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;
Florida Department of
Agriculture and Consumer
Services; and United
States Department of
Agriculture, Forest
Service

Soil Survey of Wakulla County, Florida

How To Use This Soil Survey

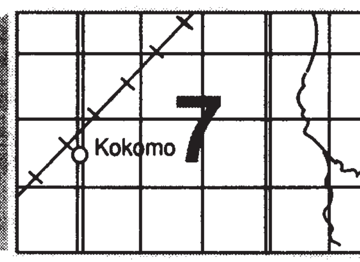
General Soil Map

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.

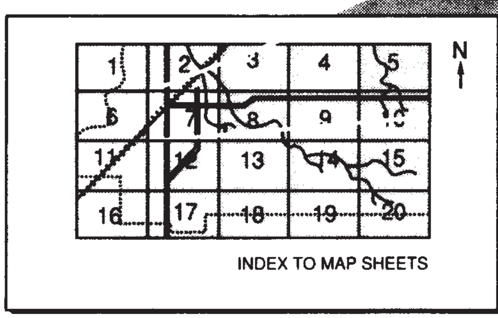
Detailed Soil Maps

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

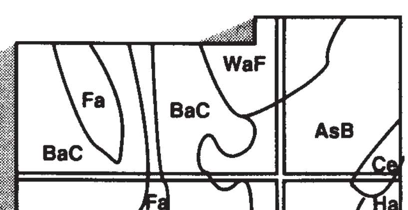
To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



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.

MAP SHEET



AREA OF INTEREST

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

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

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1987. Soil names and descriptions were approved in 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; Florida Department of Agriculture and Consumer Services; and United States Department of Agriculture, Forest Service. This survey is part of the technical assistance furnished to the Wakulla County Soil and Water Conservation District. The Wakulla Board of County 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: The St. Marks Lighthouse, a landmark in Wakulla County, in an area of Bayvi, Isles, and Estero soils, frequently flooded.

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Issued March 1991

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Foreword

This soil survey contains information that can be used in land-planning programs in Wakulla 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 shallow to bedrock. 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 Glasgow

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State Conservationist
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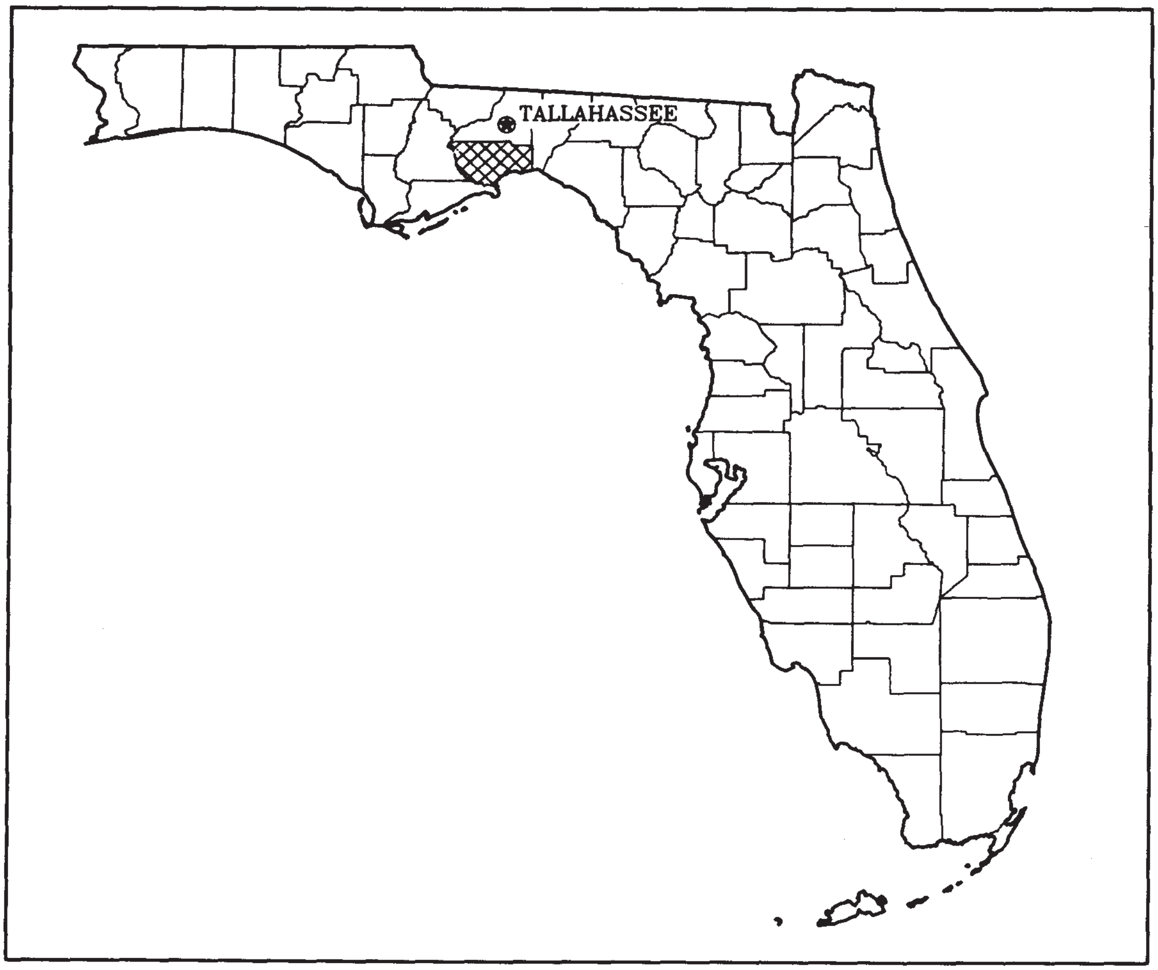

Location of Wakulla County in Florida.

Soil Survey of Wakulla County, Florida

By William Jeffrey Allen, Soil Conservation Service

Fieldwork by Walter G. George, David M. Kriz, and Leland D. Sasser, Soil Conservation Service; and Pete Avers, Jim Harrisman, James Hart, Mike Jones, John Vann, and William R. White, United States Department of Agriculture, Forest 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; the Florida Department of Agriculture and Consumer Services; and the United States Department of Agriculture, Forest Service

WAKULLA COUNTY is in the Big Bend area of the Florida Panhandle. It is bordered on the north by Leon County, on the east by Jefferson County, on the west by Liberty County, and on the south by Franklin County and the Gulf of Mexico.

The land area of the county is about 384,845 acres, or about 600 square miles *(14)*. Of this acreage, 222,738 acres is federally owned. About 167,054 acres is in the Apalachicola National Forest and 55,684 acres in the St. Marks National Wildlife Refuge. The county is about 22 miles wide from north to south and 36 miles wide from east to west.

Until the early 1960's, Wakulla County was a sparsely populated, rural county. During the 1960's, the population of the county almost doubled. Since then, it has increased to about 15,000. Crawfordville, the county seat, is only 20 miles from Tallahassee, the state capital. A majority of the county residents work in Tallahassee. Seafood and wood products are the major industries in the county. About 2 percent of the land area is used for agriculture, mainly for the production of row crops and as pasture.

