acid; gradual wavy boundary.

Btg1—24 to 33 inches; light brownish gray (10YR 6/2) sandy loam; many medium prominent yellowish red (5YR 5/8) and many medium distinct yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; very friable; common medium, fine, and very fine roots; very strongly acid; gradual wavy boundary.

Btg2—33 to 50 inches; light brownish gray (10YR 6/2) sandy clay loam; many medium prominent yellowish red (5YR 5/8) and many medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few very fine interstitial pores; common medium, fine, and very fine roots; common small white concretions; very strongly acid; gradual wavy boundary.

Btg3—50 to 65 inches; gray (10YR 6/1) sandy clay; many medium prominent dark red (2.5YR 3/6), many medium distinct yellow (10YR 7/6) and very pale brown (10YR 8/3), many medium faint gray (10YR 5/1), and common coarse prominent dark red (2.5YR 3/6) mottles; moderate medium subangular blocky structure; common fine roots; many thin continuous gray (10YR 5/1) clay skins on faces of peds; very strongly acid; gradual wavy boundary.

Btg4—65 to 80 inches; gray (10YR 6/1) clay; many medium prominent dark red (2.5YR 3/6), many medium distinct yellow (10YR 7/6) and very pale brown (10YR 8/3), many medium faint gray (10YR 5/1), and common coarse prominent dark red (2.5YR 3/6) mottles; moderate medium subangular blocky structure; many thin continuous gray (10YR 5/1) clay skins on faces of peds; very strongly acid.

Reaction is extremely acid to strongly acid.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 0 to 2. It is 3 to 13 inches thick.

The E horizon has hue of 10YR, value 4 to 7, and chroma of 1 to 3. It is 11 to 26 inches thick. Texture is fine sand, sand, or loamy sand.

The Btg horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. Mottles, if present, are few to many and are strong brown, pale brown, brown, yellowish brown, yellowish red, red, or very dark grayish brown. Texture is sandy loam, sandy clay loam, sandy clay, and clay.

The Pelham soils are taxadjuncts to the Pelham series because they have a higher clay content in the lower part of the Btg horizon than is allowed in the Pelham series. This does not significantly affect the behavior, use, and management of these Pelham soils.

Plummer Series

The soils in the Plummer series are loamy, siliceous, thermic Grossarenic Paleaquults. They are poorly drained or very poorly drained and are moderately permeable. The Plummer soils formed in sandy or loamy sediment. They are on flats, in depressions, or along drainageways. The water table is above the surface or within 15 inches of the surface for up to 6 months in the year. The depressional areas are ponded for 6 to 12 months during most years. Slopes are 0 to 2 percent.

The Plummer soils are geographically associated with Albany, Ocilla, Pelham, Sapelo, and Surrency soils. Albany and Ocilla soils are better drained than the

Plummer soils. Ocilla, Pelham, and Surrency soils have a Bt horizon between depths of 20 and 40 inches. Sapelo soils are in similar positions on the landscape as the Plummer soils but have a Bh horizon.

Typical pedon of Plummer sand; 1 mile south of Interstate Highway 10, 520 feet east of secondary road 360, NW¼NE¼ sec. 17, T. 1 S., R. 9 E.

Ap—0 to 7 inches; very dark gray (10YR 3/1) sand; weak medium granular structure; very friable; many fine and very fine roots; many uncoated sand grains; very strongly acid; abrupt smooth boundary.

AE—7 to 14 inches; dark grayish brown (10YR 4/2) sand; weak fine granular structure and weak fine subangular blocky; very friable; many medium and fine roots; strongly acid; gradual wavy boundary.

E1—14 to 22 inches; light brownish gray (10YR 6/2) sand; single grained; loose; few fine roots; strongly acid; gradual wavy boundary.

E2—22 to 43 inches; light gray (10YR 7/2) sand; common medium faint light gray (10YR 7/1) and few fine distinct brownish yellow (10YR 6/8) mottles; single grained; loose; few fine roots; strongly acid; gradual wavy boundary.

E3—43 to 52 inches; white (10YR 8/2) sand; many medium faint white (10YR 8/1) mottles; single grained; loose; medium acid; gradual wavy boundary.

BE—52 to 57 inches; light gray (10YR 7/2) loamy sand; few medium distinct brown (7.5YR 5/2) and strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable; medium acid; gradual wavy boundary.

Btg1—57 to 63 inches; light brownish gray (10YR 6/2) fine sandy loam; common fine prominent yellowish red (5YR 4/6) and common medium distinct brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; friable; many very fine interstitial pores; strongly acid; gradual wavy boundary.

Btg2—63 to 80 inches; light brownish gray (10YR 6/2) fine sandy loam; many medium distinct yellowish brown (10YR 5/6) and common fine prominent reddish brown (5YR 4/4) mottles; moderate medium subangular blocky structure; friable; common fine and very fine pores; thick continuous clay skins on faces of peds; very strongly acid.

Reaction ranges from very strongly acid to medium acid.

The Ap or A horizon has hue of 10YR. It has value of 2 to 4 and chroma of 1 or value of 3 or 4 and chroma of 2. It is 3 to 12 inches thick. Texture is sand but can be fine sand or loamy sand.

The E horizon has hue of 10YR, value of 6 to 8, and chroma of 1 or 2. It is 28 to 60 inches thick. Texture is sand but can be fine sand or loamy sand.

Depth to the Btg horizon ranges from 40 to 70 inches. This horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. Mottles are few to many and are strong brown, yellowish brown, brownish yellow, and yellow. Texture is fine sandy loam or sandy clay loam. Pockets of contrasting texture are in some pedons.

Some pedons have a C horizon, which has hue of 10YR, value of 6 to 8, and chroma of 1 or 2. Texture is fine sand or loamy sand, which extends to a depth of 80 inches or more.

Sapelo Series

The soils in the Sapelo series are sandy, siliceous, thermic Ultic Haplaquods. They are poorly drained and are moderately permeable. The Sapelo soils formed in sandy or loamy marine sediment on the flatwoods and in areas bordering swamps and depressions. The water table is at a depth of 6 to 18 inches for 1 to 6 months during most years. In some places, it is at or above the surface for brief periods and recedes to a depth of more than 40 inches during dry periods in most years. Slopes are 0 to 2 percent.

The Sapelo soils are geographically associated with Albany, Ocilla, Pamlico, Plummer, Pelham, and Surrency soils. These associated soils do not have a spodic horizon. Albany and Ocilla soils are in slightly higher positions on the landscape than the Sapelo soils. They are on low knolls and ridges on or bordering the flatwoods. They have a water table at a greater depth than the Sapelo soils. Ocilla soils have an argillic horizon within 40 inches of the surface. Pamlico, Plummer, and Surrency soils are in depressions or poorly defined drainageways. They have a water table at or above the surface for prolonged periods. Also, Pamlico soils are organic and consist of 16 to 51 inches of partially decomposed material. Pelham soils are in the same positions on the landscape as the Sapelo soils. They have a loamy subsoil within 40 inches of the surface.

Typical pedon of Sapelo sand; on Hike Lake Road, 0.5 mile southeast from the junction of Live Oak Road and Hike Lake Road, 25 feet southwest of road, SW¼NE¼ sec. 35, T. 1 S., R. 8 E.

A—0 to 6 inches; very dark gray (10YR 3/1) sand; single grained; loose; many fine and few medium roots; very strongly acid; gradual smooth boundary.

E—6 to 11 inches; gray (10YR 6/1) sand; single grained; loose; common fine roots; very strongly acid; abrupt wavy boundary.

Bh1—11 to 13 inches; black (10YR 2/1) sand; moderate medium granular structure; weakly cemented; friable; common fine roots; very strongly acid; clear wavy boundary.

Bh2—13 to 16 inches; very dark brown (10YR 2/2) sand; weak medium granular structure; very friable; few fine roots; very strongly acid; clear wavy boundary.

Bh3—16 to 20 inches; dark brown (10YR 3/3) sand; weak fine granular structure; very friable; very strongly acid; gradual wavy boundary.

E'1—20 to 28 inches; light gray (10YR 7/2) sand; common dark yellowish brown (10YR 3/4) streaks and pockets; single grained; loose; very strongly acid; gradual wavy boundary.

E'2—28 to 68 inches; light gray (10YR 7/1) sand; few yellowish brown (10YR 5/4) streaks; single grained; loose; very strongly acid; clear smooth boundary.

Btg—68 to 80 inches; light gray (10YR 7/1) sandy clay loam; weak medium subangular blocky structure; very strongly acid.

Reaction ranges from extremely acid to strongly acid. Depth to the Bh horizon is 10 to 30 inches, and depth to the Bt horizon is 40 to 70 inches.

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 2 to 4. It is 3 to 7 inches thick. Texture is mainly sand but can be fine sand.

The E horizon has hue of 10YR. It has value of 5 or 6 and chroma of 1 or 2 or value of 7 or 8 and chroma of 1. It is 3 to 16 inches thick. Texture is sand or fine sand.

The Bh horizon has hue of 10YR. It has value of 2 or 3 and chroma of 1 or 2 or value of 3 and chroma of 3. It is 5 to 16 inches thick. Texture is sand, fine sand, or loamy fine sand.

Some horizons have a Bw horizon, which has hue of 10YR, value of 3 to 5, and chroma of 3 or 4. It is as much as 19 inches thick.

The E' horizon has hue of 10YR. It has value of 5 or 6 and chroma of 2 or 3 or value of 7 and chroma of 1 to 4. It is 13 to 48 inches thick. Texture is sand or fine sand.

The Btg horizon has hue of 10YR, value of 6 or 7, and chroma of 1 or 2. It is mottled in shades of red, yellow, brown, and gray. Texture is sandy loam to sandy clay loam. Some pedons have a clayey texture below a depth of 60 inches.

Surrency Series

The soils in the Surrency series are loamy, siliceous, thermic Arenic Umbric Paleaquults. They are very poorly drained. Permeability is moderate and moderately rapid. The Surrency soils formed in marine or fluvial deposits of loamy material. They are along upland drainageways and in depressions on the flatwoods. The water table is at the surface for long periods, and ponding is common. Slopes are less than 1 percent.

The Surrency soils are geographically associated with Albany, Ocilla, Pelham, and Plummer soils. The associated soils do not have a thick, dark surface layer. Albany and Ocilla soils are somewhat poorly drained. Pelham and Plummer soils are poorly drained. Plummer soils have a sandy surface layer that is 40 inches or more thick.

Typical pedon of Surrency loamy sand, in an area of Plummer and Surrency soils, depressional; 1.3 miles north of U.S. Highway 90, 1.7 miles west of Still Road on a powerline right-of-way, NE¼NE¼NW¼ sec. 10, T. 1 N., R. 8 E.

A—0 to 10 inches; black (10YR 2/1) loamy sand; moderate fine granular structure; friable; many fine and few medium roots; extremely acid; clear wavy boundary.

E1—10 to 14 inches; dark grayish brown (10YR 4/2) loamy sand; weak fine granular structure; very friable; common fine roots; extremely acid; clear wavy boundary.

E2—14 to 32 inches; light brownish gray (10YR 6/2) sand; weak fine granular structure; very friable; common fine roots; extremely acid; clear wavy boundary.

Btg—32 to 80 inches; gray (10YR 5/1) sandy clay loam; few medium distinct dark grayish brown (10YR 4/2) mottles; moderate medium subangular blocky structure; few fine and medium roots; very strongly acid.

Reaction ranges from strongly acid to extremely acid.

The A horizon has hue of 10YR, value 2 or 3, and chroma of 1, or it is neutral and has value of 2. It is 10 to 14 inches thick. Texture is mainly loamy sand but can be sand.

The E horizon has a hue of 10YR, value of 4 to 6, and chroma of 1 or 2. It is 15 to 24 inches thick. Texture is loamy sand or sand.

The Btg horizon has hue of 10YR, value 5 to 7, and chroma of 1 or 2. It has few medium distinct mottles in shades of brown. Texture is sandy clay loam or sandy loam.

Troup Series

The soils in the Troup series are loamy, siliceous, thermic Grossarenic Paleudults. They are well drained and are moderately permeable. The Troup soils formed in sandy or loamy marine sediment mainly on the Coastal Plain uplands. The water table is below a depth of 72 inches. Slopes range from 0 to 8 percent.

The Troup soils are geographically associated with Alaga, Albany, Blanton, Bonifay, Lakeland, and Lucy soils. Alaga and Lakeland soils do not have a Bt horizon. Albany and Blanton soils are poorly drained. Bonifay soils have a subhorizon, which has more than 5 percent plinthite within 60 inches of the surface. Lucy soils have a sandy A horizon 20 to 40 inches thick.

Typical pedon of Troup sand, 0 to 5 percent slopes; 3 miles north of Florida Highway 6, 75 feet west of secondary road 255, SE¼SE¼NE¼ sec. 3, T. 1 N., R. 10 E.

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

E1—8 to 18 inches; dark yellowish brown (10YR 4/4) sand; weak fine granular structure; very friable; few medium and fine roots; strongly acid; clear wavy boundary.

E2—18 to 35 inches; yellowish brown (10YR 5/6) sand; weak medium subangular blocky structure parting to weak fine granular; very friable; few medium and fine roots; strongly acid; gradual wavy boundary.

E3—35 to 68 inches; yellowish brown (10YR 5/8) sand; common coarse distinct pockets of very pale brown (10YR 8/3) uncoated sand grains; weak medium subangular blocky structure parting to weak fine granular; very friable; few medium roots; strongly acid; gradual wavy boundary.

BE—68 to 74 inches; strong brown (7.5YR 5/8) loamy sand; weak fine subangular blocky structure; friable; very strongly acid; gradual wavy boundary.

Bt—74 to 80 inches; strong brown (7.5YR 5/8) sandy clay loam; common coarse prominent red (2.5YR 5/8) mottles; strong medium subangular blocky structure; friable; few thin patchy clay films on faces of peds; very strongly acid.

Reaction is strongly acid or very strongly acid.

The A horizon has hue 10YR, value of 3 or 4, and chroma of 2 or 3. It is 3 to 8 inches thick. Texture is mainly sand or fine sand but can be loamy sand.

The E horizon has hue of 10YR, value of 4 or 5, and chroma of 4 to 8. It is 32 to 65 inches thick. Texture is fine sand, sand, or loamy sand.

The BE horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 6 to 8. Some pedons do not have a BE horizon.

The Bt horizon has hue 7.5YR, value of 4 or 5, and chroma of 4 or hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 6 to 8. It extends to a depth of 80 inches or more. Texture is sandy loam or sandy clay loam.

Formation of the Soils

This section describes the factors of soil formation and relates them to morphology of formation of the soils in Madison County and explains the processes of soil formation.

Factors of Soil Formation

Soil is formed when parent material, climate, relief, plants and animals, and time interact. These five factors determine the nature of the soil and affect the formation of each soil, but the relative importance of each factor differs from place to place. In some areas, one factor may dominate in the formation of a soil and determine most of the soil properties. For example, if the parent material is pure quartz sand, which is highly resistant to weathering, the soil generally has a faint horizon. A distinct profile can form in such soils if the vegetation is of certain types, relief is low and flat, and the water table is high.

Parent Material

Parent material is the unconsolidated mass from which a soil is formed. It determines the chemical and mineral composition of a soil. In Madison County, the parent material is sandy or loamy marine sediment.

Differences in parent material in the county are mainly the result of the way the sand, silt, and clay were sorted and deposited by the ocean and streams of the Pleistocene epoch.

The soils on the uplands of Madison County were mainly formed in the Miccosukee Formation. They are characterized by the sandy and clayey soils on the rolling hills in the northern and northwestern parts of the county. These soils are often varicolored and frequently crossbedded with thin lamellae of white to light gray clay. The Miccosukee Formation can be observed in numerous road cuts throughout the northern part of the county. Esto and Nankin soils are examples of soils derived from this formation.

The soils on the Gulf Coastal Lowlands in the southern part of the county were formed in Pliocene age and Pleistocene age sediments. These sediments are mainly quartz sand underlain by loamy lenses. Plummer and Sapelo soils are examples of the Gulf Coastal Lowlands soils in southern Madison County.

Climate

Climate, particularly temperature and rainfall, mostly determines the rate and nature of the physical, chemical, and biological processes that affect the weathering of soil material. Rainfall, changing temperatures, wind, and sun help to advance the breakdown of rocks and minerals, the release of chemicals, and other processes that affect the development of the soils. The amount of water that percolates through the soil depends on rainfall, relative humidity, soil permeability, and physiographic position. Temperature influences the kinds of organisms and their growth and the speed of physical and chemical reactions in the soils.

Madison County has a warm, humid climate characterized by long, hot summers and short, mild winters. The soils are generally low in bases because most of the rainfall percolates through the soil and moves downward. The climate is uniform throughout the county and has had about the same effect on soil development in all parts of the county. The soils in this county are mostly highly weathered, leached, strongly acid, and low in natural fertility and in content of organic matter.

Relief

Relief has mainly affected the formation of soils in the county through its influence on soil-water relationships and through its effect on erosion. Other factors of soil formation that are generally associated with relief, such as temperature and plant cover, are of minor importance.

The general relief areas in the county are the flatwoods, broad swamps, sand hills, rolling uplands, and flood plains. The differences in soils in these areas are directly related to relief.

The soils in the swamps and on the flatwoods have a high water table and are periodically wet at the surface. These soils are not as highly leached as those on the sand flats, such as Alpin soils, which are deep, sandy soils that are subject to droughtiness. The soils on the rolling uplands, such as Orangeburg soils, are mostly loamy and are subject to erosion. The soils on the flood plains, such as Eunola soils, are subject to flooding and prolonged wetness.

The most prominent examples of relief affecting soil formation are at San Pedro Bay and Hixtown Swamp. These areas are large depressions that have few or no outlets and have a water table at or above the surface most of the time. This prolonged saturation and the partly decomposed organic matter prevent rapid oxidation and weathering of the soils.

Plants and Animals

Plants, animals, bacteria, and other organisms are active in the soil-forming processes. The changes they bring about depend on the kind of life processes peculiar to each. The kinds of plants and animals that live on and in the soil are affected, in turn, by climate, parent material, relief, and the age of the soil.

Plants provide a cover that reduces erosion and stabilizes the surface so that the soil-forming processes can continue. The leaves, twigs, roots, and entire plants that accumulate on the surface and in the soil under forest are decomposed by percolating water, micro-organisms, earthworms, and other forms of life.

Small animals, earthworms, insects, and micro-organisms also influence the formation of soils by mixing organic matter into the soil and by breaking down plant residue. Small animals burrow into the soils, thus mixing the layers. Earthworms and other small invertebrates feed on the organic matter in the upper few inches of the soil. They slowly but continuously mix the soil material and alter it chemically in some places. Bacteria, fungi, and other micro-organisms hasten the weathering of rocks and the decomposition of organic matter.

Time

Time is an important factor in soil formation. The physical and chemical changes brought about by climate, living organisms, and relief are slow. The length of time needed to convert raw, geologic material into soil varies according to the nature of the geologic material and the influence of the other factors. Some minerals from which soils are formed weather fairly rapidly, but others are chemically inert and show little change over long periods. The processes of translocation of fine particles in the soil to form horizons vary under different conditions, but these processes always take a relatively long time.

In Madison County, the dominant geologic materials are inactive. The sand is almost pure quartz and is highly resistant to weathering. The finer textured silt and clay are the products of earlier weathering. The limestone material erodes relatively fast, resulting in the formation of sinkholes.

Relatively little geological time has elapsed since the soil material in the county was laid down by the sea. The loamy and clayey horizons formed in place through processes of clay translocation. Coherent subsurface horizons stained by organic matter formed in place where surface organic matter and minerals were leached through the soils and settled at a point of equilibrium.

Processes of Horizon Differentiation

Soil morphology refers to the process involved in the formation of a soil horizon, or soil horizon differentiation. The differentiation of horizons in soils in Madison County is the result of the accumulation of organic matter, leaching of carbonates, reduction and transfer of iron, or accumulation of silicate clay minerals. Sometimes more than one of these processes is involved.

Some organic matter has accumulated in the upper part of most of the soils to form an A horizon. The content of organic matter is low in some of the soils and high in others.

Leaching of carbonates and salts has occurred in nearly all of the soils. The effects of leaching have been indirect because leaching permitted the subsequent translocation of silicate clay materials in some soils. Most of the soils in the county are leached to varying degrees.

The reduction and transfer of iron has occurred in most of the soils in the county except the organic soils. In some of the wet soils, iron has been segregated in the deeper horizons to form reddish brown mottles and concretions.

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Glossary

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well-aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Alkali (sodic) soil. Soil having so high a degree of alkalinity (pH 8.5 or higher), or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

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.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

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.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

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-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.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard compacted layers to a depth below normal plow depth.

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, i.e., clay coating, clay skin.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

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.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

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.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

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.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

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 flood plains and Coastal Plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, such as fire, that exposes the surface.

Excess lime (in tables). Excess carbonates in the soil restrict the growth of some plants.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grains are grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fast intake (in tables). The movement of water into the soil is rapid.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fine textured soil. Sandy clay, silty clay, and clay.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant that is not a grass or a sedge.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual*. The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is, in part, a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as accumulation of clay, sesquioxides, humus, or a combination of these; prismatic or blocky structure; redder or browner colors than those in the A horizon; or a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Arabic numeral 2 precedes the letter C.

R layer.—Consolidated rock (unweathered bedrock) beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

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

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

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

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake in inches per hour is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Karst (topography). The relief of an area underlain by limestone that dissolves in differing degrees, thus forming numerous depressions or small basins.

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

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. The soil is not strong enough to support loads.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permeability. The quality of the soil that enables water to move through the profile. Permeability is measured as the number of inches per hour that water moves through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Subsurface tunnels or pipelike cavities are formed by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor filter (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poor outlets (in tables). In these areas, surface or subsurface drainage outlets are difficult or expensive to install.

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

Reaction, soil. A measure of the acidity or alkalinity of a soil expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are—

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

Relief. The elevations or inequalities of a land surface, considered collectively.

Rooting depth (in tables). There is a shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

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

Sinkhole. A depression on the landscape where limestone has been dissolved.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

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

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in organic matter content than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed on the contour or at a slight angle to the contour across sloping soils. The terrace intercepts surface runoff, so that water soaks into the soil or flows slowly to a prepared outlet.

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

Thin layer (in tables). An otherwise suitable soil material that is too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Toxicity (in tables). An excessive amount of toxic substances in the soil, such as sodium or sulfur, severely hinders the establishment of vegetation or severely restricts plant growth.

Variegation. Refers to patterns of contrasting colors that are assumed to be inherited from the parent material rather than to be the result of poor drainage.

Weathering. All physical and chemical changes produced by atmospheric agents in rocks or other deposits at or near the earth's surface. These changes result in disintegration and decomposition of the material.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Recorded in the period 1951-80 at Madison, Florida]

Month	Temperature					Precipitation		
	Average daily maximum	Average daily minimum	Average daily	Mean number of days with temperatures of--		Average	Mean number of days with rainfall of--	
				90° F or higher	32° F or lower		.10 inch or more	1.00 inch or more
	°F	°F				In		
January	64.0	42.1	53.0	0	6	4.13	6	1
February	67.0	43.9	55.4	0	4	4.12	5	1
March	74.2	50.2	62.2	0	1	4.73	5	1
April	87.6	63.2	75.4	2	1	3.66	4	0
May	87.6	63.2	75.4	12	0	3.88	4	0
June	91.3	68.4	79.9	20	0	5.26	7	1
July	92.1	71.0	81.5	25	0	6.51	10	1
August	91.7	70.8	81.3	23	0	5.77	8	1
September	88.4	67.9	78.2	15	0	5.23	7	1
October	80.9	57.6	69.2	1	0	2.34	3	0
Novemver	72.1	49.0	66.6	0	1	2.86	4	0
December	65.2	42.8	54.0	0	5	3.65	5	0
Yearly:								
Average	79.7	57.0	68.4	98	17	52.09	68	7
Extreme	---	---	---	102	7	62.00	---	---

TABLE 2.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
2	Albany sand, 0 to 5 percent slopes	39,500	8.70
3	Alpin sand, 0 to 2 percent slopes	29,021	6.40
5	Blanton sand, 0 to 5 percent slopes	69,176	15.20
6	Blanton sand, 5 to 8 percent slopes	3,558	0.80
10	Lakeland sand, 0 to 5 percent slopes	4,161	0.92
11	Lakeland sand, 5 to 8 percent slopes	876	0.19
13	Lucy sand, 2 to 5 percent slopes	6,617	1.45
14	Lucy sand, 5 to 8 percent slopes	3,532	0.78
15	Mascotte sand	3,485	0.77
16	Orangeburg loamy sand, 2 to 5 percent slopes	2,467	0.54
17	Orangeburg loamy sand, 5 to 8 percent slopes	2,002	0.44
18	Orangeburg loamy sand, 8 to 12 percent slopes	308	0.07
21	Cantey fine sandy loam	1,268	0.28
22	Pelham sand	5,888	1.30
23	Plummer sand	25,299	5.55
26	Troup sand, 0 to 5 percent slopes	6,001	1.32
27	Troup sand, 5 to 8 percent slopes	3,684	0.80
28	Chipley fine sand, 0 to 5 percent slopes	3,059	0.67
30	Ocilla sand, 0 to 5 percent slopes	15,042	3.31
34	Sapelo sand	16,911	3.72
38	Goldsboro loamy sand, 2 to 5 percent slopes	685	0.15
48	Plummer and Surrency soils, depressional	38,366	8.44
53	Bonifay fine sand, 0 to 5 percent slopes	5,453	1.20
55	Esto fine sandy loam, 2 to 5 percent slopes	9,132	2.01
56	Nankin loamy sand, 5 to 8 percent slopes	7,806	1.71
57	Nankin sandy loam, 8 to 12 percent slopes, eroded	1,216	0.27
58	Fuquay sand, 2 to 5 percent slopes	2,308	0.51
61	Alaga loamy sand, 0 to 5 percent slopes	6,309	1.39
62	Alaga loamy sand, 5 to 8 percent slopes	1,594	0.35
63	Alaga loamy sand, 8 to 12 percent slopes	220	0.05
64	Alaga loamy sand, moderately wet, 0 to 5 percent slopes	4,171	0.92
65	Lovett sand, 0 to 5 percent slopes	19,792	4.35
66	Lovett sand, 5 to 8 percent slopes	4,569	1.00
67	Udorthents, loamy	1,228	0.28
71	Faceville loamy fine sand, 2 to 5 percent slopes	1,630	0.36
72	Faceville loamy fine sand, 5 to 8 percent slopes	1,609	0.35
74	Dorovan and Pamlico soils, depressional	85,569	18.81
77	Surrency, Plummer, and Cantey soils, frequently flooded	6,811	1.50
78	Alpin fine sand, occasionally flooded	3,920	0.86
79	Eunola fine sand, occasionally flooded	3,544	0.78
80	Kenansville loamy fine sand, occasionally flooded	3,365	0.74
	Water areas less than 40 acres in size	3,466	0.76
	Total	454,618	100.00

TABLE 3.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Soil name and map symbol	Land capability	Tobacco	Corn	Wheat	Soybeans	Watermelons	Bahiagrass	Improved bermudagrass
		Lbs	Bu	Bu	Bu	Tons	AUM*	AUM*
2---------------- Albany	IIIe	2,100	75	---	20	---	6.5	7.0
3---------------- Alpin	IVs	1,500	---	---	---	4.4	7.0	8.0
5---------------- Blanton	IIIs	2,400	60	---	25	12.0	6.5	8.0
6---------------- Blanton	IVs	---	---	---	---	---	---	---
10--------------- Lakeland	IVs	1,700	55	---	20	---	7.0	7.0
11--------------- Lakeland	VIs	---	---	---	---	---	6.5	6.5
13--------------- Lucy	IIs	2,800	80	---	33	---	8.5	8.0
14--------------- Lucy	IIIs	2,500	70	---	25	---	8.5	7.5
15--------------- Mascotte	IVw	---	50	---	20	5.0	8.0	---
16--------------- Orangeburg	IIe	3,000	---	---	45	---	8.5	10.5
17--------------- Orangeburg	IIIe	2,700	95	---	35	---	8.0	10.0
18--------------- Orangeburg	IVe	2,000	85	---	30	---	7.0	9.0
21--------------- Cantey	VIw	---	---	---	---	---	---	---
22--------------- Pelham	Vw	---	---	---	---	---	---	---
23--------------- Plummer	IVw	---	---	---	---	---	5.0	6.0
26--------------- Troup	IIIs	---	60	---	25	---	7.2	7.5
27--------------- Troup	IVs	---	55	---	22	---	7.0	7.3
28--------------- Chipley	IIIs	2,000	50	---	20	5.0	7.5	8.0
30--------------- Ocilla	IIIw	2,600	75	39	35	---	7.5	8.5

See footnote at end of table.

TABLE 3.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Tobacco	Corn	Wheat	Soybeans	Watermelons	Bahiagrass	Improved bermudagrass
		Lbs	Bu	Bu	Bu	Tons	AUM*	AUM*
34-------------- Sapelo	IVw	---	50	26	20	---	7.5	---
38-------------- Goldsboro	IIe	2,900	115	60	38	---	---	---
48-------------- Plummer and Surrency	Vw	---	---	---	---	---	---	---
53-------------- Bonifay	IIIs	2,000	50	26	24	---	7.2	7.5
55-------------- Esto	IIIe	2,200	50	---	35	---	6.0	6.0
---------------- Nankin	IIIe	2,000	55	26	35	---	6.0	7.0
57-------------- Nankin	VIe	---	---	26	30	---	5.5	5.0
58-------------- Fuquay	IIs	2,400	85	41	30	---	---	---
61-------------- Alaga	IIIs	---	60	45	30	---	7.0	7.5
62-------------- Alaga	IVs	---	55	45	27	---	7.0	7.5
63-------------- Alaga	VIs	---	---	---	---	---	6.5	6.5
64-------------- Alaga	IIIs	2,800	80	50	40	---	---	8.0
65-------------- Lovett	IIs	---	60	40	32	---	8.0	7.0
66-------------- Lovett	IIIe	---	55	30	28	---	7.0	7.0
67. Udorthents								
71-------------- Faceville	IIe	---	115	---	45	---	7.0	10.0
72-------------- Faceville	IIIe	---	85	---	25	---	6.5	9.5
74-------------- Dorovan and Pamlico	---	---	---	---	---	---	---	---
77-------------- Surrency, Plummer, and Cantey	VIw	---	---	---	---	---	5.0	6.0

See footnote at end of table.

TABLE 3.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Tobacco	Corn	Wheat	Soybeans	Watermelons	Bahiagrass	Improved bermudagrass
		Lbs	Bu	Bu	Bu	Tons	AUM*	AUM*
78-------------- Alpin	IVs	---	---	---	---	---	8.0	5.0
79-------------- Eunola	IIw	---	90	---	30	---	---	---
80-------------- Kenansville	IIs	2,400	85	---	---	---	---	---

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

TABLE 4.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
2 Albany	9W	Slight	Moderate	Moderate	Slight	Moderate	Loblolly pine	95	9	Loblolly pine, slash pine.
							Slash pine	85	11	
							Longleaf pine	80	7	
3 Alpin	10S	Slight	Moderate	Moderate	Slight	Slight	Slash pine	80	10	Slash pine, longleaf pine.
							Loblolly pine	85	8	
							Longleaf pine	70	6	
							Turkey oak	---	---	
							Post oak	---	---	
							Blackjack oak	---	---	
							Bluejack oak	---	---	
5, 6 Blanton	11S	Slight	Moderate	Moderate	Slight	Slight	Slash pine	90	11	Slash pine, loblolly pine, longleaf pine.
							Loblolly pine	80	8	
							Longleaf pine	70	6	
							Bluejack oak	---	---	
							Turkey oak	---	---	
							Southern red oak	---	---	
							Live oak	---	---	
10, 11 Lakeland	10S	Slight	Moderate	Moderate	Slight	Slight	Slash pine	80	10	Slash pine, loblolly pine.
							Loblolly pine	80	8	
							Longleaf pine	65	5	
							Turkey oak	---	---	
							Blackjack oak	---	---	
							Post oak	---	---	
13, 14 Lucy	8S	Slight	Moderate	Moderate	Slight	Moderate	Loblolly pine	80	8	Slash pine, longleaf pine, loblolly pine.
							Longleaf pine	70	6	
15 Mascotte	10W	Slight	Moderate	Moderate	Slight	Moderate	Slash pine	80	10	Slash pine, loblolly pine.
							Loblolly pine	80	8	
							Longleaf pine	70	6	
16, 17, 18 Orangeburg	8A	Slight	Slight	Slight	--------	--------	Loblolly pine	80	8	Slash pine, loblolly pine.
							Slash pine	86	11	
							Longleaf pine	77	7	
21 Cantey	8W	Slight	Severe	Severe	Slight	Severe	Sweetgum	95	8	Sweetgum.
							Water oak	---	---	

See footnotes at end of table.

TABLE 4.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns					Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Productivity class*	
22 Pelham	11W	Slight	Severe	Severe	--------	--------	Slash pine	90	11	Slash pine, loblolly pine.
							Loblolly pine	90	9	
							Longleaf pine	80	7	
							Sweetgum	80	6	
							Blackgum	80	8	
							Water oak	80	5	
23 Plummer	11W	Slight	Severe	Severe	--------	--------	Slash pine	88	11	Loblolly pine, slash pine.
							Loblolly pine	91	9	
							Longleaf pine	70	6	
26, 27 Troup	8S	Slight	Slight	Moderate	Slight	Moderate	Loblolly pine	82	8	Loblolly pine, longleaf pine.
							Longleaf pine	74	6	
28 Chipley	11S	Slight	Moderate	Slight	Slight	Moderate	Slash pine	90	11	Slash pine, loblolly pine.
							Loblolly pine	90	9	
							Longleaf pine	80	7	
							Post oak	---	---	
							Turkey oak	---	---	
							Blackjack oak	---	---	
30 Ocilla	8W	Slight	Moderate	Moderate	--------	--------	Loblolly pine	85	8	Loblolly pine, slash pine.
							Slash pine	90	11	
							Longleaf pine	77	7	
34 Sapelo	7W	Slight	Moderate	Moderate	--------	--------	Loblolly pine	77	7	Loblolly pine, slash pine.
							Slash pine	77	10	
							Longleaf pine	65	5	
38 Goldsboro	9W	Slight	Moderate	Slight	--------	--------	Loblolly pine	90	9	Loblolly pine, slash pine, yellow poplar, American sycamore, sweetgum.
							Longleaf pine	77	7	
							Slash pine	93	12	
							Sweetgum	90	7	
							Southern red oak	---	---	
							White oak	---	---	
							Water oak	---	---	
							Yellow poplar	---	---	
48:										
Plummer	7W	Slight	Severe	Severe	--------	--------	Baldcypress	108	7	
							Pond pine	60	---	
							Swamp tupelo	---	---	

See footnotes at end of table.

TABLE 4.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
48: Surrency	7W	Slight	Severe	Severe	Slight	Severe	Baldcypress	108	7	**
							Sweetgum	90	7	
							Blackgum	---	---	
							Water oak	---	---	
							Cypress	---	---	
							Water tupelo	---	---	
53: Bonifay	10S	Slight	Moderate	Moderate	Slight	Moderate	Slash pine	80	10	Slash pine, loblolly pine, longleaf pine.
							Longleaf pine	65	5	
							Loblolly pine	80	8	
							Post oak	---	---	
							Blackjack oak	---	---	
							Turkey oak	---	---	
55: Esto	8A	Slight	Slight	Slight	Slight	Moderate	Loblolly pine	82	8	Loblolly pine, slash pine, longleaf pine.
							Longleaf pine	66	5	
							Slash pine	82	10	
56, 57: Nankin	8A	Slight	Slight	Slight	Slight	Moderate	Loblolly pine	80	8	Loblolly pine, slash pine.
							Slash pine	80	10	
							Longleaf pine	70	6	
58: Fuquay	8S	Slight	Moderate	Moderate	--------	--------	Loblolly pine	83	8	Longleaf pine.
							Longleaf pine	67	5	
61, 62, 63: Alaga	8S	Slight	Moderate	Moderate	Slight	Moderate	Loblolly pine	80	8	Slash pine, loblolly pine.
							Longleaf pine	70	6	
							Slash pine	80	10	
64: Alaga	8S	Slight	Moderate	Moderate	Slight	Moderate	Loblolly pine	80	8	Loblolly pine.
							Longleaf pine	70	6	
65, 66: Lovett	12S	Slight	Moderate	Moderate	Slight	Moderate	Slash pine	91	12	Slash pine, loblolly pine.
							Loblolly pine	90	9	
							Laurel oak	---	---	
							Live oak	---	---	
							Water oak	---	---	
							Sweetgum	---	---	
							Black cherry	---	---	
71, 72: Faceville	8A	Slight	Slight	Slight	--------	--------	Loblolly pine	82	8	Loblolly pine, slash pine.
							Slash pine	80	10	
							Longleaf pine	65	5	

See footnotes at end of table.