General Nature of the County

This section gives information about the climate, history, transportation facilities, and geology in Wakulla County.

Climate

Wakulla County has a moderate climate. Summers are long, warm, and humid. Winters are mild or cool. The Gulf of Mexico moderates the maximum and minimum temperatures.

Annual rainfall in the county averages about 57 inches. Rainfall is heaviest from June through September. About 47 percent of the annual rainfall occurs during this period. October and November are the driest months. The remainder of the year receives evenly distributed rainfall.

Most summer rainfall occurs as local afternoon or early evening thundershowers. Measurable rainfall can be expected every other day from June through September. Summer showers are sometimes heavy with 2 or 3 inches of rain falling in an hour or two. Daylong rains in summer are rare and almost always are associated with a tropical storm. Winter and spring rains generally are associated with large-scale, continental weather developments and are of longer duration. Some last for 24 hours or more. They generally are not so intense as the thundershowers; but, occasionally, they do result in large amounts of rainfall over a large area. A 24-hour rainfall of 7 inches or more occurs about once every 10 years.

Hail occurs at irregular intervals during thundershowers. The hailstones are generally small and seldom cause much damage. Snow is very rare in the area and generally melts as it hits the ground.

Tropical storms can affect the area at any time from early in June through mid-November. The intensity of these storms diminishes quite rapidly as the storms move inland. The likelihood of a hurricane in Wakulla County is about once every 13 years, but fringe effects are felt about once every 5 years. Extended periods of dry weather can occur in any season but are most common in spring and fall. Dry periods in April and May generally are of shorter duration than those in the fall but are intensified by higher temperatures.

As the cold continental air flows eastward across the Florida Panhandle toward Wakulla County, the cold air is appreciably modified. The coldest weather generally occurs the second night after the arrival of a cold front and after heat is lost through radiation. The average date of the first freezing temperature is about December 3, and the average date of the last freezing temperature is about February 26. Frost has occurred, however, as early as November 1 and as late as April 15. Table 1 shows freeze data for Wakulla County.

Summer temperatures are moderated by the gulf breeze and by cumulus clouds that frequently shade the land without completely obscuring the sun. The mean average temperature from June through September is about 80 degrees F. Temperatures of 86 degrees or higher have occurred during the period May through September, but 100 degrees is rarely reached. June, July, and August are the warmest months. Their average maximum temperature is 90 degrees. Fewer than 22 days of the year have temperatures above 95 degrees. Temperature and precipitation data are shown in table 2.

Fog occurs on an average of six mornings a month in winter and spring and almost never occurs in summer and fall. Prevailing winds generally are from the south in spring and summer. From October through January, however, the winds blow from the north. The mean windspeed for the year is 7.3 miles per hour. The lowest monthly mean windspeed of 5.8 miles per hour occurs in August, and the highest monthly mean windspeed of 9 miles per hour occurs in March.

History

Wakulla County was established on March 11, 1843 *(15)*. The original inhabitants of the area, the Apalachee Indians, were mainly hunters and gatherers. They used very advanced farming methods for their time.

In about 1528, Panfilo de Narvaez led the first Spanish expedition up the west coast of the peninsula. Later, Spanish colonists and missionaries developed the area. In 1679, Fort San Marcos de Apalachee was built by the Spaniards at the confluence of the St. Marks and Wakulla Rivers. This fort was destroyed and rebuilt several times. The remains of the fort are still visited by many tourists.

During the 19th century, the seaport area of the St. Marks River experienced a period of economic prosperity. Between 1821 and 1843, five towns were established along the river as a result of the lucrative cotton transport business. St. Marks was the first town established in the area on the site of Fort San Marcos de Apalachee, but it could not handle the growing waterborne cotton trade. Rockhaven was established at the rise of the St. Marks River but never realized its anticipated prosperity because the entrance into the port was obstructed by a natural bridge of stone. Magnolia, which was established about 7 miles above St. Marks, was abandoned soon after the mule-driven railroad between Tallahassee and St. Marks diverted most of the cotton trade. In 1843, Port Leon was established between St. Marks and Magnolia and was designated the county seat. The town was destroyed by a hurricane later that year and was never rebuilt. The county seat was moved from Port Leon to its present site in Crawfordville. Newport, which was established in 1843, experienced phenomenal prosperity and at its peak was the fifth largest town in Florida with a population of about 1,500. Rail transportation eventually brought about the demise of Newport and the waterborne cotton trade.

During the Civil War, the largest industry in Florida was the production of salt, which was produced by boiling seawater. Several saltworks were established at the head of small inlets and bays along the coast, but they were destroyed by Union soldiers during the war.

Around the turn of the century, the immense pine forests in Wakulla County attracted many entrepreneurs. Sopchoppy was the center of the turpentine industry. The production of turpentine was the principal industry in the county during the 1910's and early 1920's. In 1928, a hurricane destroyed many of the pine trees and as a result drastically affected the economy of the county.

Many sawmills were along creeks, which flowed into the Ochlockonee River in the western part of the county. Honey production was also a thriving industry.

In 1828, the United States Congress authorized the construction of a lighthouse at St. Marks. The building and tower were completed in 1831 and were renovated in 1867. Archeological evidence indicates that the Spanish built a lighthouse early in their explorations.

The St. Marks Wildlife Refuge, which was established along the coast in 1929, is home to thousands of migratory birds during the winter. At one time it was the only major wintering area of Canada geese in Florida. Over 35,000 geese once refuged at St. Marks.

The principal industries in Wakulla County now are seafood and tourism, followed by wood products and agriculture. The Apalachicola National Forest in Wakulla County is an important source of revenue and also provides excellent opportunities for hunting, fishing, and other recreational activities for local residents. In 1975, about 23,432 acres of the National Forest in Bradwell Bay was designated as a wilderness area.

Transportation Facilities

Wakulla County is served by a network of highways. U.S. Highway 319 crosses the middle of the county in a north-south direction, while U.S. Highway 98 parallels the coast in an east-west direction. The United States Department of Agriculture, Forest Service, maintains an extensive network of roads through the Apalachicola National Forest, which is in the western part of the county.

Regularly scheduled air transportation is not available in the county, but the Tallahassee Municipal Airport, which is only 20 miles to the north, offers both passenger and freight air service.

Geology

Steven M. Spencer and Frank R. Rupert, geologists, Geological Survey, Bureau of Geology, Florida Department of Natural Resources, prepared this section.

Wakulla County is in the Gulf Coastal Lowlands physiographic province. The county is essentially flat and has a Pleistocene-age to Holocene-age sand cover extending from the Gulf of Mexico north to the Cody Scarp in Leon County. The Cody Scarp forms the boundary between the Gulf Coastal Lowlands to the south and the Tallahassee Hills to the north *(28)*. The average north-to-south slope of the land surface is 4 feet per mile *(29)*.