TABLE 4.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns					Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Productivity class*	
74:										
Dorovan	7W	Slight	Severe	Severe	---	---	Blackgum	70	7	**
							Sweetbay	---	---	
							Baldcypress	---	---	
							Swamp tupelo	---	---	
							Green ash	---	---	
							Red maple	---	---	
							Water tupelo	---	---	
Pamlico	4W	Slight	Severe	Severe	Severe	Severe	Pond pine	55	---	**
							Baldcypress	---	---	
							Water tupelo	---	---	
77:										
Surrency	10W	Slight	Severe	Severe	Slight	Severe	Loblolly pine	95	10	**
							Slash pine	90	11	
							Sweetgum	90	7	
							Blackgum	---	---	
							Water oak	---	---	
							Baldcypress	---	---	
							Water tupelo	---	---	
Plummer	11W	Slight	Severe	Severe	---	---	Slash pine	88	11	**
							Loblolly pine	91	9	
							Longleaf pine	70	6	
Cantey	8W	Slight	Severe	Severe	Slight	Severe	Sweetgum	95	8	Sweetgum.
							Water oak	---	---	
78 Alpin	10S	Slight	Moderate	Moderate	Slight	Slight	Slash pine	80	10	Slash pine, longleaf pine.
							Loblolly pine	85	8	
							Longleaf pine	70	6	
							Turkey oak	---	---	
							Post oak	---	---	
							Blackjack oak	---	---	
							Bluejack oak	---	---	
79 Eunola	9W	Slight	Moderate	Slight	Slight	Moderate	Loblolly pine	90	9	Loblolly pine, slash pine, sweetgum, yellow poplar.
							Slash pine	90	11	
							Sweetgum	90	7	
80 Kenansville	8S	Slight	Moderate	Moderate	---	---	Loblolly pine	80	8	Loblolly pine, slash pine.
							Longleaf pine	65	5	

* Productivity class is the yield in cubic meters per hectare per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

** Trees are generally not grown for commercial purposes because of flooding or extended wetness.

TABLE 5.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
2 Albany	Severe: wetness.	Severe: too sandy.	Severe: too sandy, wetness.	Severe: too sandy.	Severe: droughty.
3 Alpin	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty, too sandy.
5 Blanton	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
6 Blanton	Severe: too sandy.	Severe: too sandy.	Severe: too sandy, slope.	Severe: too sandy.	Severe: droughty.
10 Lakeland	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty, too sandy.
11 Lakeland	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Moderate: droughty, too sandy.
13 Lucy	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty, too sandy.
14 Lucy	Slight	Slight	Severe: slope.	Slight	Moderate: droughty.
15 Mascotte	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness.
16 Orangeburg	Slight	Slight	Moderate: slope.	Slight	Slight.
17 Orangeburg	Slight	Slight	Severe: slope.	Slight	Slight.
18 Orangeburg	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
21 Cantey	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
22 Pelham	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
23 Plummer	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
26 Troup	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty.

TABLE 5.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
27-------------------- Troup	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Moderate: droughty.
28-------------------- Chipley	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
30-------------------- Ocilla	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: wetness, droughty, too sandy.
34-------------------- Sapelo	Severe: too sandy, wetness.	Severe: too sandy, wetness.	Severe: too sandy, wetness.	Severe: too sandy, wetness.	Severe: droughty, wetness.
38-------------------- Goldsboro	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Slight----------	Slight.
48:					
Plummer--------------	Severe: ponding, too sandy.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding, droughty.
Surrency-------------	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
53-------------------- Bonifay	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
55-------------------- Esto	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones, percs slowly.	Slight----------	Slight.
56-------------------- Nankin	Moderate: percs slowly.	Moderate: percs slowly.	Severe: slope.	Slight----------	Slight.
57-------------------- Nankin	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight----------	Moderate: slope.
58-------------------- Fuquay	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty, too sandy.
61-------------------- Alaga	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, too sandy.	Moderate: too sandy.	Moderate: droughty.
62-------------------- Alaga	Moderate: too sandy.	Moderate: too sandy.	Severe: slope.	Moderate: too sandy.	Moderate: droughty.
63-------------------- Alaga	Moderate: slope, too sandy.	Moderate: slope, too sandy.	Severe: slope.	Moderate: too sandy.	Moderate: droughty, slope.
64-------------------- Alaga	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, too sandy.	Moderate: too sandy.	Moderate: droughty.

TABLE 5.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
65 Lovett	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty, too sandy.
66 Lovett	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Moderate: droughty, too sandy.
67. Udorthents					
71 Faceville	Slight	Slight	Moderate: slope.	Slight	Slight.
72 Faceville	Slight	Slight	Severe: slope.	Slight	Slight.
74: Dorovan	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
Pamlico	Severe: flooding, ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
77: Surrency	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: flooding, wetness.
Plummer	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
Cantey		Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
78 Alpin	Severe: too sandy, flooding.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty, too sandy.
79 Eunola	Severe: flooding.	Moderate: wetness.	Moderate: wetness, flooding.	Moderate: wetness.	Moderate: wetness, flooding.
80 Kenansville	Severe: flooding.	Moderate: too sandy.	Moderate: too sandy, flooding.	Moderate: too sandy.	Moderate: droughty, flooding.

TABLE 6.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
2------------------ Albany	Fair	Fair	Fair	Fair	Fair	Fair	Poor	Fair	Fair	Poor.
3------------------ Alpin	Poor	Fair	Fair	Poor	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
5, 6--------------- Blanton	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
10, 11------------- Lakeland	Poor	Fair	Fair	Poor	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
13, 14------------- Lucy	Poor	Fair	Good	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
15----------------- Mascotte	Poor	Fair	Fair	Poor	Fair	Poor	Fair	Fair	Fair	Poor.
16----------------- Orangeburg	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
17, 18------------- Orangeburg	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
21----------------- Cantey	Poor	Poor	Fair	Fair	Fair	Good	Good	Poor	Fair	Good.
22----------------- Pelham	Poor	Poor	Fair	Fair	Fair	Fair	Fair	Poor	Fair	Fair.
23----------------- Plummer	Poor	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair.
26, 27------------- Troup	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
28----------------- Chipley	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
30----------------- Ocilla	Fair	Fair	Good	Fair	Good	Fair	Fair	Fair	Good	Fair.
34----------------- Sapelo	Poor	Fair	Fair	Poor	Fair	Fair	Fair	Fair	Fair	Fair.
38----------------- Goldsboro	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
48:										
Plummer-----------	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Surrency----------	Poor	Poor	Poor	Poor	Poor	Fair	Good	Poor	Poor	Fair.
53----------------- Bonifay	Poor	Fair	Fair	Poor	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.

TABLE 6.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
55----------------- Esto	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
56, 57------------- Nankin	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
58----------------- Fuquay	Fair	Fair	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
61, 62, 63, 64------ Alaga	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
65, 66------------- Lovett	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
67. Udorthents										
71----------------- Faceville	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
72----------------- Faceville	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
74:										
Dorovan-----------	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
Pamlico-----------	Very poor.	Very poor.	Poor	Poor	Poor	Good	Good	Very poor.	Poor	Good.
77:										
Surrency----------	Poor	Poor	Poor	Poor	Poor	Fair	Good	Poor	Poor	Fair.
Plummer-----------	Poor	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair.
Cantey------------	Poor	Poor	Fair	Fair	Fair	Good	Good	Poor	Fair	Good.
78----------------- Alpin	Poor	Fair	Fair	Poor	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
79----------------- Eunola	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
80----------------- Kenansville	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

TABLE 7.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
2----------------- Albany	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Severe: droughty.
3----------------- Alpin	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Severe: droughty, too sandy.
5----------------- Blanton	Severe: cutbanks cave.	Slight---------	Moderate: wetness.	Slight---------	Slight---------	Severe: droughty.
6----------------- Blanton	Severe: cutbanks cave.	Slight---------	Moderate: wetness.	Moderate: slope.	Slight---------	Severe: droughty.
10---------------- Lakeland	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Moderate: droughty, too sandy.
11---------------- Lakeland	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Slight---------	Moderate: droughty, too sandy.
13---------------- Lucy	Moderate: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Moderate: droughty, too sandy.
14---------------- Lucy	Moderate: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Slight---------	Moderate: droughty.
15---------------- Mascotte	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
16---------------- Orangeburg	Slight---------	Slight---------	Slight---------	Slight---------	Slight---------	Slight.
17---------------- Orangeburg	Slight---------	Slight---------	Slight---------	Moderate: slope.	Slight---------	Slight.
18---------------- Orangeburg	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
21---------------- Cantey	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
22---------------- Pelham	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
23---------------- Plummer	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
26---------------- Troup	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Moderate: droughty.

TABLE 7.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
27---------------- Troup	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Slight---------	Moderate: droughty.
28---------------- Chipley	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Severe: droughty.
30---------------- Ocilla	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, droughty, too sandy.
34---------------- Sapelo	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: droughty, wetness.
38---------------- Goldsboro	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Slight.
48:						
Plummer----------	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, droughty.
Surrency---------	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
53---------------- Bonifay	Severe: cutbanks cave.	Slight---------	Moderate: wetness.	Slight---------	Slight---------	Severe: droughty.
55---------------- Esto	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Slight.
------------------ Nankin	Moderate: too clayey.	Slight---------	Slight---------	Moderate: slope.	Slight---------	Slight.
57---------------- Nankin	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
58---------------- Fuquay	Slight---------	Slight---------	Moderate: wetness.	Slight---------	Slight---------	Moderate: droughty, too sandy.
61---------------- Alaga	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Moderate: droughty.
62---------------- Alaga	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Slight---------	Moderate: droughty.
63---------------- Alaga	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
64---------------- Alaga	Severe: cutbanks cave.	Slight---------	Moderate: wetness.	Slight---------	Slight---------	Moderate: droughty.
65---------------- Lovett	Severe: cutbanks cave.	Slight---------	Moderate: wetness.	Slight---------	Slight---------	Moderate: droughty, too sandy.

TABLE 7.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
66 Lovett	Severe: cutbanks cave.	Slight	Moderate: wetness.	Moderate: slope.	Slight	Moderate: droughty, too sandy.
67. Udorthents						
71 Faceville	Moderate: too clayey.	Slight	Slight	Slight	Moderate: low strength.	Slight.
72 Faceville	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
74: Dorovan	Severe: excess humus, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding.	Severe: subsides, ponding. low strength.	Severe: subsides, ponding.	Severe: ponding, excess humus.
Pamlico	Severe: cutbanks cave, excess humus, ponding.	Severe: ponding, low strength.	Severe: ponding.	Severe: ponding, low strength.	Severe: low strength, ponding.	Severe: ponding, excess humus.
77: Surrency	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.
Plummer	Severe: cutbanks cave, wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: wetness, droughty, flooding.
Cantey	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: wetness, flooding.
78 Alpin	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Moderate: droughty, flooding.
79 Eunola	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.	Moderate: wetness, flooding.
80 Kenansville	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: droughty, flooding.

TABLE 8.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
2: Albany	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness, too sandy.	Severe: seepage, wetness.	Poor: too sandy, wetness.
3: Alpin	Slight	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy, seepage.
5: Blanton	Moderate: wetness.	Severe: seepage.	Severe: too sandy.	Severe: seepage.	Poor: too sandy.
6: Blanton	Moderate: wetness.	Severe: seepage, slope.	Severe: too sandy.	Severe: seepage.	Poor: too sandy.
10, 11: Lakeland	Slight	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
13, 14: Lucy	Slight	Severe: seepage.	Slight	Severe: seepage.	Fair: too clayey.
15: Mascotte	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: wetness.	Severe: seepage, wetness.	Poor: wetness, thin layer.
16, 17: Orangeburg	Slight	Moderate: seepage, slope.	Slight	Slight	Good.
18: Orangeburg	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
21: Cantey	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Severe: wetness.	Poor: wetness.
22: Pelham	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness.	Severe: wetness, seepage.	Poor: wetness.
23: Plummer	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: wetness, too sandy.	Severe: seepage, wetness.	Poor: too sandy, wetness.
26, 27: Troup	Slight	Severe: seepage.	Severe: too sandy.	Severe: seepage.	Poor: seepage, too sandy.
28: Chipley	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: too sandy, seepage.
30: Ocilla	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness.	Severe: seepage, wetness.	Fair: wetness.

TABLE 8.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
34----------------- Sapelo	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
38----------------- Goldsboro	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
48:					
Plummer------------	Severe: ponding, poor filter.	Severe: seepage, ponding.	Severe: ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
Surrency-----------	Severe: ponding.	Severe: seepage, ponding.	Severe: ponding, too sandy.	Severe: seepage, ponding.	Poor: too sandy, ponding.
53----------------- Bonifay	Moderate: wetness, percs slowly.	Severe: seepage.	Severe: too sandy.	Severe: seepage.	Poor: too sandy.
55----------------- Esto	Severe: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----------	Fair: too clayey, hard to pack.
56----------------- Nankin	Severe: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----------	Fair: too clayey.
57----------------- Nankin	Severe: percs slowly.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
58----------------- Fuquay	Moderate: percs slowly.	Moderate: slope.	Slight-----------	Slight-----------	Poor: too sandy.
61, 62------------- Alaga	Slight-----------	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
63----------------- Alaga	Slight-----------	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
64----------------- Alaga	Slight-----------	Severe: seepage.	Severe: seepage, wetness, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
65, 66------------- Lovett	Severe: wetness, percs slowly, poor filter.	Severe: seepage.	Severe: too sandy.	Severe: seepage.	Poor: too sandy.
67. Udorthents					
71, 72------------- Faceville	Slight-----------	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----------	Fair: too clayey.

TABLE 8.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
74:					
Dorovan	Severe: subsides, ponding.	Severe: excess humus, ponding.	Severe: seepage, ponding.	Severe: seepage, ponding.	Poor: ponding, excess humus.
Pamlico	Severe: ponding, poor filter.	Severe: seepage, flooding, excess humus.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
77:					
Surrency	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, wetness, too sandy.	Severe: flooding, seepage, wetness.	Poor: too sandy, wetness.
Plummer	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: wetness, too sandy.	Severe: seepage, wetness.	Poor: too sandy, wetness.
Cantey	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Severe: wetness.	Poor: wetness.
78 Alpin	Severe: flooding.	Severe: seepage, flooding.	Severe: seepage, too sandy, flooding.	Severe: seepage, flooding.	Poor: too sandy, seepage.
79 Eunola	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness, thin layer.
80 Kenansville	Severe: flooding, poor filter.	Severe: seepage, flooding.	Severe: flooding, seepage, too sandy.	Severe: flooding, seepage.	Poor: seepage, too sandy.

TABLE 9.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
2 Albany	Fair: wetness.	Improbable: thin layer.	Improbable: excess fines.	Poor: too sandy.
3 Alpin	Good	Probable	Improbable: too sandy.	Poor: too sandy.
5, 6 Blanton	Good	Probable	Improbable: too sandy.	Poor: too sandy.
10, 11 Lakeland	Good	Probable	Improbable: too sandy.	Poor: too sandy.
13, 14 Lucy	Good	Improbable: excess fines, thin layer.	Improbable: excess fines.	Poor: too sandy.
15 Mascotte	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
16, 17 Orangeburg	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
18 Orangeburg	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, too clayey.
21 Cantey	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
22 Pelham	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, wetness.
23 Plummer	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
26, 27 Troup	Good	Probable	Improbable: too sandy.	Poor: too sandy.
28 Chipley	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
30 Ocilla	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.
34 Sapelo	Poor: wetness.	Improbable: excess fines.	Improbable: too sandy.	Poor: too sandy, wetness.
38 Goldsboro	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.

TABLE 9.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
48:				
Plummer	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
Surrency	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, wetness.
53 Bonifay	Good	Probable	Improbable: too sandy.	Poor: too sandy.
55 Esto	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
56, 57 Nankin	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
58 Fuquay	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.
61, 62, 63, 64 Alaga	Good	Probable	Improbable: too sandy.	Poor: too sandy.
65, 66 Lovett	Fair: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.
67. Udorthents				
71, 72 Faceville	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
74:				
Dorovan	Poor: wetness.	Probable	Improbable: too sandy.	Poor: excess humus, wetness.
Pamlico	Poor: low strength, wetness.	Probable	Improbable: too sandy.	Poor: excess humus, wetness.
77:				
Surrency	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, wetness.
Plummer	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
Cantey	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
78 Alpin	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
79 Eunola	Fair: wetness.	Probable	Improbable: too sandy.	Fair: too clayey, thin layer.
80 Kenansville	Good	Probable	Improbable: too sandy.	Fair: too sandy.

TABLE 10.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Soil name and map symbol	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
2: Albany	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy.	Wetness, droughty.
3: Alpin	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, soil blowing.	Too sandy, soil blowing.	Droughty.
5: Blanton	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake.	Too sandy, soil blowing.	Droughty.
6: Blanton	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Too sandy, soil blowing.	Droughty.
10, 11: Lakeland	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.	Droughty.
13, 14: Lucy	Severe: seepage.	Moderate: piping.	Severe: no water.	Deep to water	Droughty, fast intake, slope.	Too sandy	Droughty.
15: Mascotte	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Favorable	Wetness, droughty, fast intake.	Wetness, soil blowing.	Wetness, droughty.
16, 17: Orangeburg	Moderate: seepage, slope.	Moderate: piping.	Severe: no water.	Deep to water	Fast intake, slope.	Favorable	Favorable.
18: Orangeburg	Severe: slope.	Moderate: piping.	Severe: no water.	Deep to water	Fast intake, slope.	Slope	Slope.
21: Cantey	Slight	Severe: hard to pack, wetness.	Severe: slow refill.	Percs slowly	Wetness, percs slowly, soil blowing.	Wetness, percs slowly.	Wetness, percs slowly.
22: Pelham	Severe: seepage.	Severe: piping, wetness.	Severe: cutbanks cave.	Favorable	Fast intake, wetness.	Wetness, soil blowing.	Wetness.

TABLE 10.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Limitations for-- Aquifer-fed excavated ponds	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Terraces and diversions	Features affecting-- Grassed waterways
23: Plummer	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy.	Wetness, droughty.
26: Troup	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake.	Too sandy	Droughty.
27: Troup	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, slope.	Too sandy	Droughty.
28: Chipley	Severe: seepage.	Severe: seepage.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Droughty.
30: Ocilla	Severe: seepage.	Severe: piping, wetness.	Severe: cutbanks cave.	Favorable	Wetness, droughty, fast intake.	Wetness	Droughty.
34: Sapelo	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy.	Droughty, wetness.
38: Goldsboro	Moderate: seepage, slope.	Moderate: piping, wetness.	Moderate: slow refill, cutbanks cave, deep to water.	Slope	Slope, wetness, fast intake.	Wetness	Favorable.
48:							
Plummer	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, cutbanks cave.	Ponding, droughty, fast intake.	Ponding, too sandy.	Wetness, droughty.
Surrency	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, cutbanks cave.	Ponding, droughty, fast intake.	Ponding, too sandy.	Wetness, droughty, rooting depth.

TABLE 10.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
53. Bonifay	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Droughty, fast intake.	Too sandy, soil blowing.	Droughty.
55. Esto	Moderate: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Percs slowly, slope.	Percs slowly	Percs slowly.
56. Nankin	Moderate: seepage, slope.	Severe: thin layer.	Severe: no water.	Deep to water	Fast intake, slope.	Favorable	Favorable.
57. Nankin	Severe: slope.	Severe: thin layer.	Severe: no water.	Deep to water	Slope	Slope	Slope.
58. Fuquay	Slight	Slight	Severe: no water.	Deep to water	Droughty, fast intake, slope.	Too sandy	Droughty.
61. Alaga	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake.	Too sandy, soil blowing.	Droughty.
62. Alaga	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, slope.	Too sandy, soil blowing.	Droughty.
63. Alaga	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, slope.	Slope, too sandy, soil blowing.	Slope, droughty.
64. Alaga	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Deep to water	Droughty, fast intake.	Too sandy, soil blowing.	Droughty.
65. Lovett	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake.	Too sandy, soil blowing.	Droughty.
66. Lovett	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Too sandy, soil blowing.	Droughty.
67. Udorthents							
71, 72. Faceville	Moderate: seepage.	Slight	Severe: no water.	Deep to water	Fast intake, slope.	Favorable	Favorable.

TABLE 10.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Limitations for-- Aquifer-fed excavated ponds	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Terraces and diversions	Features affecting-- Grassed waterways
74:							
Dorovan	Moderate: seepage.	Severe: excess humus, ponding.	Severe: cutbanks cave.	Ponding, flooding, subsides.	Ponding, flooding.	Ponding	Wetness.
Pamlico	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, subsides, cutbanks cave.	Ponding, soil blowing.	Ponding, too sandy, soil blowing.	Wetness.
77:							
Surrency	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Flooding, cutbanks cave.	Droughty, fast intake, wetness.	Too sandy, wetness.	Wetness, droughty, rooting depth.
Plummer	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy.	Wetness, droughty.
Cantey	Slight	Severe: hard to pack, wetness.	Severe: slow refill.	Percs slowly	Wetness, percs slowly, soil blowing.	Wetness, percs slowly.	Wetness, percs slowly.
78 Alpin	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water, flooding.	Droughty, soil blowing, flooding.	Too sandy, soil blowing.	Droughty.
79 Eunola	Severe: seepage.	Severe: piping, wetness.	Severe: cutbanks cave.	Flooding	Wetness, fast intake.	Wetness	Favorable.
80 Kenansville	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake.	Too sandy	Droughty.

TABLE 11.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated. Some soils may have Unified classifications and USDA textures in addition to those shown. In general, the dominant classifications and textures are shown]

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
2---------------- Albany	0-50	Sand-------------	SM, SP-SM	A-2	0	100	100	75-90	10-20	---	NP
	50-80	Sandy clay loam, fine sandy loam, sandy clay.	SC, SM, SM-SC	A-2, A-4, A-6, A-7-6	0	97-100	95-100	70-100	20-50	<45	NP-23
3---------------- Alpin	0-3	Sand-------------	SP-SM, SM	A-3, A-2-4	0	95-100	90-100	60-100	5-20	---	NP
	3-55	Fine sand, sand.	SP-SM	A-3, A-2-4	0	95-100	90-100	60-100	5-20	---	NP
	55-80	Fine sand, sand.	SP-SM, SM	A-2-4	0	95-100	90-100	60-100	11-20	---	NP
5, 6------------- Blanton	0-69	Sand-------------	SP-SM, SM	A-3, A-2-4	0	100	90-100	65-100	5-20	---	NP
	69-80	Sandy clay loam, sandy loam, sandy clay.	SC, SM-SC, SM	A-4, A-2-4, A-2-6, A-6	0	100	95-100	69-100	25-50	12-45	3-22
10, 11----------- Lakeland	0-4	Sand-------------	SP-SM	A-3, A-2-4	0	90-100	90-100	60-100	5-12	---	NP
	4-80	Sand, fine sand.	SP, SP-SM	A-3, A-2-4	0	90-100	90-100	50-100	1-12	---	NP
13, 14----------- Lucy	0-24	Sand, loamy sand.	SM, SP-SM	A-2	0	95-100	90-100	50-75	10-30	---	NP
	24-34	Sandy loam, fine sandy loam, sandy clay loam.	SM, SC, SM-SC	A-2, A-4, A-6	0	97-100	95-100	55-95	15-50	10-30	NP-15
	34-80	Sandy clay loam, clay loam, sandy clay.	SC, SM-SC, SM	A-2, A-6, A-4	0	100	95-100	60-95	20-50	20-40	3-20
15--------------- Mascotte	0-14	Sand-------------	SP-SM	A-3, A-2-4	0	100	100	85-100	5-12	---	NP
	14-24	Fine sand, sand, loamy fine sand.	SP-SM, SM	A-3, A-2-4	0	100	100	85-100	8-15	---	NP
	24-37	Fine sand, sand, loamy fine sand.	SP-SM	A-3, A-2-4	0	100	100	85-100	5-12	---	NP
	37-80	Sandy clay loam, sandy loam, fine sandy loam.	SC, SM-SC, SM	A-2, A-4, A-6	0	100	100	85-100	19-45	<38	NP-15
16, 17----------- Orangeburg	0-15	Loamy sand-------	SM	A-2	0	98-100	95-100	60-87	14-28	---	NP
	15-80	Sandy clay loam, sandy clay, sandy loam.	SC, CL	A-6, A-4, A-7	0	98-100	95-100	70-97	40-65	24-46	8-21
18--------------- Orangeburg	0-17	Loamy sand-------	SM	A-2	0	98-100	95-100	60-87	14-28	---	NP
	17-80	Sandy clay loam, sandy clay, sandy loam.	SC, CL	A-6, A-4, A-7	0	98-100	95-100	70-97	40-65	24-46	8-21
21--------------- Cantey	0-19	Fine sandy loam--	SM, SC, SM-SC	A-2, A-4	0	98-100	98-100	60-85	30-50	<30	NP-10
	19-80	Clay, sandy clay, silty clay.	CL, ML, MH, CH	A-6, A-7	0	98-100	98-100	75-100	55-95	28-66	12-32

TABLE 11.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
22--------------- Pelham	0-24	Sand, loamy sand.	SM, SP-SM	A-2	0	100	95-100	75-100	10-25	---	NP
	24-50	Sandy clay loam, sandy loam, fine sandy loam.	SM, SC, SM-SC	A-2, A-4, A-6	0	100	95-100	65-100	27-50	15-30	2-12
	50-80	Sandy clay loam, sandy clay, clay.	SC, SM, ML, CL	A-2, A-4, A-6, A-7	0	100	95-100	65-100	27-65	20-45	3-20
23--------------- Plummer	0-57	Sand, loamy sand.	SM, SP-SM	A-2-4, A-3	0	100	100	75-90	5-20	---	NP
	57-80	Sandy loam, sandy clay loam, fine sandy loam.	SM, SC, SM-SC	A-2-4, A-4	0	100	97-100	76-96	20-48	<30	NP-10
26, 27----------- Troup	0-74	Sand-------------	SM, SP-SM	A-2	0	95-100	90-100	50-75	10-30	---	NP
	74-80	Sandy clay loam, sandy loam, fine sandy loam.	SC, SM-SC, CL-ML, CL	A-4, A-2, A-6	0	95-100	90-100	60-90	24-55	19-40	4-20
28--------------- Chipley	0-6	Fine sand--------	SP-SM	A-3, A-2-4	0	100	100	80-100	6-12	---	NP
	6-80	Sand, fine sand.	SP-SM	A-3, A-2-4	0	100	100	80-100	6-12	---	NP
30--------------- Ocilla	0-29	Sand-------------	SM, SP-SM	A-2, A-3	0	100	95-100	70-100	8-35	---	NP
	29-80	Sandy clay loam, sandy clay, sandy loam.	SC, CL	A-4, A-6, A-7	0	100	95-100	80-100	36-60	20-45	7-20
34--------------- Sapelo	0-11	Sand-------------	SM, SP, SP-SM	A-2, A-3	0	100	100	85-100	4-20	---	NP
	11-20	Fine sand, sand, loamy fine sand.	SM, SP-SM	A-2, A-3	0	100	100	80-100	8-20	---	NP
	20-68	Fine sand, sand.	SM, SP, SP-SM	A-2, A-3	0	100	100	75-100	4-20	---	NP
	68-80	Sandy loam, sandy clay loam, fine sandy loam.	SM, SC, SM-SC	A-2, A-4, A-6	0	100	100	80-100	20-50	<40	NP-20
38--------------- Goldsboro	0-15	Loamy sand-------	SM	A-2	0	95-100	95-100	50-95	13-30	<20	NP
	15-80	Sandy clay loam, sandy loam.	SM-SC, SC, CL-ML, CL	A-2, A-4, A-6	0	98-100	95-100	60-100	25-55	16-37	4-18
48:											
Plummer---------	0-6	Fine sand--------	SM, SP-SM	A-2-4, A-3	0	100	100	75-90	5-20	---	NP
	6-66	Sand, fine sand, loamy sand.	SM, SP-SM	A-2-4, A-3	0	100	100	75-96	5-26	---	NP
	66-80	Sandy loam, sandy clay loam, fine sandy loam.	SM, SC, SM-SC	A-2-4, A-4	0	100	97-100	76-96	20-48	<30	NP-10
Surrency--------	0-10	Loamy sand-------	SM	A-2	0	100	95-100	50-100	15-26	---	NP
	10-32	Loamy sand, sand, fine sand.	SP-SM, SM	A-2-4	0	100	95-100	50-100	10-26	---	NP
	32-80	Sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2	0	100	95-100	75-100	22-35	<30	NP-10

TABLE 11.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
53 Bonifay	0-48	Fine sand, sand, loamy sand.	SP-SM	A-3, A-2-4	0	98-100	98-100	60-95	5-12	---	NP
	48-80	Sandy loam, sandy clay loam, fine sandy loam.	SM-SC, SC, SM	A-2-4, A-4, A-2-6, A-6	0	95-100	90-100	63-95	23-50	<30	NP-12
55 Esto	0-7	Fine sandy loam	SM, SM-SC, ML, CL-ML	A-4, A-2	0	95-100	85-100	70-96	25-55	<25	NP-6
	7-80	Clay loam, clay, sandy clay.	CL, CH	A-7	0	95-100	85-100	85-100	51-98	40-80	18-52
56 Nankin	0-6	Loamy sand	SM, SP-SM	A-2	0	85-100	85-100	50-85	10-35	---	NP
	6-12	Sandy clay loam, sandy loam.	SC, SM, SM-SC	A-2, A-4, A-6	0	97-100	95-100	75-90	25-45	20-35	4-15
	12-58	Sandy clay, clay, sandy clay loam.	SC, CL, ML, CL-ML	A-4, A-6, A-7	0	98-100	95-100	75-95	40-70	25-45	7-20
	58-80	Sandy clay loam, sandy loam.	SC, SM-SC, CL, CL-ML	A-2, A-4, A-6	0	98-100	95-100	70-85	25-55	20-40	4-16
57 Nankin	0-5	Sandy loam	SM, SM-SC	A-2, A-4	0	85-100	85-100	70-90	25-45	<25	NP-4
	5-27	Sandy clay, clay, sandy clay loam.	SC, CL, ML, CL-ML	A-4, A-6, A-7	0	98-100	95-100	75-95	40-70	25-45	7-20
	27-80	Sandy clay loam, sandy loam.	SC, SM-SC, CL, CL-ML	A-2, A-4, A-6	0	98-100	95-100	70-85	25-55	20-40	4-16
58 Fuquay	0-35	Sand, loamy sand.	SP-SM, SM	A-1, A-2, A-3	0	95-100	90-100	45-80	5-20	---	NP
	35-80	Sandy loam, fine sandy loam, sandy clay loam.	SM, SC, SM-SC	A-2, A-4, A-6	0	85-100	85-100	70-90	23-45	<25	NP-13
61, 62, 63 Alaga	0-9	Loamy sand	SM, SW-SM, SP-SM	A-2, A-1-b	0	100	100	40-80	10-35	<25	NP-4
	9-80	Loamy sand, sand, fine sand.	SM, SW-SM, SP-SM	A-2	0	100	100	50-80	10-35	<25	NP-4
64 Alaga	0-7	Loamy sand	SM, SW-SM, SP-SM	A-2, A-1-b	0	100	100	40-70	10-35	---	NP
	7-80	Loamy sand, sand, fine sand.	SM, SW-SM, SP-SM	A-2	0	100	100	50-80	10-25	---	NP
65, 66 Lovett	0-9	Sand	SM	A-2-4	0	100	100	90-95	15-30	---	NP
	9-38	Sand, fine sand, loamy fine sand.	SM	A-2-4	0	100	100	90-95	15-30	---	NP
	38-47	Sandy loam, fine sandy loam, sandy clay loam.	SC, SM-SC	A-2, A-4, A-6	0	100	100	90-95	30-50	20-35	4-14
	47-80	Sandy clay, clay.	CL, CH	A-7-6, A-6	0	100	100	90-95	50-70	35-55	11-27
67. Udorthents											
71, 72 Faceville	0-6	Loamy fine sand	SM	A-2	0	90-100	85-100	72-97	13-25	---	NP
	6-80	Sandy clay, clay, clay loam.	CL, SC, CH, ML	A-6, A-7	0	98-100	95-100	75-99	45-72	25-52	11-25

TABLE 11.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
74:											
Dorovan	0-6	Mucky peat	PT	---	0	---	---	---	---	---	---
	6-70	Muck	PT	---	0	---	---	---	---	---	---
	70-80	Sand, loamy sand, loam.	SP-SM, SM-SC, SM	A-1, A-3, A-4, A-2-4	0	100	100	5-70	5-49	<20	NP-7
Pamlico	0-33	Muck	PT	---	0	---	---	---	---	---	---
	33-80	Sand, fine sand, loamy sand.	SM, SP-SM	A-2, A-3	0	100	100	70-95	5-20	---	NP
77:											
Surrency	0-10	Loamy sand	SM	A-2	0	100	95-100	50-100	15-26	---	NP
	10-33	Loamy sand, sand, fine sand.	SP-SM, SM	A-2-4	0	100	95-100	50-100	10-26	---	NP
	33-80	Sandy clay, sandy clay loam.	SM, SM-SC, SC	A-2	0	100	95-100	75-100	22-35	<30	NP-10
Plummer	0-58	Fine sand	SM, SP-SM	A-2-4, A-3	0	100	100	75-90	5-20	---	NP
	58-80	Sandy loam, sandy clay loam, fine sandy loam.	SM, SC, SM-SC	A-2-4, A-4	0	100	97-100	76-96	20-48	<30	NP-10
Cantey	0-19	Fine sandy loam	SM, SC, SM-SC	A-2, A-4	0	98-100	98-100	60-85	30-50	<30	NP-10
	19-80	Clay, sandy clay, silty clay.	CL, ML, MH, CH	A-6, A-7	0	98-100	98-100	75-100	55-95	28-66	12-32
78 Alpin	0-4	Fine sand	SP-SM, SM	A-3, A-2-4	0	95-100	90-100	60-100	5-20	---	NP
	4-55	Fine sand, sand.	SP-SM, SM	A-3, A-2-4	0	95-100	90-100	60-100	5-20	---	NP
	55-80	Fine sand, sand, loamy sand.	SP-SM, SM	A-2-4	0	95-100	90-100	60-100	11-20	---	NP
79 Eunola	0-12	Fine sand	SM, SP-SM	A-2, A-4, A-2-4	0	100	98-100	50-80	15-38	---	NP
	12-29	Sandy clay loam, clay loam, fine sandy loam.	SM, SC, SM-SC, CL	A-4, A-2, A-6	0	100	90-100	75-95	30-60	<36	NP-15
	29-56	Sandy clay loam, sandy clay, clay loam.	SM, SC, ML, CL	A-4, A-6, A-7	0	100	98-100	80-95	36-60	20-50	7-26
	56-80	Sand, loamy sand, fine sand.	SM, SP-SM	A-2, A-3	0	100	98-100	50-75	5-30	---	NP
80 Kenansville	0-22	Loamy fine sand	SM, SP-SM	A-1, A-2	0	100	95-100	45-99	10-25	---	NP
	22-56	Sandy loam, fine sandy loam, sandy clay loam.	SM, SC, SM-SC	A-2, A-4	0	100	95-100	50-99	25-45	<30	NP-10
	56-80	Sand, loamy sand, fine sand.	SP-SM, SM	A-1, A-2, A-3	0	100	95-100	40-99	5-30	---	NP