Ancient marine geomorphic features, including beach ridges, spits, bars, dunes, and terraces, make up modern topography in Wakulla County *(30)*. Five marine terraces in the county are distinguished by using topographic elevations *(16)*. Terraces represent wave-cut platforms and depositional features that formed during still stands of the sea. In Wakulla County the Wicomico terrace was mapped at 70 to 100 feet above mean sea level (m.s.l.), the Penholoway terrace at 42 to 70 feet above m.s.l., the Talbot terrace at 25 to 42 feet above m.s.l., the Pamlico terrace at 10 to 25 feet above m.s.l., and the Silver Bluff terrace at 0 to 10 feet above m.s.l. *(16)*.

The Gulf Coastal Lowlands are subdivided *(17, 28)* into the Woodville Karst Plain and the Apalachicola Coastal Lowlands (fig. 1). The Woodville Karst Plain in Wakulla County is east of an approximate north-south line through Crawfordville and Panacea *(29)*. The sediments at the surface and near the surface are made up of quartz sand that generally is not more than 20 feet thick. This sand cover is underlain by a karstic, early Miocene limestone.

Minor geomorphic features *(17)* that lie in the Woodville Karst Plain include the Lake Munson Hills, a series of relict sand dunes and bars relating to the Wicomico sea level stand; the Wakulla Sand Hills, sand dunes relating to the Pamlico sea level stand; and the River Valley Lowlands of the St. Marks and Wakulla Rivers. The Coastal Marsh Belt, representing the seaward edge of the Silver Bluff shoreline *(23, 28)*, is along the Gulf of Mexico coastline in Wakulla County and forms the southern boundary of the Woodville Karst Plain.

The Apalachicola Coastal Lowlands *(17)* originally were the flat, sandy areas in western Leon County. Later, this geomorphic subdivision of the Gulf Coastal Lowlands was extended *(29)* into western Wakulla County, which makes up most of the Apalachicola National Forest. The Apalachicola Coastal Lowlands are west of a line approximating U.S. Highway 319. This region generally is made up of flat, sandy areas underlain by thick sandy clay, clayey sand, and peat. These sediments are underlain by early Miocene limestone. Numerous densely wooded wetland areas and creeks are in the Apalachicola Coastal Lowlands. Although the lowlands are relatively flat, they attain a maximum elevation of 150 feet above m.s.l. in a paleo-dune area in northwestern Wakulla County.

The Ochlockonee River Valley Lowlands *(17)*, the Sopchoppy River, and Lost Creek are in the Apalachicola Coastal Lowlands. The Ochlockonee River, which forms the western boundary of Wakulla County, originates in Georgia and meanders southward more than 100 miles to Ochlockonee Bay and the Gulf of Mexico *(29)*. The Sopchoppy River forms at the

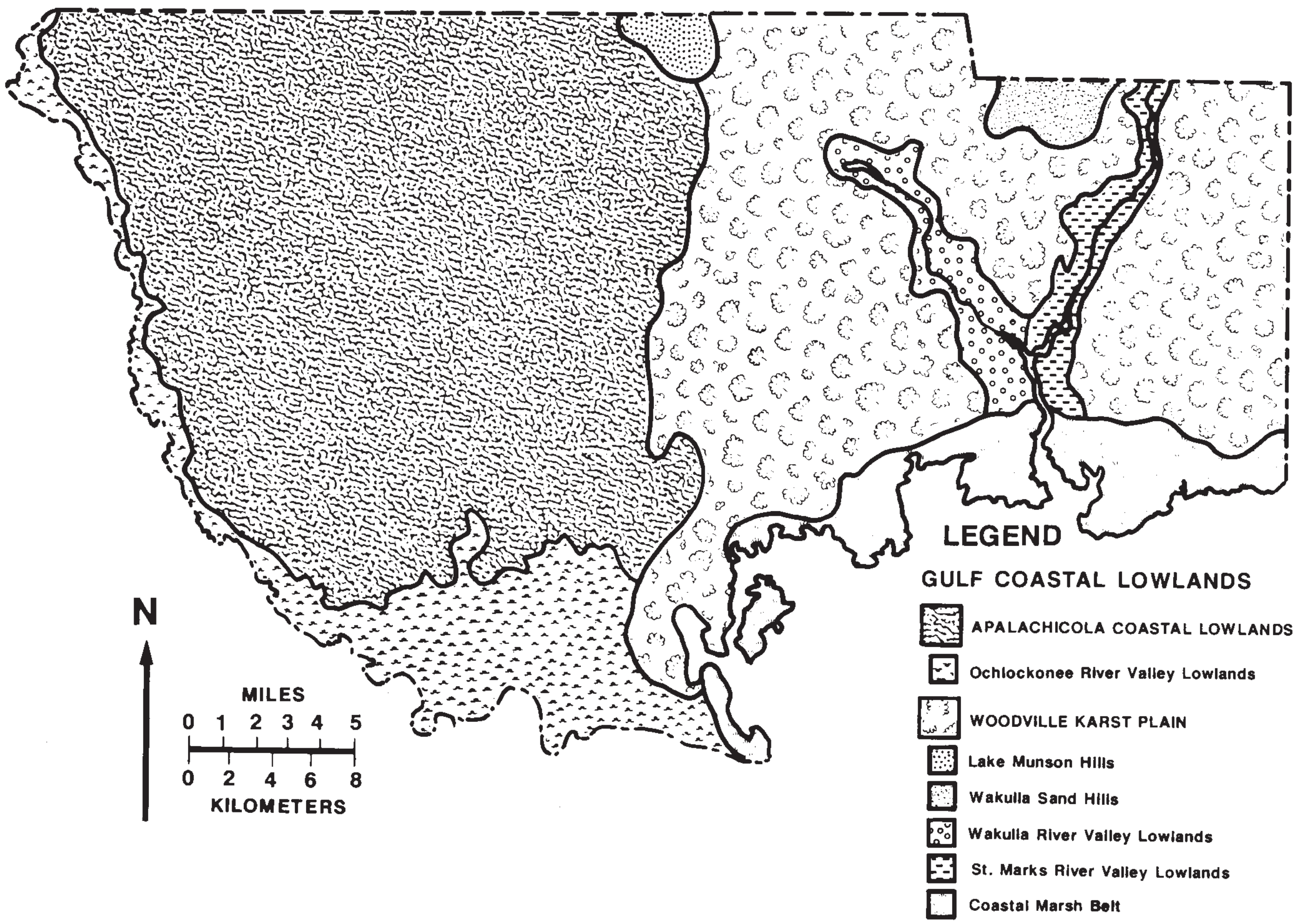

Figure 1.—The Woodville Karst Plain and the Apalachicola Coastal Lowlands, subdivisions of the Gulf Coastal Lowlands in Wakulla County.

confluence of several creeks in northwestern Wakulla County. It meanders through the Apalachicola National Forest until it enters Ochlockonee Bay near Panacea. Lost Creek originates in southern Leon County, where several small creeks form its headwaters, meanders southeastward, and disappears underground near Crawfordville.

Stratigraphy

The sediments that underlie Wakulla County range from Paleozoic age to Recent age. The deepest penetration into strata is 12,242 feet below the surface in an oil test well, which was completed in 1974. The stratum has been identified as Paleozoic shale and diabase *(7)*. The oldest rock outcrop in the county is Oligocene Suwannee Limestone. The youngest sediments are Pleistocene terrace and dune sands and Holocene alluvium.

Suwannee Limestone

The Suwannee Limestone rock exposures are the oldest in the county. They crop out in the southeastern part of the county along the Jefferson-Wakulla county line at the gulf coast (fig. 2). The Suwannee Limestone in this area consists of silicified limestone boulders and dolomite *(40)*.

The Suwannee Limestone is in several sets of water well cuttings from Wakulla County. The Suwannee Limestone is recrystallized, white to cream or brown limestone, which is often dolomitic, and is typically fossiliferous with foraminifera and other invertebrates *(29)*.

St. Marks Formation

The early Miocene sediments of the St. Marks Formation are underlain by the Suwannee Limestone and are overlain by the Hawthorn Group. The St. Marks

Formation underlies nearly all of Wakulla County and interfingers with the Chattahoochee Formation to the west *(28)*. It crops out in many springs and sinkholes, particularly in the eastern and southeastern areas of the county. The typical location of the St. Marks Formation is "The Swirl," a sinkhole about 3 miles south of Crawfordville, just east of U.S. Highway 319. The St. Marks Formation is very fossiliferous, moderately indurated to well indurated, pale orange to light gray to cream, calcarenitic limestone. Foraminifera and numerous species of mollusks are common in this formation *(21)*.

Torreya Formation

The early Miocene Torreya Formation is characteristically a siliciclastic unit consisting of very fine or medium clayey sand to sandy silty clay. This formation frequently contains variable amounts of limestone and dolomite with traces of phosphate. Little is known of the areal extent of the Torreya Formation in Wakulla County. The Torreya Formation extends into the northwestern and western parts of the county *(33)* and has been noted in an abandoned quarry south of Crawfordville *(6)*. In a series of water well cross sections, there are indications *(25)* of undifferentiated Hawthorn Group sediments underlying nearly all of western Wakulla County and pinching out eastward in the vicinities of Crawfordville and Panacea.

Bruce Creek Limestone

The Bruce Creek Limestone is a middle Miocene limestone *(18)* in Walton County. It has been described after observation of a core taken from easternmost Franklin County *(31)*. This description shows its probable updip limit in western Wakulla County. In wells to the west of Wakulla County, the Bruce Creek Limestone is typically moderately indurated, white to light yellowish gray, calcarenitic and sandy quartz, highly fossiliferous limestone. The extent to which it underlies Wakulla County is yet to be determined.

Intracoastal Formation

The Intracoastal Formation was earlier described as a soft, sandy Pliocene-age limestone underlying the coastal area of western Florida *(18)*. Based on planktonic foraminifera *(32)*, it was later established that this formation is of middle Miocene to late Pliocene age. The Intracoastal Formation has been mapped as far east as easternmost Franklin and Liberty Counties *(10)*, and its updip limit occurs in westernmost Wakulla County *(31)*. Throughout its areal extent, the Intracoastal Formation is a very sandy, highly microfossiliferous, poorly consolidated limestone. It is generally argillaceous, phosphatic, and calcilutitic *(32)*.

Jackson Bluff Formation

The upper Miocene mollusk facies *(27)* were combined into the Jackson Bluff Formation *(28)*. This formation was named after Jackson Bluff on the Ochlockonee River in western Leon County. Studies of the microfauna of the Jackson Bluff Formation *(1, 18)* indicate its age as late Pliocene.

The areal extent of the Jackson Bluff Formation is not well defined in Wakulla County. The Jackson Bluff

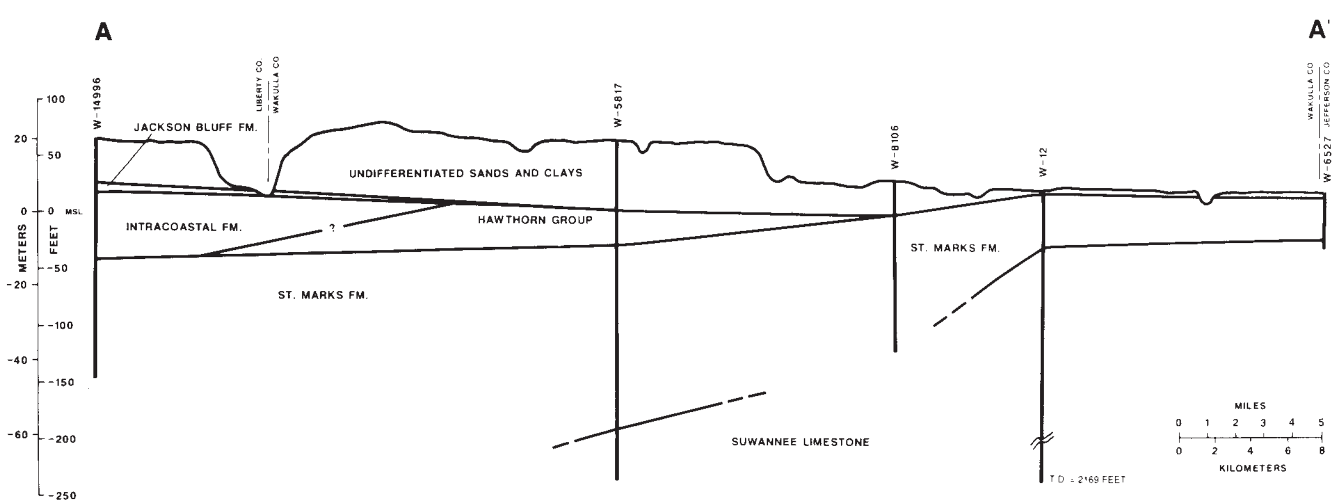

Figure 2.—Geologic cross section showing stratigraphy in Wakulla County. The numbers preceded by "W" are well numbers.