TABLE 12.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
2----------------- Albany	0-50	1-10	1.40-1.55	6.0-20	0.02-0.04	3.6-6.5	Low--------	0.10	5	1	1-2
	50-80	13-40	1.55-1.65	0.6-2.0	0.10-0.16	3.6-6.0	Low--------	0.24			
3----------------- Alpin	0-3	1-12	1.35-1.55	2.0-6.0	0.05-0.10	4.5-6.5	Low--------	0.10	5	1	0-2
	3-55	1-7	1.40-1.55	6.0-20	0.03-0.09	4.5-6.5	Low--------	0.10			
	55-80	5-8	1.45-1.65	2.0-6.0	0.06-0.09	4.5-6.5	Low--------	0.10			
5, 6-------------- Blanton	0-69	1-7	1.30-1.60	6.0-20	0.03-0.07	4.5-6.0	Low--------	0.10	5	1	.5-1
	69-80	12-40	1.60-1.70	0.6-2.0	0.10-0.15	4.5-5.5	Low--------	0.20			
10, 11------------ Lakeland	0-4	2-8	1.35-1.65	6.0-20	0.05-0.09	4.5-6.0	Low--------	0.10	5	1	<1
	4-80	1-6	1.50-1.60	6.0-20	0.02-0.08	4.5-6.0	Low--------	0.10			
13, 14------------ Lucy	0-24	1-10	1.30-1.70	6.0-20	0.05-0.10	5.1-6.0	Low--------	0.10	5	1	.5-1
	24-34	10-30	1.40-1.60	2.0-6.0	0.10-0.12	4.5-5.5	Low--------	0.24			
	34-80	15-45	1.40-1.60	0.6-2.0	0.12-0.14	4.5-5.5	Low--------	0.28			
15---------------- Mascotte	0-14	1-8	1.20-1.45	6.0-20	0.03-0.08	3.6-5.5	Low--------	0.10	5	1	2-11
	14-24	2-12	1.35-1.50	0.6-2.0	0.10-0.15	3.6-5.5	Low--------	0.15			
	24-37	2-8	1.35-1.50	6.0-20	0.03-0.08	3.6-5.5	Low--------	0.15			
	37-80	14-35	1.45-1.65	0.6-2.0	0.10-0.15	3.6-5.5	Low--------	0.24			
16, 17------------ Orangeburg	0-15	4-10	1.35-1.55	2.0-6.0	0.06-0.09	4.5-6.0	Low--------	0.10	5	2	.5-1
	15-80	20-45	1.60-1.75	0.6-2.0	0.11-0.14	4.5-5.5	Low--------	0.24			
18---------------- Orangeburg	0-17	4-10	1.35-1.55	2.0-6.0	0.06-0.09	4.5-6.0	Low--------	0.10	5	2	.5-1
	17-80	20-45	1.60-1.75	0.6-2.0	0.11-0.14	4.5-5.5	Low--------	0.24			
21---------------- Cantey	0-19	5-15	1.30-1.60	0.6-2.0	0.10-0.15	3.6-6.5	Low--------	0.24	5	3	1-5
	19-80	35-60	1.30-1.50	0.06-0.2	0.11-0.16	3.6-5.5	Moderate	0.24			
22---------------- Pelham	0-24	1-8	1.50-1.70	6.0-20	0.04-0.07	3.6-5.5	Low--------	0.10	5	1	1-2
	24-50	15-30	1.30-1.60	0.6-2.0	0.10-0.13	3.6-5.5	Low--------	0.24			
	50-80	20-45	1.30-1.60	0.6-2.0	0.10-0.16	3.6-5.5	Low--------	0.24			
23---------------- Plummer	0-57	1-7	1.35-1.65	2.0-20	0.03-0.08	3.6-5.5	Low--------	0.10	5	1	1-3
	57-80	15-30	1.50-1.70	0.6-2.0	0.07-0.15	3.6-5.5	Low--------	0.15			
26, 27------------ Troup	0-74	1-10	1.30-1.70	6.0-20	0.05-0.10	4.5-6.0	Low--------	0.10	5	1	<1
	74-80	15-35	1.40-1.60	0.6-2.0	0.10-0.13	4.5-5.5	Low--------	0.20			
28---------------- Chipley	0-6	1-5	1.35-1.45	6.0-20	0.05-0.10	3.6-6.0	Low--------	0.10	5	1	2-5
	6-80	1-7	1.45-1.60	6.0-20	0.03-0.08	4.5-6.5	Low--------	0.10			
30---------------- Ocilla	0-29	3-10	1.45-1.65	2.0-20	0.05-0.07	4.5-5.5	Low--------	0.10	5	1	1-2
	29-80	15-40	1.55-1.70	0.6-2.0	0.09-0.12	4.5-5.5	Low--------	0.24			
34---------------- Sapelo	0-11	2-5	1.40-1.65	6.0-20	0.03-0.07	3.6-5.5	Low--------	0.10	5	1	1-3
	11-20	3-7	1.35-1.60	0.6-2.0	0.10-0.15	3.6-5.5	Low--------	0.15			
	20-68	3-6	1.50-1.70	6.0-20	0.03-0.07	3.6-5.5	Low--------	0.17			
	68-80	10-30	1.55-1.75	0.6-2.0	0.12-0.17	3.6-5.5	Low--------	0.24			
38---------------- Goldsboro	0-15	2-8	1.55-1.75	6.0-20	0.06-0.11	3.6-5.5	Low--------	0.17	5	2	.5-2
	15-80	18-30	1.30-1.50	0.6-2.0	0.11-0.15	3.6-5.5	Low--------	0.24			

TABLE 12.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Soil reaction	Shrink- swell potential	Erosion factors K	Erosion factors T	Wind erodi- bility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
48:											
Plummer---------	0-6	1-7	1.35-1.65	6.0-20	0.03-0.08	3.6-5.5	Low-------	0.10	5	8	1-10
	6-66	1-7	1.35-1.65	2.0-20	0.03-0.20	3.6-5.5	Low-------	0.10			
	66-80	15-30	1.50-1.70	0.6-2.0	0.07-0.15	3.6-5.5	Low-------	0.15			
Surrency--------	0-10	<10	1.50-1.70	2.0-20	0.05-0.10	3.6-5.5	Low-------	0.10	5	---	2-9
	10-32	<10	1.50-1.65	2.0-20	0.05-0.10	3.6-5.5	Low-------	0.10			
	32-80	10-23	1.60-1.85	0.6-6.0	0.06-0.10	3.6-5.5	Low-------	0.15			
53--------------- Bonifay	0-48	3-9	1.35-1.60	6.0-20	0.03-0.08	4.5-6.5	Low-------	0.10	5	1	1-3
	48-80	15-35	1.60-1.70	0.6-2.0	0.10-0.15	4.5-6.5	Low-------	0.24			
55--------------- Esto	0-7	8-20	1.45-1.65	2.0-6.0	0.11-0.15	3.6-5.5	Low-------	0.28	4	3	<1
	7-80	35-60	1.50-1.65	0.06-0.2	0.12-0.18	3.6-5.5	Moderate	0.32			
----------------- Nankin	0-6	5-12	1.45-1.65	2.0-6.0	0.05-0.10	4.5-5.5	Low-------	0.17	3	2	.5-1
	6-12	15-35	1.55-1.65	0.6-2.0	0.10-0.15	4.5-5.5	Low-------	0.24			
	12-58	35-50	1.30-1.70	0.2-0.6	0.11-0.16	4.5-5.5	Low-------	0.24			
	58-80	15-35	1.60-1.70	0.6-2.0	0.10-0.15	4.5-5.5	Low-------	0.24			
57--------------- Nankin	0-5	7-20	1.45-1.55	2.0-6.0	0.08-0.12	4.5-5.5	Low-------	0.28	3	3	.5-1
	5-27	35-50	1.30-1.70	0.2-0.6	0.11-0.16	4.5-5.5	Low-------	0.24			
	27-80	15-35	1.60-1.70	0.6-2.0	0.10-0.15	4.5-5.5	Low-------	0.24			
58--------------- Fuquay	0-35	1-7	1.60-1.70	>6.0	0.03-0.07	4.5-6.0	Low-------	0.10	5	1	.5-2
	35-80	10-35	1.40-1.60	0.6-2.0	0.12-0.15	3.6-6.0	Low-------	0.20			
61, 62, 63------- Alaga	0-9	2-12	1.30-1.70	>6.0	0.05-0.09	3.6-6.0	Low-------	0.10	5	2	.5-3
	9-80	2-12	1.30-1.70	>6.0	0.05-0.09	3.6-6.0	Low-------	0.10			
64--------------- Alaga	0-7	2-12	1.30-1.70	>6.0	0.05-0.09	3.6-6.0	Low-------	0.10	5	2	.5-1
	7-80	2-12	1.30-1.70	>6.0	0.05-0.09	3.6-6.0	Low-------	0.10			
65, 66----------- Lovett	0-9	2-12	1.55-1.75	2.0-6.0	0.05-0.13	4.5-6.0	Low-------	0.10	5	1	0-1
	9-38	2-12	1.55-1.75	6.0-20	0.05-0.13	4.5-6.0	Low-------	0.10			
	38-47	18-35	1.40-1.60	0.2-0.6	0.08-0.16	4.5-5.0	Low-------	0.17			
	47-80	36-60	1.40-1.60	0.06-0.2	0.08-0.16	3.6-5.0	Moderate	0.20			
67. Udorthents											
71, 72----------- Faceville	0-6	2-10	1.45-1.65	6.0-20	0.06-0.09	4.5-5.5	Low-------	0.17	5	2	.5-1
	6-80	35-55	1.25-1.60	0.6-2.0	0.12-0.18	4.5-6.0	Low-------	0.37			
74:											
Dorovan---------	0-6	---	0.25-0.40	0.6-2.0	0.20-0.50	3.6-4.4	-----------	----	---	8	>60
	6-70	---	0.35-0.55	0.6-2.0	0.20-0.50	3.6-4.4	-----------	----			
	70-80	5-20	1.40-1.65	6.0-20	0.05-0.08	4.5-5.5	Low-------	----			
Pamlico---------	0-33	---	0.20-0.65	0.6-6.0	0.24-0.40	3.6-5.5	Low-------	----	---	8	20-80
	33-80	5-10	1.60-1.75	6.0-20	0.02-0.10	3.6-5.5	Low-------	0.10			
77:											
Surrency--------	0-10	<10	1.50-1.70	2.0-20	0.05-0.10	3.6-5.5	Low-------	0.10	5	2	2-9
	10-33	<10	1.50-1.65	2.0-20	0.05-0.10	3.6-5.0	Low-------	0.10			
	33-80	10-38	1.60-1.85	0.6-6.0	0.06-0.10	3.6-5.5	Low-------	0.15			
Plummer---------	0-58	1-7	1.35-1.65	2.0-20	0.03-0.08	3.6-5.5	Low-------	0.10	5	1	1-3
	58-80	15-30	1.50-1.70	0.6-2.0	0.07-0.15	3.6-5.5	Low-------	0.15			
Cantey----------	0-19	5-15	1.30-1.60	0.6-2.0	0.10-0.15	3.6-6.5	Low-------	0.24	5	3	1-5
	19-80	35-60	1.30-1.50	0.06-0.2	0.11-0.16	3.6-5.5	Moderate	0.24			

TABLE 12.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permea-bility	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
78---------------- Alpin	0-4	1-12	1.35-1.55	2.0-6.0	0.05-0.10	4.5-6.0	Low--------	0.10	5	1	0-2
	4-55	1-7	1.40-1.55	6.0-20	0.03-0.09	4.5-6.0	Low--------	0.10			
	55-80	5-8	1.45-1.65	2.0-6.0	0.06-0.09	4.5-6.0	Low--------	0.10			
79---------------- Eunola	0-12	3-11	1.45-1.70	2.0-6.0	0.06-0.11	4.5-5.5	Low--------	0.15	5	1	.5-2
	12-29	18-35	1.35-1.65	0.6-2.0	0.12-0.17	4.5-5.5	Low--------	0.28			
	29-56	18-45	1.30-1.60	0.6-2.0	0.12-0.16	4.5-5.5	Low--------	0.32			
	56-80	2-11	1.45-1.75	6.0-20	0.02-0.06	4.5-5.5	Low--------	0.20			
80---------------- Kenansville	0-22	3-10	1.50-1.70	6.0-20	0.04-0.10	4.5-6.0	Low--------	0.15	5	2	.5-2
	22-56	5-24	1.30-1.50	0.6-6.0	0.10-0.16	4.5-6.0	Low--------	0.15			
	56-80	1-10	1.50-1.70	6.0-20	<0.05	4.5-6.0	Low--------	0.10			

TABLE 13.--WATER FEATURES

["Flooding" and "water table" and terms as "frequent," "brief," "apparent," and "perched" are explained in the text. The symbol > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated]

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
2------------------------ Albany	C	None------------	---	---	1.0-2.5	Apparent	Dec-Mar
3------------------------ Alpin	A	None------------	---	---	>6.0	---	---
5, 6--------------------- Blanton	A	None------------	---	---	4.0-6.0	Perched	Dec-Mar
10----------------------- Lakeland	A	None------------	---	---	>6.0	---	---
11----------------------- Lakeland	A	None------------	---	---	>6.0	---	---
13, 14------------------- Lucy	A	None------------	---	---	>6.0	---	---
15----------------------- Mascotte	B/D	None------------	---	---	0-1.0	Apparent	Jun-Sep
16, 17, 18--------------- Orangeburg	B	None------------	---	---	>6.0	---	---
21----------------------- Cantey	D	None------------	---	---	0-1.0	Apparent	Nov-Apr
22----------------------- Pelham	B/D	None------------	---	---	0-1.0	Apparent	Jan-Apr
23----------------------- Plummer	B/D	None------------	---	---	0-1.0	Apparent	Dec-Jul
26, 27------------------- Troup	A	None------------	---	---	>6.0	---	---
28----------------------- Chipley	C	None------------	---	---	2.0-3.0	Apparent	Dec-Apr
30----------------------- Ocilla	C	None------------	---	---	1.0-2.5	Apparent	Dec-Apr
34----------------------- Sapelo	D	None------------	---	---	0.5-1.5	Apparent	Nov-Apr
38----------------------- Goldsboro	B	None------------	---	---	2.0-3.0	Apparent	Dec-Apr
48*:							
Plummer------------------	B/D	None------------	---	---	+2-1.0	Apparent	Dec-Jul
Surrency-----------------	D	None------------	---	---	+1-0.5	Apparent	Jan-Dec
53----------------------- Bonifay	A	None------------	---	---	4.0-5.0	Perched	Jan-Feb

See footnote at end of table.

TABLE 13.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
55 Esto	B	None	---	---	>6.0	---	---
56, 57 Nankin	C	None	---	---	>6.0	---	---
58 Fuquay	B	None	---	---	4.0-6.0	Perched	Jan-Mar
61, 62, 63 Alaga	A	None	---	---	>6.0	---	---
64 Alaga	A	None	---	---	4.0-6.0	Apparent	Jan-Mar
65, 66 Lovett	B	None	---	---	3.0-4.5	Perched	Feb-Apr
67. Udorthents							
71, 72 Faceville	B	None	---	---	>6.0	---	---
74*:							
Dorovan	D	None	---	---	+1-0.5	Apparent	Jan-Dec
Pamlico	D	None	---	---	+2-0	Apparent	Dec-May
77:							
Surrency	D	Frequent	Very long	Dec-Mar	0-0.5	Apparent	Jan-Dec
Plummer	B/D	Frequent	---	---	0-1.0	Apparent	Dec-Jul
Cantey	D	Frequent	---	---	0-1.0	Apparent	Nov-Apr
78 Alpin	A	Occasional	Brief	Mar-Apr	>6.0	---	---
79 Eunola	C	Occasional	Very brief	Dec-Apr	1.5-2.5	Apparent	Nov-Mar
80 Kenansville	A	Occasional	Long	Dec-Apr	>6.0	---	---

* In the "High water table--Depth" column, a plus sign preceding the range in depth indicates that the high water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

TABLE 14.--PHYSICAL ANALYSES OF SELECTED SOILS

Soil name and sample number	Depth	Horizon	Particle-size distribution: Sand: Very coarse (2.0-1.0 mm)	Coarse (1.0-0.5 mm)	Medium (0.5-0.25 mm)	Fine (0.25-0.1 mm)	Very fine (0.1-0.05 mm)	Total (2.0-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm)	Hydraulic conductivity	Bulk density (filed moist)	Water content: 1/10 bar	1/3 bar	15 bar
	Cm		Pct								Cm/hr	g/cm	Pct(wt)		
Alaga loamy sand:															
S40-04-1	0-10	A1	1.2	9.7	32.7	37.3	5.4	86.3	6.2	7.5	10.3	1.22	19.6	14.9	5.4
-2	10-23	A2	1.1	8.5	32.7	36.4	5.5	84.2	9.6	6.2	14.0	1.40	13.0	10.2	4.3
-3	23-74	C1	1.7	8.6	32.7	36.2	5.3	84.5	8.2	7.3	18.2	1.33	11.9	9.4	4.4
-4	74-147	C2	2.2	9.2	27.8	41.1	5.8	86.1	6.0	7.9	12.7	1.48	8.2	6.7	3.8
-5	147-183	C3	3.9	11.2	32.3	40.6	5.0	93.0	2.4	4.6	14.0	1.60	4.4	3.1	1.5
-6	183-203	C4	1.5	8.5	33.8	45.0	4.0	92.8	2.2	5.0	13.8	1.58	5.3	3.6	1.4
Albany sand:															
S40-23-1	0-25	Ap	0.5	7.4	28.7	45.5	9.2	91.3	6.3	2.4	19.5	1.54	9.3	5.9	1.6
-2	25-66	E1	0.3	6.7	26.0	46.7	10.4	90.1	7.0	2.9	57.2	1.48	8.0	5.6	1.5
-3	66-94	E2	0.5	6.5	25.6	47.5	10.3	90.4	6.3	3.3	32.9	1.60	5.7	3.9	1.3
-4	94-127	E3	0.4	7.1	26.2	48.2	9.6	91.5	5.5	3.0	25.6	1.61	6.0	4.0	1.4
-5	127-145	Bt	1.7	11.6	24.4	34.6	6.5	78.8	5.3	15.9	1.6	1.80	10.2	8.8	5.1
-6	145-175	Btg1	0.4	4.0	14.0	30.8	8.6	57.8	4.8	37.4	0.2	1.72	20.3	19.7	13.4
-7	175-203	Btg2	0.0	1.5	12.1	39.0	11.9	64.5	4.6	30.9	0.2	1.77	18.6	16.6	10.7
Alpin sand:															
S40-21-1	0-8	A	1.3	13.5	30.0	35.3	13.7	93.8	6.1	0.1	27.0	1.55	6.9	4.0	0.9
-2	8-46	E1	2.6	13.0	27.2	36.1	14.8	93.7	4.8	1.5	38.5	1.57	5.4	3.0	0.8
-3	46-86	E1	2.0	11.9	27.5	36.8	15.6	93.8	4.5	1.7	42.7	1.62	4.5	2.3	0.7
-4	86-140	E2	2.2	11.4	26.5	39.1	15.3	94.5	4.1	1.4	30.9	1.63	4.0	2.4	0.7
-5	140-203	BtE/B	2.2	11.2	26.8	39.7	15.5	95.4	3.6	1.0	14.7	1.68	4.3	2.3	0.6
Blanton sand:															
S40-22-1	0-30	Ap	0.5	6.6	30.5	48.8	9.4	95.8	2.4	1.8	30.9	1.45	7.0	4.2	1.3
-2	30-94	E1	0.6	7.7	27.1	45.4	10.3	91.1	5.5	3.4	39.4	1.43	7.4	4.6	1.8
-3	94-135	E2	0.8	7.0	25.5	47.2	11.0	91.5	4.8	3.7	27.9	1.50	6.0	3.4	1.4
-4	135-175	E3	0.8	7.8	23.8	48.3	11.2	91.9	3.8	4.3	33.9	1.56	4.7	2.8	1.2
-5	175-203	Bt	1.0	7.5	20.0	39.6	9.8	77.9	3.5	18.6	1.8	1.72	13.6	9.6	5.1
Chipley fine sand:															
S40-23-1	0-15	Ap	0.2	4.4	11.2	61.4	18.3	95.5	2.2	2.3	15.8	1.45	9.4	5.0	1.1
-2	15-58	C1	0.2	4.1	10.6	59.7	19.8	94.4	3.7	1.9	21.3	1.47	7.6	4.0	1.0
-3	58-119	C2	0.2	4.0	10.3	61.9	18.8	95.2	2.9	1.9	18.8	1.52	6.1	3.0	0.7
-4	119-103	C3	0.2	3.3	9.1	64.2	21.3	98.1	1.5	0.4	17.7	1.63	4.5	1.8	0.2
Esto sandy loam:															
S40-05-1	0-16	Ap	0.6	6.7	23.9	36.7	13.1	81.0	5.0	14.0	3.5	1.64	13.9	10.0	5.0
-2	16-46	Bt1	0.4	3.6	11.8	18.8	7.4	42.0	8.9	49.1	3.8	1.38	28.1	24.9	17.2
-3	46-61	Bt2	0.2	2.4	9.2	13.4	6.0	31.2	6.6	62.2	6.0	1.20	30.1	27.5	20.6
-4	61-79	Bt3	0.2	1.8	7.0	10.8	6.4	26.2	5.9	67.9	1.3	1.31	28.8	26.1	22.7
-5	79-112	Bt4	0.2	1.2	5.4	9.6	8.0	24.3	4.9	70.7	1.8	1.30	29.7	26.6	22.4
-6	112-112	Bt5	0.2	1.0	4.2	8.2	10.6	24.2	6.2	69.6	0.2	1.52	23.9	22.7	21.4
-7	157-203	Bt5	0.0	0.4	1.6	9.8	22.6	37.3	6.4	56.2	0.2	1.67	20.5	19.3	15.7