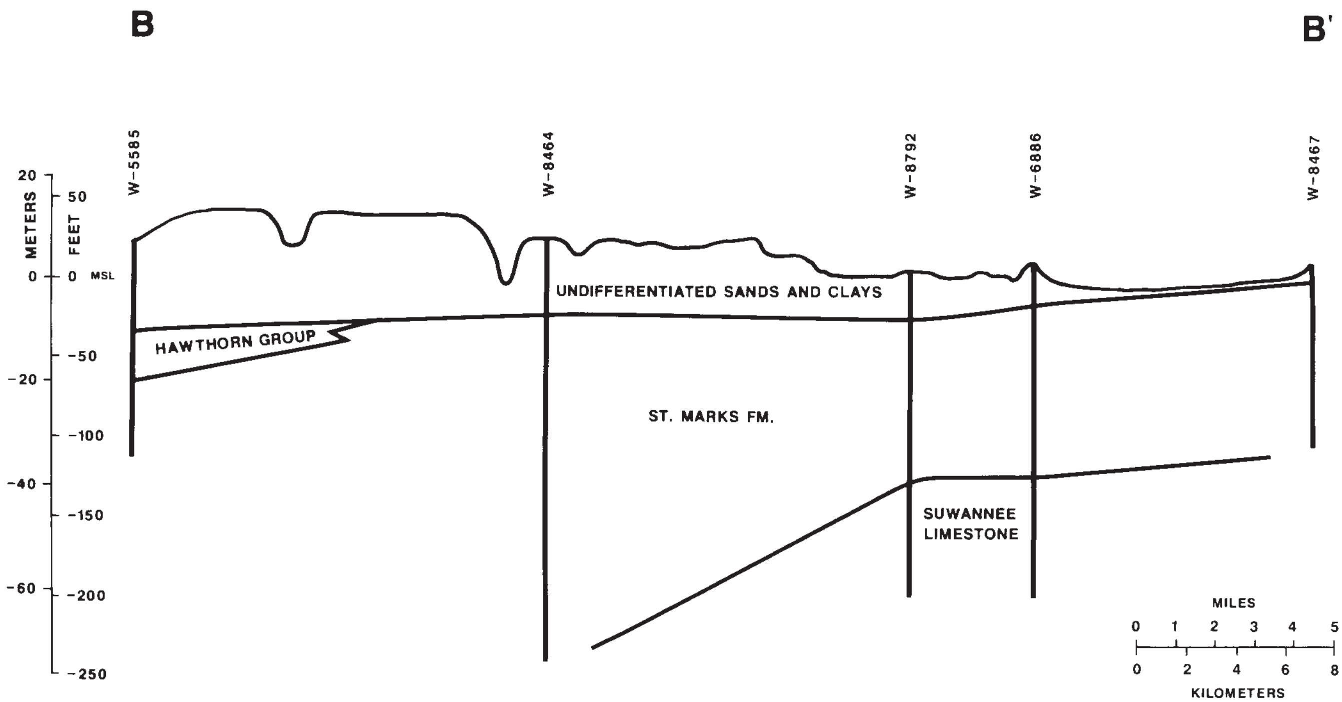

Figure 3.—Geologic cross section showing stratigraphy in Wakulla County. The numbers preceded by "W" are well numbers.

Formation was mapped *(17)* as extending roughly south from Lake Talquin to where Florida State Highway 267 crosses the Leon-Wakulla county line and westward to the Ochlockonee River. Jackson Bluff Formation deposits were recorded *(8)* in auger samples from the western half of the Bradwell Bay Wilderness Area in western Wakulla County. These samples were recovered from a depth of about 20 feet and were described as a sandy, light orange, cream, and very light gray or off-white marl. Marine mollusk fragments were in the cuttings.

Pleistocene-age and Holocene-age undifferentiated quartz sand, silt, and clay (fig. 3) make up the undifferentiated surficial sediments of Wakulla County *(30)*. Pleistocene-age sediments are mostly marine terrace deposits unconformably underlain by older formations.

In eastern Wakulla County the St. Marks Formation and Suwannee Limestone are overlain by a thin veneer of fine, unconsolidated quartz sand and clay that generally is less than 20 feet thick. West of Crawfordville, these sediments are as much as 100 feet thick and may lie directly on the Jackson Bluff Formation, Torreya Formation, or St. Marks Formation. Holocene-age alluvial and eolian deposits are predominantly fine-grained quartz sand and are difficult to differentiate from Pleistocene sediment.

Structure

The Apalachicola Embayment, a broad sedimentary basin, covers about 30,000 square miles *(26)*. Wakulla County is located along its eastern edge (fig. 4). Data from oil test wells have shown that the sediment fill, which is Triassic to Holocene age, is 13,000 feet thick in places. These sediments are underlain by Paleozoic sedimentary and metamorphic rocks *(4, 32)*.

Wakulla County is in a transitional area between the Tertiary carbonate evaporite facies of the peninsula to the southeast and the terrigenous siliciclastic facies to the north and west. A channellike area of erosion separated the continental border from the Paleogene and Neogene islands of the Florida Peninsula *(11)*. A structural channel or trough, possibly a graben, was later recognized in older sediments extending from southeastern Georgia southwestward to the Big Bend area *(5, 20, 26, 39)*. A good structural history of this feature has been described *(31)*. During the late Cretaceous through Oligocene ages, this elongated structure connected the Southeast Georgia Embayment with the Apalachicola Embayment *(26)*. Structure maps on different stratigraphic horizons indicate that the axis of the trough migrated over time. In the late Mesozoic age, the trough axis moved southeastward to the vicinity of western Taylor and Madison Counties. The direction reversed in the early Tertiary, and the trough moved northwestward to the present area of Gadsden and Liberty Counties *(31)*. Throughout its existence as an open connection between the embayments, the trough was an area of slow deposition or nondeposition. Strong, scouring marine currents in the trough formed a lithologic and biologic facies barrier during most of the Paleocene and Eocene ages *(9)*. Although its influence as a sediment barrier apparently waned by the end of the Oligocene age, wells drilled in Oligocene-age and younger sediments over the trough show a sediment thickening that may be related to post-Eocene downwarping in the trough *(17)*.

Ground Water

In Wakulla County and neighboring counties, ground water is derived mostly from precipitation *(17)*. Part of the precipitation leaves the area as surface runoff in streamflow or by evaporation and transpiration. The rest soaks into the ground and moves downward into the porous zone of saturation. The top of the zone of saturation is known as the water table. Once in the zone of saturation, the water moves under the influence of gravity toward discharge points, such as wells, springs, or the Gulf of Mexico. Some of the water moves into deeper aquifers. Water remaining in shallow sand and clay above the St. Marks Formation is free to rise and fall and is referred to as unconfined water. This unconfined water makes up the surficial aquifer system and is not used extensively for public consumption in the county *(25)*. Water that becomes confined under pressure between formations of low permeability is not free to rise and fall and is called artesian water. In Wakulla County artesian water is in the Floridan Aquifer system, which provides the bulk of water for drinking and other consumptive uses.

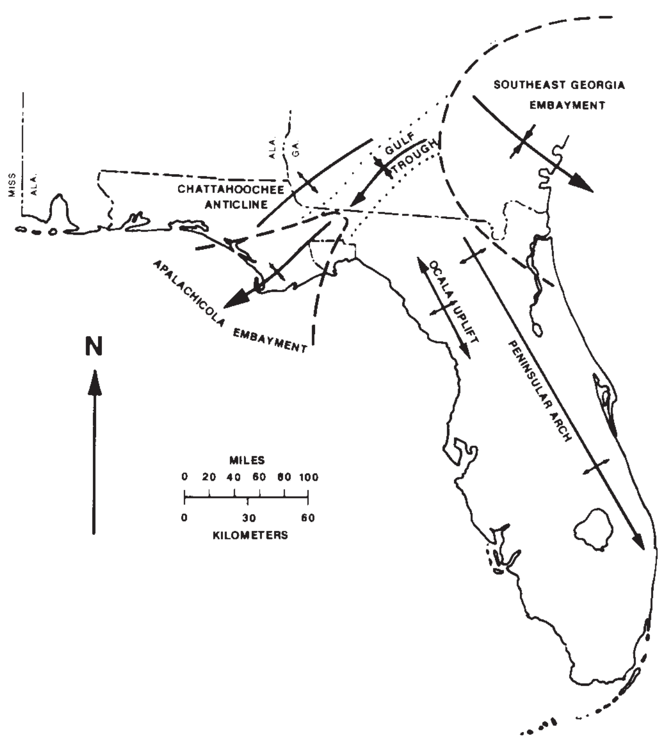

Figure 4.—Wakulla County is along the eastern edge of the Apalachicola Embayment.