TABLE 14.--PHYSICAL ANALYSES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Particle-size distribution: Sand: Very coarse (2.0-1.0 mm)	Sand: Coarse (1.0-0.5 mm)	Sand: Medium (0.5-0.25 mm)	Sand: Fine (0.25-0.1 mm)	Sand: Very fine (0.1-0.05 mm)	Sand: Total (2.0-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm)	Hydraulic conductivity	Bulk density (filed moist)	Water content: 1/10 bar	Water content: 1/3 bar	Water content: 15 bar
	Cm		Pct								Cm/hr	g/cm	Pct (wt)		
Eunola fine sand:															
S40-26-1	0-18	A	0.2	2.2	8.9	54.2	21.9	87.4	9.9	2.7	23.7	1.44	9.7	5.3	1.2
-2	18-30	E	0.2	2.3	8.8	50.1	19.2	80.6	12.2	7.2	6.1	1.68	10.0	6.0	1.9
-3	30-51	Bt1	0.1	1.7	6.8	41.8	17.1	67.5	12.2	20.3	4.0	1.60	15.2	11.3	5.9
-4	51-74	Bt2	0.0	0.5	3.3	33.1	14.7	51.6	14.2	34.2	0.9	1.61	19.0	16.3	9.5
-5	74-117	Bt3	0.0	0.1	1.8	32.7	15.8	50.4	12.8	36.8	1.3	1.50	22.0	19.4	11.6
-6	117-142	Bt4	0.0	0.1	1.4	52.6	16.8	70.9	6.5	22.6	0.9	1.62	17.7	14.2	8.0
-7	142-165	BC	0.0	0.1	2.9	72.6	12.8	88.4	2.0	9.6	7.7	1.57	12.0	8.9	5.1
-8	165-203	2C	0.0	0.2	1.4	70.0	24.2	95.8	1.3	2.9	20.9	1.47	5.8	2.3	0.6
Facevile loamy fine sand:															
S40-13-1	0-5	Ap	0.8	6.0	17.3	38.9	23.4	87.4	5.3	7.3	16.1	1.46	14.9	9.9	2.5
-2	5-20	Ap	0.4	5.6	18.8	37.6	21.4	83.8	9.5	6.7	2.2	1.68	11.2	7.6	2.5
-3	20-30	BA	0.8	6.0	17.4	33.4	19.8	77.4	9.9	12.7	1.8	1.71	11.4	8.4	3.3
-4	30-71	Bt1	0.4	4.8	14.6	26.2	14.2	60.2	6.5	33.3	0.4	1.73	17.6	15.6	8.3
-5	71-102	Bt2	0.4	4.0	12.8	22.6	12.8	53.6	5.3	41.1	3.2	1.53	22.8	20.7	12.8
-6	102-129	Bt3	0.8	4.4	13.4	19.6	10.4	48.6	8.4	43.0	0.3	1.66	21.2	19.7	13.9
-7	129-162	Bt4	0.6	6.0	15.4	21.4	12.4	55.8	1.1	43.1	0.1	1.76	18.9	17.4	11.8
-8	162-203	BC	0.4	5.6	17.8	24.0	14.8	62.6	8.3	29.1	0.1	1.82	16.8	14.6	9.2
Fuquay sand:															
S40-22-1	0-15	Ap	0.3	6.3	22.9	47.7	13.4	90.6	5.2	4.2	22.0	1.40	10.4	6.6	2.0
-2	15-76	E	0.3	6.1	22.5	45.8	13.6	88.3	6.6	5.1	9.7	1.57	8.2	4.9	1.7
-3	76-89	BE	0.4	5.6	19.1	34.4	14.3	83.7	6.2	17.9	12.5	1.55	8.0	5.3	2.5
-4	89-104	Btv1	0.5	5.6	17.7	39.2	12.9	75.9	6.2	17.9	5.5	1.58	12.6	9.4	5.1
-5	104-137	Btv2	0.5	5.2	15.8	31.8	11.3	64.6	5.4	30.0	0.5	1.64	16.0	13.0	7.9
-6	137-203	Btv3	0.6	5.0	13.4	24.7	9.8	53.5	7.4	39.1	0.2	1.73	15.8	13.7	9.1
Kenansville loamy fine sand:															
S40-25-1	0-10	A	0.0	0.8	2.9	40.0	37.4	81.1	14.4	4.5	8.8	1.21	27.4	14.6	3.2
-2	10-38	E1	0.0	0.9	2.8	42.0	37.3	83.0	11.3	5.7	7.5	1.46	13.4	6.9	1.3
-3	38-56	E2	0.1	0.8	2.6	42.2	36.1	81.8	13.0	5.2	7.4	1.50	10.0	5.2	1.2
-4	56-66	Bt1	0.0	0.7	2.4	37.9	35.3	76.3	12.3	11.4	8.4	1.55	10.2	6.8	2.9
-5	66-96	Bt2	0.0	0.6	1.7	31.7	31.3	65.3	11.7	23.0	0.9	1.67	15.5	12.0	6.3
-6	96-124	Bt3	0.0	0.2	0.8	33.3	32.7	67.0	9.7	23.3	0.8	1.63	18.0	13.8	7.3
-7	124-142	BC	0.0	0.1	0.5	43.3	36.9	80.8	7.0	12.2	8.3	1.52	12.0	7.4	3.7
-8	142-175	CB	0.0	0.1	0.4	58.6	32.6	91.7	3.8	4.5	17.7	1.48	7.2	3.2	1.3
-9	175-203	2C	0.0	0.0	0.3	77.0	20.4	97.7	0.5	1.8	30.6	1.53	5.1	1.9	0.3

TABLE 14.--PHYSICAL ANALYSES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Particle-size distribution: Sand: Very coarse (2.0-1.0 mm)	Coarse (1.0-0.5 mm)	Medium (0.5-0.25 mm)	Fine (0.25-0.1 mm)	Very fine (0.1-0.05 mm)	Total (2.0-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm)	Hydraulic conductivity	Bulk density (filed moist)	Water content: 1/10 bar	1/3 bar	15 bar
	Cm		Pct								Cm/hr	g/cm	Pct (wt)		
Lovett sand:															
S40-06-1	0-23	Ap	0.5	6.3	24.1	39.4	20.8	91.1	5.3	3.6	4.2	1.68	8.9	5.5	1.8
-2	23-58	E	0.4	6.0	23.6	39.6	20.2	89.8	6.4	3.8	14.6	1.62	6.8	4.1	1.5
-3	58-96	E	0.4	5.6	22.0	38.6	21.6	88.2	6.8	5.0	19.3	1.60	6.5	4.3	1.9
-4	96-119	Bt1	0.6	5.8	18.6	32.6	18.5	76.0	6.2	17.8	1.1	1.69	15.8	12.8	6.2
-5	119-157	Bt2	0.4	4.0	15.0	26.6	13.6	56.6	5.8	37.6	0.8	1.49	26.4	24.1	15.0
-6	157-203	C	0.2	2.4	10.4	19.0	16.6	48.6	6.2	45.2	0.9	1.55	24.5	23.4	17.8
Lucy sand:															
S40-07-1	0-28	Ap	1.2	8.3	29.3	41.7	8.2	88.7	4.8	6.5	20.1	1.58	9.4	7.0	2.9
-2	28-61	E	1.4	7.8	24.8	40.6	9.4	84.0	7.5	8.5	11.8	1.61	8.5	6.5	2.9
-3	61-86	Bt1	2.4	8.6	18.6	35.2	9.0	73.8	7.6	18.6	6.0	1.59	14.4	12.4	6.7
-4	86-122	Bt2	1.8	7.8	20.6	34.2	8.2	72.6	4.8	22.6	1.4	1.68	15.4	13.5	7.2
-5	122-162	Bt3	1.2	8.4	23.0	33.0	7.2	72.8	4.2	23.0	2.1	1.68	15.6	13.8	7.4
-6	162-203	Bt3	1.2	7.6	22.0	28.8	6.0	65.6	3.4	31.0	1.9	1.60	18.9	17.0	10.0
Nankin fine sand:															
S40-04-1	0-18	Ap	0.0	1.5	30.0	52.6	7.4	91.5	1.0	7.5	49.0	1.37	9.0	6.2	2.2
-2	18-36	E	0.1	1.7	29.7	47.5	7.5	86.5	4.7	8.8	14.1	1.58	8.2	5.8	2.6
-3	36-48	Bt1	0.0	1.2	16.0	36.4	7.2	60.8	3.9	35.3	1.2	1.56	18.4	16.5	10.8
-4	48-76	Bt2	0.0	0.4	8.2	38.0	3.6	50.2	3.4	46.4	0.6	1.55	23.9	22.3	15.6
-5	76-119	Bt3	0.0	0.4	6.0	28.2	2.0	36.6	7.1	56.3	0.4	1.50	28.0	26.8	20.1
-6	119-137	Bt4	0.0	0.2	4.0	40.8	1.0	46.0	2.5	51.5	0.8	1.44	28.2	26.3	17.0
-7	137-203	BC	0.0	0.2	9.4	43.6	1.0	54.2	2.0	43.8	0.1	1.65	21.1	18.8	13.9
Ocilla sand:															
S40-20-1	0-8	A	0.2	5.6	22.9	47.7	15.1	91.5	5.8	2.7	14.7	1.62	8.6	4.5	1.1
-2	8-33	E1	0.2	6.1	24.8	44.5	13.2	88.8	7.1	4.1	11.3	1.57	10.8	5.4	1.7
-3	33-48	E2	0.2	5.9	22.4	45.1	14.6	88.2	7.3	4.5	15.8	1.55	8.0	4.2	1.5
-4	48-61	E3	0.2	5.8	20.4	45.8	15.8	88.0	7.9	4.1	10.0	1.59	6.8	3.9	1.7
-5	61-74	E4	0.3	6.5	19.9	44.4	14.3	85.4	7.9	6.7	12.0	1.63	8.0	4.9	2.4
-6	74-86	Bt1	0.3	5.8	19.1	39.9	13.1	78.2	7.6	14.2	5.3	1.67	13.7	9.7	5.8
-7	86-117	Bt2	0.2	4.3	17.8	30.8	9.3	62.4	7.2	30.4	2.2	1.70	16.7	14.0	9.0
-8	117-160	Bt2	0.2	4.2	14.8	28.3	10.0	57.5	9.5	33.0	0.4	1.69	19.0	16.3	11.0
-9	160-203	Bt2	0.2	3.9	13.5	27.9	11.1	56.6	14.3	29.1	0.4	1.88	13.6	11.4	6.6
Orangeburg loamy sand:															
S40-02-1	0-15	A	0.4	5.9	25.0	39.6	11.8	83.4	6.6	10.0	4.8	1.41	14.9	11.4	5.2
-2	15-38	E	0.3	4.3	21.7	40.0	15.0	80.3	9.6	9.8	12.9	1.41	12.9	9.8	4.8
-3	38-66	Bt1	0.4	5.0	20.0	39.6	14.0	79.8	6.0	14.2	4.8	1.56	12.9	10.2	5.2
-4	66-112	Bt2	0.4	5.4	18.0	32.0	11.8	67.8	4.8	27.4	0.4	1.65	17.4	15.7	9.3
-5	112-157	Bt2	0.2	3.8	18.0	31.0	10.6	63.6	4.2	32.2	0.7	1.60	16.8	14.8	8.6
-6	157-203	Bt2	0.2	4.2	19.4	30.8	10.2	65.0	4.9	30.1	0.3	1.66	17.7	16.1	9.9

TABLE 14.--PHYSICAL ANALYSES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Particle-size distribution: Sand: Very coarse (2.0-1.0 mm)	Sand: Coarse (1.0-0.5 mm)	Sand: Medium (0.5-0.25 mm)	Sand: Fine (0.25-0.1 mm)	Sand: Very fine (0.1-0.05 mm)	Sand: Total (2.0-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm)	Hydraulic conductivity	Bulk density (filed moist)	Water content: 1/10 bar	Water content: 1/3 bar	Water content: 15 bar
	Cm		Pct								Cm/hr	g/cm	Pct (wt)		
Pamlico muck:															
S40-16-1	0-15	Oa1	---	---	---	---	---	---	---	---	130.0	0.21	257.1	225.4	34.7
-2	15-38	Oa2	---	---	---	---	---	---	---	---	44.7	0.20	359.3	319.6	37.5
-3	38-84	Oa3	---	---	---	---	---	---	---	---	27.0	0.17	400.2	306.2	26.7
-4	84-109	C1	0.0	4.1	21.0	58.2	13.8	97.7	1.7	0.6	15.1	1.73	4.0	1.9	0.4
-5	109-152	C2	0.0	3.2	17.0	54.9	20.6	95.9	2.8	1.3	---	---	---	---	---
-6	152-203	C3	0.1	3.1	14.4	42.1	14.8	74.4	3.9	21.7	---	---	---	---	---
Pelham sand:															
S40-19-1	0-18	Ap	0.2	4.2	22.0	46.3	15.1	88.6	6.2	5.2	3.0	1.58	14.5	10.3	2.4
-2	18-33	A	0.3	4.7	22.7	46.2	15.4	88.6	6.2	5.2	3.4	1.63	10.4	6.9	2.0
-3	33-61	E	0.2	3.6	20.0	46.6	16.4	86.8	5.0	8.2	5.9	1.68	8.8	6.0	2.3
-4	61-84	Btg1	0.4	4.0	18.0	38.4	14.8	76.4	4.6	19.0	0.2	1.77	16.9	15.2	6.8
-5	84-127	Btg2	0.2	3.2	18.0	32.0	10.4	64.4	3.9	31.0	0.2	1.65	21.3	19.4	11.0
-6	127-165	Btg3	0.2	3.0	15.0	25.8	9.4	53.8	5.0	41.2	0.9	1.44	24.4	23.5	15.6
-7	165-203	Btg4	0.2	1.6	10.4	19.4	9.6	40.8	5.5	53.7	0.3	1.55	25.3	24.2	18.0
Plummer sand:															
S40-18-1	0-18	Ap	0.4	5.7	21.1	43.0	19.2	89.4	6.4	4.2	8.8	1.54	16.7	12.6	2.4
-2	18-36	AE	0.4	6.0	23.9	42.8	16.0	89.1	7.9	3.0	3.6	1.57	12.7	8.3	5.0
-3	36-56	E1	0.4	6.3	22.6	43.6	17.4	90.3	6.9	2.8	9.7	1.64	8.3	5.0	1.2
-4	56-109	E2	0.6	6.0	20.4	45.7	18.7	91.4	6.4	2.2	3.1	1.87	7.4	3.6	0.8
-5	109-132	E3	0.5	6.7	19.3	45.4	20.4	92.3	5.9	1.8	5.5	1.77	6.2	2.9	0.6
-6	132-145	Bt1	0.5	6.0	21.1	41.4	16.7	85.7	5.5	8.8	0.9	1.79	10.0	6.6	2.1
-7	145-160	Bt2	0.5	5.2	18.0	36.2	15.2	75.1	5.4	19.5	0.3	1.73	15.5	12.2	5.3
-8	160-203	Bt3	0.3	5.2	18.4	37.3	15.4	76.6	4.9	18.5	0.1	1.71	17.4	14.7	5.7
Troup sand:															
S40-11-1	0-20	Ap	1.1	9.8	30.7	41.2	9.2	92.0	5.4	2.6	39.1	1.36	8.8	6.1	1.9
-2	20-46	E1	1.3	8.6	29.4	42.4	10.1	91.8	5.6	2.6	13.8	1.69	6.2	4.2	1.6
-3	46-89	E2	1.6	9.2	29.7	42.6	9.3	92.4	4.5	3.1	37.5	1.56	5.6	4.0	1.5
-4	89-135	E3	1.4	8.9	27.0	45.2	10.4	92.9	4.1	3.0	41.4	1.61	4.1	2.9	1.3
-5	135-173	E3	1.5	11.1	28.4	44.5	9.3	94.8	2.6	2.6	26.7	1.63	3.9	2.5	1.0
-6	173-188	Bt1	4.4	11.9	25.7	36.6	7.4	86.0	3.1	10.9	11.7	1.66	8.2	6.7	3.3
-7	188-203	Bt2	2.1	8.6	22.4	31.9	8.0	73.0	3.6	23.4	3.2	1.67	16.1	14.3	9.3