The Floridan Aquifer System

The Floridan Aquifer system *(24, 35)* includes the artesian aquifer and all or parts of formations from early Eocene to middle Miocene age. In most of Wakulla County, the St. Marks Formation makes up the upper part of the Floridan Aquifer system. Basal Hawthorn Group (Torreya Formation) limestones may make up the intermediate confining unit in areas of western Wakulla County *(25)*. Most public water supply wells draw from the St. Marks Formation at a depth of 25 to 150 feet. The Suwannee Limestone of the Ocala Group and the Avon Park Formation *(22)* make up the lower units of the Floridan Aquifer system in northern Florida *(25)*.

The Floridan Aquifer system is recharged by downward leakage from the surficial aquifer system, by direct recharge by way of lakes and sinks, and by direct influx through porous sands. In the Big Bend area, the Floridan Aquifer system receives much of its direct recharge from southern Georgia, central Leon County, and northeastern Wakulla County, where porous sand is underlain by the aquifer *(17, 25)*.

How This Survey Was Made

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

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

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

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

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

A ground-penetrating radar (GPR) system *(12, 13, 19, 34)* was used in Wakulla County to document the type and variability of soils that occur in the detailed soil 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, as described in the section "Detailed Soil Map Units," are based on this data.

Confidence Limits of Soil Survey Information

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, information about the soils does not extend below a depth of about 6 feet. The information presented in the soil survey is not meant to be used as a substitute for onsite investigation. Soil survey information can be used to select alternative practices or 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 Wakulla County were determined by random transects made with GPR across mapped areas. The data are statistically summarized in the description of most of the map units in the section "Detailed Soil Map Units." Soil scientists made enough transects and took enough samples to characterize most map units at a specific confidence level. For example, in 80 percent of the areas mapped as Tooles-Nutall fine sands, the percentage of the Tooles and Nutall soils will be within the range given in the map unit description. In about 20 percent of this map unit, the percentage of Tooles and Nutall soils can be higher or lower than the given range.

The composition of miscellaneous areas and urban map units was based on the judgment of a 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, it 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 Ridges

The general soil map unit in this group consists of nearly level to gently undulating, moderately well drained and excessively drained, sandy soils. Some of these soils contain thin bands of loamy material. These soils are mainly in the central part of Wakulla County.

1. Lakeland-Ortega-Alpin

Nearly level to gently undulating, excessively drained and moderately well drained, sandy soils; some have thin bands of loamy material at a depth of 40 inches or more

The soils in this map unit are mostly on broad sandhill ridges. The landscape includes some wet depressional areas, sinkholes, and small lakes. The largest area of this map unit is in the south-central part of the county, south of the town of Shadeville and west of the Wakulla River. It is about 9 miles long and 6 miles wide.

The natural vegetation includes mostly longleaf pine, turkey oak, laurel oak, bluejack oak, and blackjack oak. The understory includes pineland threeawn, running oak, and scattered wild lupine.

This map unit makes up about 18,635 acres, or 4.8 percent, of Wakulla County. It is about 30 percent Lakeland soils, 25 percent Ortega soils, 20 percent Alpin soils, and 25 percent soils of minor extent.

The Lakeland soils are excessively drained. Typically, the surface layer is grayish brown sand about 6 inches thick. The upper part of the underlying material, to a depth of 55 inches, is light yellowish brown and very pale brown sand. The lower part, to a depth of 80 inches, is pale yellow sand.

The Ortega soils are moderately well drained. Typically, the surface layer is light gray sand about 3 inches thick. The upper part of the underlying material, to a depth of 34 inches, is light yellowish brown sand. The next part, to a depth of 71 inches, is brownish yellow fine sand and very pale brown fine sand mottled with reddish yellow. The lower part, to a depth of 80 inches, is white sand mottled with strong brown.

The Alpin soils are excessively drained. Typically, the surface layer is grayish brown sand about 3 inches thick. The subsurface layer is sand. It extends to a depth of about 42 inches. The upper part is light yellowish brown, and the lower part is very pale brown. The subsurface material has been mixed with the subsoil to a depth of 80 inches or more. The upper part of the subsoil is very pale brown sand, and the lower part is white sand that has thin bands of brownish yellow loamy sand less than 1 inch thick.

Of minor extent in this map unit are Shadeville, Moriah, Otela, Pilgrims, and Ridgewood soils.

The soils in this map unit are used mostly for woodland production (fig. 5).

Seepage and the caving of cutbanks are the main limitations affecting sanitary facilities and building site development.

Soils on the Low Uplands

The five general soil map units in this group consist of nearly level to sloping, very poorly drained to excessively drained, sandy soils. Some of these soils have a loamy subsoil, and some have a loamy subsoil

Figure 5.—A wooded area of the Lakeland-Ortega-Alpin general soil map unit.

that is underlain by limestone bedrock. These soils are throughout Wakulla County.

2. Ridgewood-Otela-Lutterloh

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

The soils in this map unit are on low uplands and on slightly convex knolls on flatwoods. The landscape includes depressional areas, sinkholes, and ponds. One area of this unit is in the northeastern part of the county and adjoins the Leon and Jefferson county lines. It is about 2 miles wide and 3 miles long.

The natural vegetation includes mostly slash pine, longleaf pine, loblolly pine, laurel oak, live oak, bluejack oak, red oak, sweetgum, hickory, dogwood, and persimmon. The understory consists of dwarf huckleberry and pineland threeawn.

This map unit makes up about 4,800 acres, or 1.2 percent, of Wakulla County. It is about 40 percent Ridgewood soils, 20 percent Otela soils, 15 percent Lutterloh soils, and 25 percent soils of minor extent.

The Ridgewood soils are somewhat poorly drained.

Typically, the surface layer is gray fine sand about 4 inches thick. The underlying material is fine sand to a depth of 80 inches or more. The upper part is light yellowish brown, the next part is light gray mottled with shades of brown and yellow, and the lower part is white mottled with yellowish brown.

The Otela soils are moderately well drained. Typically, the surface layer is grayish brown fine sand about 7 inches thick. The upper part of the subsurface layer, to a depth of 23 inches, is light gray fine sand. The lower part, to a depth of about 58 inches, is white fine sand. A transitional layer, to a depth of about 67 inches, is loamy fine sand and is reticulately mottled with shades of red, brown, yellow, and white. The subsoil, to a depth of 80 inches, is light gray fine sandy loam mottled with red, strong brown, and brownish yellow. Limestone is between depths of 60 and 80 inches in less than 20 percent of the map unit.

The Lutterloh soils are somewhat poorly drained. Typically, the surface layer is gray fine sand about 7 inches thick. The subsurface layer is light gray fine sand to a depth of 58 inches. The lower part is mottled with shades of yellow. The upper part of the subsoil, to a depth of 70 inches, is light brownish gray fine sandy loam, and the lower part, to a depth of 80 inches or more, is light gray fine sandy loam. The subsoil is mottled with shades of yellow and brown.

Of minor extent in this map unit are Alpin, Shadeville, Lakeland, Moriah, Ortega, Pilgrims, and Scranton soils.

The soils in this map unit are used mostly for woodland production. The poor filtering capacity of the soils and wetness are the main limitations affecting sanitary facilities and building site development.

3. Moriah-Ridgewood-Ortega

Nearly level to gently undulating, somewhat poorly drained and moderately well drained, sandy soils; some have a loamy subsoil underlain by limestone

The soils in this map unit are mostly in broad areas on low uplands, on knolls on or along flatwoods, and on some sand ridges. The landscape includes swamps, depressions, sinkholes, and ponds. These soils are interspersed with better drained soils and with some poorly drained soils in swamps and depressions. Most areas of this map unit are in the eastern part of the county between and along the Wakulla and the St. Marks Rivers. The largest area is about 7 miles long and 2 miles wide.

The natural vegetation includes mostly slash pine, longleaf pine, spruce pine, laurel oak, water oak, turkey oak, sweetgum, hickory, dogwood, and persimmon. The understory consists of pineland threeawn, huckleberry, and briers.

This map unit makes up about 9,120 acres, or 2.4 percent, of Wakulla County. It is about 40 percent Moriah soils, 20 percent Ridgewood soils, 15 percent Ortega soils, and 25 percent soils of minor extent.

The Moriah soils are somewhat poorly drained. Typically, the surface layer is gray fine sand about 8 inches thick. The subsurface layer is fine sand to a depth of 25 inches. It is yellowish brown in the upper part and white in the lower part. It has strong brown mottles and light gray sand splotches. The subsoil, to a depth of about 50 inches, is yellow fine sandy loam mottled with strong brown, light brownish gray, and light gray. Fractured limestone bedrock is at a depth of about 50 inches. The depth to limestone bedrock varies.

The Ridgewood soils are somewhat poorly drained. Typically, the surface layer is gray fine sand about 4 inches thick. The underlying material is fine sand to a depth of 80 inches or more. The upper part is light yellowish brown, the next part is light gray mottled with shades of brown and yellow, and the lower part is white mottled with yellowish brown.

The Ortega soils are moderately well drained. Typically, the surface layer is light gray sand about 3 inches thick. The upper part of the underlying material, to a depth of 34 inches, is light yellowish brown sand. The next part, to a depth of 71 inches, is brownish yellow fine sand and very pale brown fine sand mottled with reddish yellow. The lower part, to a depth of 80 inches, is white sand mottled with strong brown.

Of minor extent in this map unit are Alpin, Shadeville, Lakeland, Lutterloh, Otela, Pilgrims, and Scranton soils.

The soils in this map unit are used mostly for woodland production. Wetness and the poor filtering capacity of the soils are the main limitations affecting sanitary facilities and building site development.

4. Otela-Ortega-Shadeville

Nearly level to sloping, moderately well drained, sandy soils; some have a loamy subsoil, and some have a loamy subsoil underlain by limestone

The soils in this map unit are mostly on broad knolls adjacent to flatwoods; on gently sloping, broad upland ridges; and in concave areas on sandy uplands. These knolls and ridges generally are slightly higher than the surrounding landscape. The landscape includes scattered, small, wet depressional areas and sinkholes. The largest area of this map unit is in the northeastern part of the county, encompassing the town of Wakulla. It is west of the St. Marks River and east of U.S. Highway 319. It is about 8 miles long and 4 miles wide.

The natural vegetation includes mostly slash pine, longleaf pine, loblolly pine, bluejack oak, live oak, laurel oak, turkey oak, red maple, and cabbage palm. The understory consists of dwarf huckleberry, pineland threeawn, and chalky bluestem.

This map unit makes up about 14,560 acres, or 3.8 percent, of Wakulla County. It is about 40 percent Otela soils, 20 percent Ortega soils, 15 percent Shadeville soils, and 25 percent soils of minor extent.

Typically, the surface layer of the Otela soils is grayish brown fine sand about 7 inches thick. The upper part of the subsurface layer, to a depth of 23 inches, is light gray fine sand. The lower part, to a depth of 58 inches, is white fine sand. A transitional layer, to a depth of 67 inches, is loamy fine sand and is reticulately mottled with shades of red, brown, yellow, and white. The subsoil, to a depth of about 80 inches, is light gray fine sandy loam mottled with red, strong brown, and brownish yellow. Limestone is between depths of 60 and 80 inches in less than 20 percent of the map unit.

Typically, the surface layer of the Ortega soils is light gray sand about 3 inches thick. The upper part of the underlying material, to a depth of 34 inches, is light yellowish brown sand. The next part, to a depth of 71 inches, is brownish yellow fine sand and very pale brown fine sand mottled with reddish yellow. The lower part, to a depth of 80 inches, is white sand mottled with strong brown.

Typically, the surface layer of the Shadeville soils is pale brown fine sand about 7 inches thick. The subsurface layer, to a depth of about 28 inches, is light gray fine sand. The subsoil to a depth of 45 inches is brownish yellow sandy clay loam. It is underlain by fractured limestone.

Of minor extent in this map unit are Alpin, Lakeland, Lutterloh, Moriah, Pilgrims, and Ridgewood soils.

The soils in this map unit are used mostly for woodland production. Seepage and the caving of cutbanks are the main limitations affecting sanitary facilities and building site development.

5. Otela-Alpin-Shadeville

Nearly level to gently undulating, moderately well drained and excessively drained, sandy soils; some have a loamy subsoil, and some have a loamy subsoil underlain by limestone

The soils in this map unit are mostly on broad upland ridges. The landscape includes a few scattered sinkholes and depressional areas. The largest area of this map unit is in the center of the county, reaching from Leon County to just north of Oyster Bay. It is along U.S. Highway 319 and east to the northern part of the Wakulla River. It is about 10 miles long and 5 miles wide.

The natural vegetation includes mostly slash pine, longleaf pine, loblolly pine, turkey oak, laurel oak, live oak, bluejack oak, and cabbage palm. The understory consists of blackberry, honeysuckle, dwarf huckleberry, chalky bluestem, and pineland threeawn.

This map unit makes up about 31,930 acres, or 8.3 percent, of Wakulla County. It is about 35 percent Otela soils, 25 percent Alpin soils, 15 percent Shadeville soils, and 25 percent soils of minor extent.

The Otela soils are moderately well drained. Typically, the surface layer is grayish brown fine sand about 7 inches thick. The upper part of the subsurface layer, to a depth of 23 inches, is light gray fine sand. The lower part, to a depth of 58 inches, is white fine sand. A transitional layer, to a depth of 67 inches, is loamy fine sand and is reticulately mottled with shades of red, brown, yellow, and white. The subsoil, to a depth of about 80 inches, is light gray fine sandy loam mottled with red, strong brown, and brownish yellow. Limestone is between depths of 60 and 80 inches in less than 20 percent of the map unit.