TABLE 15.--CHEMICAL ANAYLSES OF SELECTED SOILS

Soil name and sample number	Depth	Horizon	Extractable bases: Ca	Mg	Na	K	Sum	Extractable acidity	Sum of cations	Base saturation	Organic carbon	Electrical conductivity	pH: H_2O (1:1)	$CaCl_2$ 0.1m (1:2)	KCl 1n (1:1)	Citrate-dithionite extractable: Fe	Al
	Cm		---Milliequivalents/100 grams of soil---							Pct	Pct	Mmho/cm				Pct	Pct
Alaga loamy sand:																	
S40-03-1	0-10	A1	0.91	0.39	0.14	0.08	1.52	13.41	14.93	10	2.18	0.01	4.8	4.6	4.5	---	---
-2	10-23	A2	0.29	0.16	0.06	0.02	0.53	10.98	11.51	5	1.15	0.01	5.1	4.7	4.6	---	---
-3	23-74	C1	0.15	0.15	0.08	0.02	0.40	7.74	8.14	5	0.71	0.01	5.0	4.7	4.7	---	---
-4	74-147	C2	0.13	0.20	0.03	0.03	0.39	3.62	4.01	10	0.16	0.01	5.0	4.4	4.7	---	---
-5	147-183	C3	0.10	0.14	0.02	0.01	0.27	1.35	1.62	17	0.09	0.00	5.0	4.5	4.7	---	---
-6	183-203	C4	0.15	0.19	0.02	0.02	0.38	1.31	1.69	22	0.07	0.00	4.9	4.5	4.7	---	---
Albany sand:																	
S40-12-1	0-25	Ap	0.40	0.02	0.03	0.04	0.49	9.02	9.51	5	1.03	0.06	4.5	4.3	3.9	---	---
-2	25-66	E1	0.09	0.01	0.02	0.02	0.14	4.90	5.04	3	0.36	0.04	4.7	4.4	4.4	---	---
-3	66-94	E2	0.04	0.01	0.03	0.02	0.10	2.89	2.99	3	0.13	0.04	4.7	4.7	4.7	---	---
-4	94-127	E3	0.05	0.01	0.02	0.02	0.10	1.51	1.61	6	0.06	0.04	4.5	4.7	4.7	---	---
-5	127-145	Bt	0.36	0.03	0.04	0.05	0.48	3.66	4.14	12	0.07	0.04	4.5	4.2	4.2	0.18	0.07
-6	145-175	Btg1	0.64	0.23	0.05	0.09	1.01	8.48	9.49	11	0.07	0.06	4.1	3.9	3.9	0.20	0.08
-7	175-203	Btg2	0.29	0.08	0.04	0.08	0.49	7.58	8.07	6	0.04	0.76	4.1	3.9	3.9	0.14	0.29
Alpin sand:																	
S40-10-1	0-8	Ap	0.36	0.04	0.03	0.02	0.45	3.73	4.18	11	0.76	0.07	4.8	4.3	4.1	---	---
-2	8-46	E1	0.16	0.02	0.05	0.01	0.24	2.30	2.54	9	0.31	0.03	4.9	4.7	4.5	---	---
-3	46-86	E1	0.16	0.02	0.03	0.01	0.22	1.25	1.47	15	0.07	0.03	5.0	4.7	4.6	---	---
-4	86-140	E2	0.13	0.02	0.03	0.01	0.19	0.52	0.71	27	0.03	0.02	4.8	4.5	4.5	---	---
-5	140-203	E/B	0.10	0.02	0.02	0.00	0.14	0.54	0.68	21	0.02	0.02	4.8	4.6	4.7	---	---
Blanton sand:																	
S40-27-1	0-30	Ap	0.21	0.06	0.04	0.02	0.33	4.38	4.71	7	1.11	0.03	5.1	4.7	4.5	---	---
-2	30-94	E1	0.10	0.02	0.04	0.01	0.17	3.15	3.32	5	1.54	0.03	5.0	4.8	4.8	---	---
-3	94-135	E2	0.14	0.05	0.04	0.01	0.24	2.29	2.53	9	0.46	0.02	5.0	4.8	4.8	---	---
-4	135-175	E3	0.26	0.07	0.04	0.01	0.38	1.70	2.08	18	0.14	0.02	5.2	4.9	4.8	---	---
-5	175-203	Bt	0.62	0.26	0.06	0.03	0.97	4.49	5.46	18	0.26	0.03	4.8	4.2	4.5	0.26	0.10
Chipley fine sand:																	
S40-23-1	0-15	Ap	0.10	0.04	0.07	0.03	0.24	4.23	4.47	5	0.88	0.00	4.7	4.3	4.4	---	---
-2	15-58	C1	0.06	0.02	0.06	0.01	0.15	2.52	2.67	6	0.44	0.00	5.2	4.4	4.7	---	---
-3	58-119	C2	0.08	0.02	0.04	0.00	0.14	0.80	0.94	15	0.88	0.00	5.1	4.3	4.9	---	---
-4	119-103	C3	0.03	0.01	0.06	0.00	0.09	0.77	0.86	10	0.22	0.00	5.5	4.6	5.0	---	---
Esto sandy loam:																	
S40-05-1	0-16	Ap	2.42	1.42	0.07	0.06	4.17	10.71	14.88	28	1.12	0.01	5.1	5.0	5.1	---	---
-2	16-46	Bt1	2.54	1.56	0.10	0.09	4.39	10.47	14.86	30	0.63	0.01	4.5	4.5	4.5	2.08	0.38
-3	46-61	Bt2	1.24	1.07	0.08	0.03	2.42	10.20	12.62	19	0.21	0.00	4.9	4.0	4.2	2.22	0.27
-4	61-79	Bt3	0.43	1.03	0.06	0.02	1.54	8.71	10.25	15	0.16	0.01	4.3	3.8	4.0	2.78	0.29
-5	79-112	Bt4	0.16	1.48	0.09	0.02	1.75	8.64	10.39	17	0.12	0.01	4.1	3.9	3.9	1.72	0.14
-6	112-112	Bt5	0.09	1.40	0.10	0.02	1.61	8.55	10.16	16	0.08	0.00	4.1	3.9	3.8	1.72	0.12
-7	157-203	Bt5	0.05	0.66	0.08	0.01	0.80	6.29	7.09	11	0.05	0.00	4.1	3.9	3.9	0.74	0.06

TABLE 15.--CHEMICAL ANAYLSES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Extractable bases: Ca	Extractable bases: Mg	Extractable bases: Na	Extractable bases: K	Extractable bases: Sum	Extractable acidity	Sum of cations	Base saturation	Organic carbon	Electrical conductivity	pH: H_2O (1:1)	pH: $CaCl_2$ 0.1m (1:2)	pH: KCl 1n (1:1)	Citrate-dithionite extractable: Fe	Citrate-dithionite extractable: Al
	Cm		---Milliequivalents/100 grams of soil---							Pct	Pct	Mmho/cm				Pct	Pct
Eunola fine sand:																	
S40-26-1	0-18	A	0.16	0.08	0.06	0.01	0.31	4.07	4.38	7	0.68	0.63	4.7	4.5	4.3	---	---
-2	18-30	E	0.17	0.08	0.07	0.00	0.32	3.93	4.25	8	0.29	0.03	4.8	4.5	4.7	---	---
-3	30-51	Bt1	0.32	0.14	0.07	0.01	0.54	6.01	6.55	8	0.26	0.03	4.6	4.2	4.4	0.56	0.18
-4	51-74	Bt2	0.52	0.18	0.08	0.03	0.81	9.58	10.39	8	0.16	0.03	4.6	4.2	4.3	1.04	0.22
-5	74-117	Bt3	0.20	0.13	0.08	0.04	0.53	11.18	11.71	5	0.10	0.03	4.6	4.1	4.2	1.08	0.18
-6	117-142	Bt4	0.05	0.08	0.08	0.03	0.24	7.62	7.86	3	0.04	0.02	4.7	4.1	4.2	---	---
-7	142-165	BC	0.03	0.03	0.05	0.01	0.12	4.14	4.26	3	0.20	0.03	4.7	4.2	4.4	---	---
-8	165-203	2C	0.03	0.02	0.04	0.00	0.09	1.40	1.49	6	0.17	0.03	4.1	4.4	4.5	---	---
Facevile loamy fine sand:																	
S40-13-1	0-5	Ap	1.60	0.58	0.05	0.12	2.35	5.65	8.00	29	1.18	0.07	5.3	4.9	4.6	---	---
-2	5-20	Ap	1.25	0.25	0.03	0.07	1.60	5.48	7.08	23	0.59	0.05	5.3	5.0	4.5	---	---
-3	20-30	BA	1.30	0.27	0.03	0.04	1.64	5.14	6.78	24	0.63	0.05	5.1	4.7	4.5	---	---
-4	30-71	Bt1	1.85	1.05	0.05	0.02	2.97	5.29	8.26	36	0.08	0.03	5.2	5.0	5.1	0.79	0.35
-5	71-102	Bt2	1.31	1.13	0.05	0.02	2.51	5.74	8.25	30	0.09	0.02	5.1	4.9	5.2	1.08	0.40
-6	102-129	Bt3	0.54	0.78	0.06	0.01	1.39	7.06	8.45	16	0.11	0.02	5.1	4.5	4.6	1.35	0.32
-7	129-162	Bt4	0.44	0.62	0.05	0.01	1.12	6.09	7.21	16	0.08	0.02	4.9	4.4	4.5	1.24	0.31
-8	162-203	BC	0.44	0.33	0.06	0.01	0.84	4.98	5.82	14	0.12	0.03	4.7	4.3	4.4	---	---
Fuquay sand:																	
S40-22-1	0-15	Ap	0.80	0.21	0.07	0.29	1.37	6.10	7.47	18	0.93	0.01	5.6	4.9	4.6	---	---
-2	15-76	E	0.37	0.08	0.06	0.09	0.60	2.32	2.92	21	0.28	0.01	5.9	5.2	4.5	---	---
-3	76-89	BE	0.26	0.11	0.07	0.11	0.55	2.90	3.45	16	0.16	0.00	5.3	4.3	4.2	---	---
-4	89-104	Btv1	0.59	0.25	0.08	0.17	1.09	4.45	5.54	20	0.20	0.01	4.5	4.2	4.3	0.76	0.16
-5	104-137	Btv2	0.72	0.66	0.08	0.09	1.55	6.62	8.17	19	0.11	0.00	4.4	4.2	4.1	1.48	0.22
-6	137-203	Btv3	0.21	0.29	0.09	0.05	0.64	8.91	9.55	7	0.11	0.00	4.2	4.0	4.0	3.48	0.32
Kenansville loamy fine sand:																	
S40-25-1	0-10	A	2.42	0.23	0.06	0.04	2.75	11.83	14.58	19	2.29	0.01	5.2	4.5	4.4	---	---
-2	10-38	E1	0.37	0.05	0.03	0.01	0.46	2.39	2.85	16	0.42	0.03	5.4	4.8	4.7	---	---
-3	38-56	E2	0.32	0.16	0.03	0.00	0.51	1.49	2.00	26	0.31	0.03	5.5	4.9	4.8	---	---
-4	56-66	Bt1	0.59	0.70	0.05	0.01	1.35	3.43	4.78	28	0.16	0.03	5.5	4.6	4.6	0.28	0.08
-5	66-96	Bt2	0.60	0.82	0.05	0.02	1.49	6.49	7.98	19	0.20	0.00	4.8	4.2	4.4	0.58	0.16
-6	96-124	Bt3	0.28	0.34	0.07	0.03	0.72	7.06	7.78	9	0.16	0.03	4.7	4.2	4.3	0.54	0.14
-7	124-142	BC	0.19	0.20	0.06	0.01	0.46	3.57	4.03	11	0.06	0.03	4.7	4.3	4.5	---	---
-8	142-175	CB	0.09	0.11	0.05	0.01	0.26	2.32	2.58	10	0.03	0.03	4.9	4.5	4.6	---	---
-9	175-203	2C	0.08	0.08	0.05	0.00	0.21	0.75	0.96	22	0.04	0.02	5.3	4.7	4.9	---	---
Lovett sand:																	
S40-06-1	0-23	Ap	0.78	0.27	0.05	0.08	1.16	3.72	4.88	24	0.78	0.00	5.1	4.6	4.6	---	---
-2	23-58	E	0.38	0.15	0.04	0.03	0.57	1.54	2.11	27	0.21	0.00	5.1	4.6	4.6	---	---
-3	58-96	E	0.38	0.15	0.04	0.04	0.59	1.46	2.05	29	0.11	0.00	4.9	4.5	4.5	0.20	0.06
-4	96-119	Bt1	1.48	0.74	0.06	0.05	2.32	3.74	6.06	38	0.15	0.01	4.7	4.4	4.4	0.88	0.17
-5	119-157	Bt2	1.68	1.11	0.06	0.03	2.80	7.58	10.38	27	0.15	0.00	4.6	4.2	4.2	2.88	0.27
-6	157-203	C	0.38	1.15	0.07	0.02	1.54	5.95	7.49	21	0.14	0.00	4.3	4.1	4.0	---	---

TABLE 15.--CHEMICAL ANAYLSES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Extractable bases: Ca	Extractable bases: Mg	Extractable bases: Na	Extractable bases: K	Extractable bases: Sum	Extractable acidity	Sum of cations	Base saturation	Organic carbon	Electrical conductivity	pH H_2O (1:1)	pH $CaCl_2$ 0.1m (1:2)	pH KCl 1n (1:1)	Citrate-dithionite extractable Fe	Citrate-dithionite extractable Al
	Cm		---Milliequivalents/100 grams of soil---							Pct	Pct	Mmho/cm				Pct	Pct
Lucy sand:																	
S40-07-1	0-28	Ap	2.48	0.95	0.05	0.15	3.62	4.16	7.78	47	0.94	0.01	5.2	5.0	5.1	---	---
-2	28-61	E	1.38	0.53	0.05	0.10	1.98	4.10	6.08	33	0.22	0.01	5.1	4.9	4.8	---	---
-3	61-86	Bt1	2.28	0.99	0.07	0.09	3.40	5.33	8.73	39	0.28	0.01	5.1	4.9	4.8	0.86	0.16
-4	86-122	Bt2	1.18	0.66	0.06	0.03	1.92	7.50	9.42	20	0.06	0.01	4.7	4.3	4.3	2.25	0.20
-5	122-162	Bt3	0.78	0.95	0.07	0.02	1.76	7.10	8.86	20	0.07	0.01	4.5	4.2	4.1	1.43	0.23
-6	162-203	Bt3	0.68	1.40	0.06	0.03	2.18	8.20	10.38	21	0.08	0.00	4.7	3.9	4.1	1.34	0.22
Nankin fine sand:																	
S40-04-1	0-18	Ap	0.52	0.25	0.07	0.04	0.88	4.81	5.69	15	1.07	0.01	4.8	4.5	4.5	---	---
-2	18-36	E	0.31	0.23	0.03	0.01	0.58	3.40	3.98	15	0.46	0.01	4.8	4.5	4.6	---	---
-3	36-48	Bt1	0.29	0.80	0.05	0.02	1.16	6.48	7.64	15	0.37	0.01	3.9	4.0	4.1	0.05	0.05
-4	48-76	Bt2	0.09	0.88	0.06	0.03	1.06	7.47	8.53	12	0.14	0.00	4.3	4.0	4.1	0.03	0.05
-5	76-119	Bt3	0.06	0.60	0.07	0.03	0.76	7.39	8.15	9	0.11	0.00	4.3	4.0	4.1	0.02	0.05
-6	119-137	Bt4	0.05	0.45	0.09	0.03	0.62	8.48	9.10	7	0.27	0.00	4.3	3.8	4.0	---	---
-7	137-203	BC	0.02	0.20	0.04	0.02	0.28	6.82	7.10	4	0.15	0.01	4.3	3.8	4.0	0.04	0.05
Ocilla sand:																	
S40-20-1	0-8	A	0.11	0.07	0.06	0.02	0.36	5.86	6.22	6	0.81	0.03	4.9	4.2	4.0	---	---
-2	8-33	E1	0.04	0.03	0.01	0.01	0.19	3.45	3.64	5	0.30	0.00	5.1	4.5	4.4	---	---
-3	33-48	E2	0.05	0.02	0.00	0.01	0.16	2.85	3.01	5	0.22	0.00	5.2	4.6	4.4	---	---
-4	48-61	E3	0.10	0.02	0.08	0.01	0.21	1.83	2.04	10	0.06	0.02	4.9	4.4	4.4	0.16	0.04
-5	61-74	E4	0.09	0.04	0.09	0.01	0.23	2.20	2.43	9	0.06	0.02	4.8	4.2	4.3	0.32	0.08
-6	74-96	Bt1	0.17	0.14	0.04	0.01	0.46	4.09	4.55	10	0.07	0.02	4.9	4.2	4.1	---	---
-7	86-117	Bt2	0.37	0.27	0.01	0.03	0.88	9.89	10.77	8	0.13	0.02	4.9	4.1	4.0	---	---
-8	117-160	Bt2	0.20	0.18	0.09	0.04	0.61	10.36	10.97	6	0.06	0.00	4.9	4.0	3.9	---	---
-9	160-203	Bt2	0.16	0.20	0.08	0.04	0.58	9.60	10.18	6	0.02	0.00	5.0	4.0	3.9	---	---
Orangeburg loamy sand:																	
S40-02-1	0-15	A	1.22	0.55	0.05	0.05	1.86	10.47	12.34	15	1.38	0.01	5.0	4.8	4.5	---	---
-2	15-38	E	1.01	0.37	0.04	0.02	1.48	8.06	9.50	15	0.71	0.01	5.1	4.9	4.8	---	---
-3	38-66	Bt1	0.97	0.64	0.03	0.02	1.69	5.35	7.01	24	0.29	0.01	4.9	4.8	4.8	0.08	0.07
-4	66-112	Bt2	1.34	1.40	0.06	0.03	2.87	5.32	8.15	35	0.10	0.01	5.0	4.8	4.8	0.10	0.07
-5	112-157	Bt2	0.80	1.31	0.09	0.02	2.25	7.57	9.79	23	0.12	0.01	4.7	4.4	4.5	0.11	0.08
-6	157-203	Bt2	0.35	0.78	0.06	0.02	1.29	7.81	9.02	13	0.09	0.01	4.6	4.1	4.2	0.16	0.08
Pamlico muck:																	
S40-16-1	0-15	Oa1	0.15	2.22	0.00	0.09	2.98	220.61	223.57	1	53.64	0.20	3.1	2.6	2.0	---	---
-2	15-38	Oa2	0.09	1.56	0.08	0.05	2.18	226.26	228.44	1	55.94	0.11	3.1	2.6	2.0	---	---
-3	38-84	Oa3	0.12	0.46	0.09	0.02	0.88	98.58	99.47	1	24.69	0.12	3.6	2.7	2.0	---	---
-4	84-109	C1	0.03	0.02	0.02	0.00	0.08	0.00	0.15	47	0.18	0.02	4.4	3.9	3.5	---	---
-5	109-152	C2	0.02	0.01	0.02	0.00	0.08	0.55	0.60	8	0.26	0.02	4.5	4.0	3.7	---	---
-6	152-203	C3	0.25	0.45	0.06	0.08	0.78	7.25	8.04	10	0.36	0.02	4.5	3.8	3.4	---	---

TABLE 15.--CHEMICAL ANAYLSES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Extractable bases: Ca	Extractable bases: Mg	Extractable bases: Na	Extractable bases: K	Extractable bases: Sum	Extractable acidity	Sum of cations	Base saturation	Organic carbon	Electrical conductivity	pH: H_2O (1:1)	pH: $CaCl_2$ 0.1m (1:2)	pH: KCl 1n (1:1)	Citrate-dithionite extractable: Fe	Citrate-dithionite extractable: Al
	Cm		---Milliequivalents/100 grams of soil---							Pct	Pct	Mmho/cm				Pct	Pct
Pelham sand:																	
S40-19-1	0-18	Ap	0.41	0.12	0.08	0.05	0.66	11.51	12.17	5	1.93	0.03	5.0	4.4	3.9	---	---
-2	18-33	A	0.08	0.02	0.02	0.01	0.13	5.55	5.73	3	0.56	0.01	5.0	4.6	4.2	---	---
-3	33-61	E	0.05	0.01	0.02	0.01	0.09	3.43	3.52	3	0.18	0.01	5.0	4.5	4.2	---	---
-4	61-84	Btg1	0.18	0.09	0.04	0.02	0.33	6.09	6.42	5	0.19	0.01	4.9	4.2	3.8	0.18	0.12
-5	84-127	Btg2	0.33	0.16	0.06	0.03	0.58	8.59	9.17	6	0.16	0.01	4.9	4.1	3.6	0.41	0.16
-6	127-165	Btg3	0.49	0.23	0.07	0.05	0.84	10.82	11.66	7	0.14	0.01	5.0	4.1	3.6	1.52	0.24
-7	165-203	Btg4	0.66	0.33	0.08	0.08	0.15	12.32	13.47	9	0.10	0.01	4.9	4.0	3.5	1.55	0.20
Plummer sand:																	
S40-18-1	0-18	Ap	0.48	0.16	0.06	0.08	0.78	9.74	10.52	7	1.68	0.01	5.0	4.5	3.9	---	---
-2	18-36	AE	0.09	0.03	0.03	0.02	0.17	6.86	7.03	2	0.97	0.01	5.1	4.7	4.1	---	---
-3	36-56	E1	0.04	0.01	0.03	0.01	0.09	3.62	3.71	2	0.46	0.01	5.1	4.8	4.4	---	---
-4	56-109	E2	0.05	0.02	0.02	0.01	0.10	1.52	1.62	6	0.13	0.01	5.4	4.9	4.5	---	---
-5	109-132	E3	0.09	0.05	0.02	0.01	0.17	0.93	1.10	15	0.08	0.01	5.6	5.1	4.6	---	---
-6	132-145	Bt1	0.41	0.15	0.05	0.09	0.70	2.72	3.42	20	0.07	0.01	5.6	4.8	4.2	0.03	0.08
-7	145-160	Bt2	0.93	0.41	0.07	0.00	0.61	6.32	7.93	20	0.10	0.03	5.2	4.3	3.9	0.10	0.12
-8	160-203	Bt3	0.26	0.16	0.05	0.07	0.54	28.46	29.00	2	0.08	0.03	4.8	4.2	3.9	0.23	0.18
Troup sand:																	
S40-11-1	0-20	Ap	2.06	0.24	0.06	0.03	2.39	0.51	2.90	82	1.00	0.06	4.9	4.9	4.5	---	---
-2	20-46	E1	0.41	0.08	0.04	0.01	0.54	3.31	3.85	14	0.40	0.03	5.1	5.0	4.5	---	---
-3	46-89	E2	0.17	0.03	0.03	0.01	0.24	2.31	2.55	9	0.23	0.05	6.5	4.8	4.6	---	---
-4	89-135	E3	0.17	0.06	0.03	0.01	0.27	1.46	1.73	16	0.07	0.04	5.4	4.7	4.7	---	---
-5	135-173	E3	0.16	0.04	0.03	0.01	0.24	0.40	0.64	38	0.01	0.04	5.1	4.8	4.7	---	---
-6	173-188	Bt1	0.38	0.31	0.05	0.02	0.76	2.69	3.45	22	0.05	0.04	4.9	4.8	4.7	0.41	0.14
-7	188-203	Bt2	0.27	0.30	0.06	0.02	0.65	5.24	5.89	11	0.10	0.04	4.8	4.7	4.3	0.76	0.24

TABLE 16.--CLAY MINERALOGY OF SELECTED SOILS

Soil name and sample number	Depth	Horizon	Clay minerals			
			Montmo-rillonite	14-angstrom intergrade	Kaolinite	Quartz
	Cm		Pct	Pct	Pct	Pct
Alaga loamy sand:						
S40-03-1	0-10	A1	0	37	46	17
-4	74-147	C2	0	31	63	6
-6	183-203	C4	0	18	78	4
Albany sand:						
S40-12-1	0-25	Ap	0	16	18	66
-5	127-145	Bt	0	9	6	5
-7	175-203	Btg2	0	5	91	4
Alpin sand:						
S40-10-1	0-8	A	0	36	14	50
-3	40-86	E1	0	15	6	79
-5	140-203	E/B	12	33	22	33
Blanton sand:						
S40-27-1	0-30	Ap	32	0	42	26
-5	175-203	Bt	23	0	67	10
Chipley fine sand:						
S40-27-1	0-15	Ap	0	56	20	24
-3	58-119	C2	12	52	25	11
-4	119-203	C3	12	42	12	34
Esto sandy loam:						
S40-05-1	0-18	Ap	0	18	77	5
-3	46-61	Bt2	0	8	86	6
-5	79-112	Bt4	0	6	91	3
-7	157-203	Bt5	0	8	88	4
Eunola fine sand:						
S40-26-1	0-18	Ap	0	37	54	9
-3	30-51	Bt1	0	31	59	10
-5	74-117	Bt3	0	29	51	20
-8	165-203	2C	0	29	60	11
Faceville loamy fine sand:						
S40-13-1	0-15	Ap	0	24	71	5
-4	30-71	Bt1	0	15	81	4
-6	102-129	Bt3	0	9	88	3
-8	162-203	BC	0	5	92	3
Fuquay sand:						
S40-22-1	0-15	Ap	0	32	61	7
-4	89-104	Btv1	0	27	69	4
-6	137-203	Btv3	0	13	87	0
Kenansville loamy fine sand:						
S40-25-1	0-10	A	0	37	51	12
-5	66-96	Bt2	0	29	64	7
-9	175-203	2C	0	28	60	12
Lovett sand:						
S40-06-1	0-23	Ap	0	47	40	13
-4	96-119	Bt1	0	34	59	7
-6	157-203	C	0	12	82	6

TABLE 16.--CLAY MINERALOGY OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Clay minerals: Montmo-rillonite	14-angstrom intergrade	Kaolinite	Quartz
	Cm		Pct	Pct	Pct	Pct
Lucy sand:						
S40-07-1	0-28	Ap	0	40	49	11
-4	86-122	Bt2	0	24	68	8
-6	162-203	Bt3	0	20	74	6
Nankin fine sand:						
S40-04-1	0-18	Ap	0	25	67	8
-3	36-48	Bt1	0	11	85	4
-5	76-119	Bt3	0	6	91	3
-7	137-203	BC	0	9	87	4
Ocilla sand:						
S40-20-1	0-8	A	0	36	52	12
-5	61-74	E4	0	24	67	9
-9	160-203	Bt2	0	12	67	21
Orangeburg loamy sand:						
S40-02-1	0-15	A	0	46	44	10
-4	66-112	Bt2	0	30	64	6
-6	157-203	Bt2	0	28	67	5
Pamlico muck:						
S40-16-4	84-109	C1	40	8	26	26
-6	152-203	C3	13	7	73	7
Pelham sand:						
S40-19-1	0-18	Ap	0	43	44	13
-5	84-127	Btg2	0	13	84	3
-7	165-203	Btg4	0	6	92	2
Plummer sand:						
S40-18-1	0-18	Ap	0	43	38	19
-6	132-145	Btg1	0	38	51	11
-8	160-203	Btg3	14	25	54	7
Troup sand:						
S40-11-1	0-20	Ap	0	33	23	44
-6	173-188	Bt1	0	20	75	5

TABLE 17.--ENGINEERING INDEX TEST DATA

[Tests performed by the Florida Department of Transportation (FDOT) in cooperation with the U.S. Bureau of Public Roads, in accordance with standard procedures of the American Association of State Highway and Transportation Officials (AASHTO). See the section "Soil Series and Their Morphology" for location of pedon sampled. NP means nonplastic]

Soil name, report number, horizon, and depth (in inches)	FDOT report number	Classification: AASHTO ***	Classification: Unified ****	Mechanical analyses*: Percentage passing sieve smaller than-- No. 4	No. 10	No. 40	No. 200	Percentage smaller than-- .05 mm	.02 mm	.005 mm	.002 mm	Liquid limit	Plasticity index	Moisture density**: Maximum dry density	Optimum moisture
												Pct		Lb/ft^3	Pct
Alaga loamy sand:															
(S83FL-079-003)															
C2-------------29-58	3	A-2-4	SM	100	100	84	15	14	11	8	7	----	NP	116.9	10.5
Albany sand:															
(S84FL-079-012)															
E3-------------37-50	19, 20	A-2-4	SM	100	100	87	13	11	8	4	4	----	NP	113.4	10.6
Btg1-----------57-69		A-7-6	SC	100	96	84	46	45	44	41	39	43.0	23.0	109.0	16.7
Alpin sand:															
(S84FL-079-009)															
E2-------------34-55	16	A-2-4	SP-SM	100	100	74	11	8	4	2	2	----	NP	113.4	9.5
Blanton sand:															
(S83FL-079-010)															
E1-------------12-37	36	A-2-4	SP-SM	100	100	88	12	9	7	5	5	----	NP	115.4	10.5
Chipley fine sand:															
(S85FL-079-023)															
C2-------------23-47	34	A-3	SP-SM	100	100	94	9	6	4	2	2	----	NP	107.6	12.6
Esto sandy loam:															
(S83FL-079-005)															
Bt1-------------7-18	6, 7	A-7-6	CL	100	100	94	64	63	57	54	51	45.2	23.9	98.9	20.4
Bt5------------44-80		A-7-6	CL	100	100	99	78	72	64	62	59	45.4	21.3	100.4	21.7
Eunola fine sand:															
(S86FL-079-026)															
Bt3------------29-46	38	A-7-6	CL	100	100	100	54	45	41	36	34	41.0	26.0	109.4	15.9
Faceville loamy fine sand:															
(S84FL-079-013)															
Bt2------------28-40	21, 22	A-2-6	SC	100	100	91	45	42	39	32	31	30.0	15.0	116.1	13.2
BC-------------64-80		A-2-6	SC	100	100	90	44	41	36	32	32	28.0	15.0	115.0	13.7

See footnotes at end of table.

TABLE 17.--ENGINEERING INDEX TEST DATA--Continued

Soil name, report number, horizon, and depth (in inches)	FDOT report number	Classification		Mechanical analyses*								Liquid limit	Plasticity index	Moisture density**	
				Percentage passing sieve smaller than--				Percentage smaller than--							
		AASHTO ***	Unified ****	No. 4	No. 10	No. 40	No. 200	.05 mm	.02 mm	.005 mm	.002 mm			Maximum dry density	Optimum moisture
												Pct		Lb/ft^3	Pct
Fuquay sand: (S84FL-079-013)															
E---------------6-30	32, 33	A-2-4	SM	100	100	90	18	14	8	3	3	----	NP	113.8	11.0
Btv2-----------41-54		A-2-6	SC	100	100	91	35	32	25	24	23	27.0	11.0	115.6	13.6
Kenansville loamy fine sand: (S86FL-079-025)															
Bt2------------26-38	39, 37	A-6	SC	100	100	99	50	40	31	29	26	28.8	12.0	116.0	13.0
2C1------------56-69		A-2-4	SM	100	100	100	13	8	5	5	5	----	NP	102.5	7.1
Lovett sand: (S83FL-079-006)															
E2-------------23-38	8, 9	A-2-4	SM	100	100	90	22	17	10	8	7	----	NP	121.0	9.1
Bt2------------47-62		A-7-6	CL	100	100	93	53	51	46	42	42	44.0	23.7	104.7	20.0
Lucy sand: (S83FL-079-007)															
E--------------11-24	10, 11	A-2-4	SM	100	100	85	18	16	13	11	9	----	NP	122.7	9.3
Bt3------------48-80		A-2-4	SC	100	100	86	32	31	27	26	24	24.8	8.8	118.5	11.5
Nankin fine sand: (S83FL-079-004)															
Bt2------------19-30	4, 5	A-7-6	CL	100	100	99	52	51	51	48	47	48.0	28.8	100.8	21.2
BC-------------54-80		A-7-6	CL	100	100	99	49	48	46	43	42	41.0	22.0	105.7	19.5
Ocilla fine sand: (S85FL-079-020)															
Btg1-----------34-46	29	A-6	SC	100	100	92	38	33	28	25	25	34.0	18.0	114.5	14.2
Orangeburg loamy sand: (S83FL-079-002)															
Bt2------------26-80	2	A-6	SC	100	100	92	38	37	35	33	32	30.0	13.0	111.9	14.8
Pelham sand: (S84FL-079-019)															
E--------------13-24	27, 28	A-2-4	SM	100	100	93	22	15	9	7	6	----	NP	118.9	9.3
Btg2-----------33-50		A-6	SC	100	100	94	40	37	33	31	30	30.0	14.0	111.8	15.3

See footnotes at end of table.

TABLE 17.--ENGINEERING INDEX TEST DATA--Continued

Soil name, report number, horizon, and depth (in inches)	FDOT report number	Classification: AASHTO ***	Classification: Unified ****	Mechanical analyses*: Percentage passing sieve smaller than--: No. 4	No. 10	No. 40	No. 200	Percentage smaller than--: .05 mm	.02 mm	.005 mm	.002 mm	Liquid limit	Plasticity index	Moisture density**: Maximum dry density	Optimum moisture
												Pct		Lb/ft^3	Pct
Plummer sand:															
(S84FL-079-018)															
E2-------------22-43	25, 26	A-2-4	SP-SM	100	100	90	17	13	8	5	3	----	NP	115.5	11.1
Btg3-----------63-80		A-2-4	SM	100	100	92	30	28	25	22	20	----	NP	118.6	11.9
Troup sand:															
(S84FL-079-011)															
E3-------------35-68	17, 18	A-3	SP-SM	100	100	78	9	15	5	4	3	----	NP	112.4	11.2
Bt2------------74-80		A-2-6	SC	100	100	85	31	30	28	26	25	28.0	12.0	117.0	13.6

* Mechanical analyses according to AASHTO designation T88-70. Results by this procedure differ somewhat from those obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHTO procedure, the fine material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the basis of all the material, including that coarser than 2 millimeters in diameter is excluded from the calculations of grain-size fractions. The mechanical analyses used in this table are not suitable for use in naming textural classes for soil.

** Based on AASHTO designation T99-70.

*** Based on AASHTO designation M145-66.

**** Based on AASHTO designation D2487-69.

TABLE 18.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Alaga	Thermic, coated Typic Quartzipsamments
*Albany	Loamy, siliceous, thermic Grossarenic Paleudults
Alpin	Thermic, coated Typic Quartzipsamments
Blanton	Loamy, siliceous, thermic Grossarenic Paleudults
Bonifay	Loamy, siliceous, thermic Grossarenic Plinthic Paleudults
Cantey	Clayey, kaolinitic, thermic Typic Albaquults
Chipley	Thermic, coated Aquic Quartzipsamments
Dorovan	Dysic, thermic Typic Medisaprists
Esto	Clayey, kaolinitic, thermic Typic Paleudults
Eunola	Fine-loamy, siliceous, thermic Aquic Hapludults
Faceville	Clayey, kaolinitic, thermic Typic Paleudults
*Fuquay	Loamy, siliceous, thermic Arenic Plinthic Kandiudults
Goldsboro	Fine-loamy, siliceous, thermic Aquic Paleudults
*Kenansville	Loamy, siliceous, thermic Arenic Hapludults
Lakeland	Thermic, coated Typic Quartzipsamments
Lovett	Loamy, siliceous, thermic Arenic Paleudults
Lucy	Loamy, siliceous, thermic Arenic Paleudults
Mascotte	Sandy, siliceous, thermic Ultic Haplaquods
Nankin	Clayey, kaolinitic, thermic Typic Hapludults
Ocilla	Loamy, siliceous, thermic Aquic Arenic Paleudults
Orangeburg	Fine-loamy, siliceous, thermic Typic Paleudults
Pamlico	Sandy or sandy-skeletal, siliceous, dysic, thermic Terric Medisaprists
*Pelham	Loamy, siliceous, thermic Arenic Paleaquults
Plummer	Loamy, siliceous, thermic Grossarenic Paleaquults
Sapelo	Sandy, siliceous, thermic Ultic Haplaquods
Surrency	Loamy, siliceous, thermic Arenic Umbric Paleaquults
Troup	Loamy, siliceous, thermic Grossarenic Paleudults

* The soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series.

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