The Alpin soils are excessively drained. Typically, the surface layer is grayish brown sand about 3 inches thick. The subsurface layer is sand and extends to a depth of about 42 inches. The upper part is light yellowish brown, and the lower part is very pale brown. The subsurface material has been mixed with the subsoil to a depth of 80 inches or more. The upper part of the subsoil is very pale brown sand, and the lower part is white sand that has thin bands of brownish yellow loamy sand less than 1 inch thick.

The Shadeville soils are moderately well drained. Typically, the surface layer is pale brown fine sand about 7 inches thick. The subsurface layer, to a depth of about 28 inches, is light gray fine sand. The subsoil, to a depth of 45 inches, is brownish yellow sandy clay loam. It is underlain by fractured limestone.

Of minor extent in this map unit are Lakeland, Lutterloh, Moriah, Ortega, Pilgrims, and Ridgewood soils.

The soils in this map unit are used mostly for woodland production. Seepage and the caving of cutbanks are the main limitations affecting sanitary facilities and building site development.

6. Ridgewood-Ortega-Rutlege

Nearly level to gently undulating, somewhat poorly drained, moderately well drained, and very poorly drained, sandy soils

The soils in this map unit are mostly on broad low uplands, on slightly convex knolls on flatwoods, or on sandy side slopes. This map unit is interspersed with shallow depressions and natural drainageways. The largest area of this map unit is in the center of the county, west of U.S. Highway 319 and west of Ditch Bay and Bradwell Bay. It is bordered on the north by Cow Swamp and on the south by Ochlockonee Bay. It is about 16 miles long and 8 miles wide.

The natural vegetation includes mostly slash pine, longleaf pine, turkey oak, live oak, water oak, red maple, cypress, and blackgum. The understory consists of saw palmetto, waxmyrtle, and pineland threeawn.

This map unit makes up about 59,010 acres, or 15.3 percent, of Wakulla County. It is about 30 percent Ridgewood soils, 28 percent Ortega soils, 17 percent Rutlege soils, and 25 percent soils of minor extent.

The Ridgewood soils are somewhat poorly drained. Typically, the surface layer is gray fine sand about 4 inches thick. The underlying material is fine sand to a depth of 80 inches or more. The upper part is light yellowish brown, the next part is light gray mottled with shades of brown and yellow, and the lower part is white mottled with yellowish brown.

The Ortega soils are moderately well drained. Typically, the surface layer is light gray sand about 3 inches thick. The upper part of the underlying material, to a depth of 34 inches, is light yellowish brown sand. The next part, to a depth of 71 inches, is brownish yellow fine sand and very pale brown fine sand mottled with reddish yellow. The lower part, to a depth of 80 inches, is white sand mottled with strong brown.

The Rutlege soils are very poorly drained. Typically, the surface layer is sand about 24 inches thick. It is black in the upper part, very dark gray in the next part, and very dark grayish brown in the lower part. The underlying material, to a depth of 72 inches, is grayish brown and gray sand mottled with shades of brown, gray, and yellow.

Of minor extent in this map unit are Croatan, Dorovan, Lakeland, Lutterloh, Otela, Scranton, and Surrency soils.

The soils in this map unit are used mostly for woodland production. The poor filtering capacity of the soils and wetness are the main limitations affecting sanitary facilities and building site development.

Soils in the Coastal Marshes

The general soil map unit in this group consists of nearly level, very poorly drained soils that are subject to daily flooding by salt water. Some of these soils have a thin organic surface layer and are underlain by sandy material; some have a sandy, dark, organic-stained subsoil; and some have a loamy subsoil that is underlain by limestone bedrock. These soils are along most of the southern boundary of Wakulla County on the coast of the Gulf of Mexico.

7. Bayvi-Isles-Estero

Nearly level, very poorly drained, sandy soils; some have an organic surface layer underlain by a dark, organic-stained subsoil; and some have an organic surface layer and a loamy subsoil underlain by limestone

The largest area of this map unit is in the saltwater marshes adjacent to Apalachee Bay in the southern part of the county (fig. 6). This map unit is widest in the eastern part of the county and extends almost across the entire southern border.

The natural vegetation includes needlerush, sawgrass, and cordgrass.

This map unit makes up about 25,300 acres, or 6.6 percent, of Wakulla County. It is about 40 percent Bayvi soils, 30 percent Isles soils, 15 percent Estero soils, and 15 percent soils of minor extent.

Typically, the surface layer of the Bayvi soils is very dark brown mucky sand about 26 inches thick. The upper part of the underlying material, to a depth of 50 inches, is dark gray sand. The lower part, to a depth of 80 inches or more, is dark grayish brown sand.

Typically, the surface layer of the Isles soils is black sand about 9 inches thick. The subsurface layer, to a depth of 35 inches, is dark grayish brown sand. The subsoil, to a depth of 51 inches, is greenish gray sandy clay loam. Limestone bedrock is at a depth of 51 inches.

Typically, the Estero soils have an organic surface layer that is very dark gray muck to a depth of about 4 inches. Below that, to a depth of 14 inches, is very dark grayish brown sand. The subsurface layer, to a depth of about 34 inches, is grayish brown sand. The subsoil, to a depth of 54 inches, is very dark brown sand. The substratum, to a depth of 80 inches or more, is dark grayish brown sand.

Of minor extent in this map unit are Chaires, Leon, Maurepas, Nutall, and Tooles soils.

Most areas of this map unit support natural vegetation and are used mainly as habitat for wildlife. Wetness is the main limitation affecting sanitary

Figure 6.—An area of the Bayvi-Isles-Estero general soil map unit in the saltwater marshes in the foreground. Leon, Scranton, and Rutlege soils are on flatwoods in the background.

facilities and building site development. Flooding is a hazard.

Soils in the Depressions and Drainageways

The three general soil map units in this group consist of nearly level or depressional, poorly drained and very poorly drained soils. Some of these soils are sandy and have a loamy subsoil underlain by limestone bedrock, some have an organic layer underlain by various mineral textures, some have an organic layer underlain by sand, and some have a loamy surface layer underlain by a clayey texture. These soils are throughout Wakulla County.

8. Tooles-Nutall

Nearly level, very poorly drained, sandy soils that have a loamy subsoil underlain by limestone

The soils in this map unit are in swamps, depressions, and drainageways. The landscape includes ponds, narrow to very broad rivers, and some higher, better drained areas. One area of this map unit is along the eastern edge of the county. It is about 7 miles long and 1 mile wide and includes part of Gum Swamp.

The natural vegetation includes red maple, sweetgum, baldcypress, water oak, tupelo, and cabbage palm.

This map unit makes up about 11,020 acres, or 2.9 percent, of Wakulla County. It is about 40 percent Tooles soils, 35 percent Nutall soils, and 25 percent soils of minor extent.

Typically, the surface layer of the Tooles soils is black fine sand about 3 inches thick. It is underlain by very dark gray fine sand to a depth of about 8 inches. The subsurface layer is sand. It extends to a depth of about 39 inches. The upper part is light brownish gray, and the lower part is light gray. The subsoil, to a depth of about 59 inches, is mottled light brownish gray and very pale brown sandy clay loam. Limestone bedrock is at a depth of about 59 inches.

Typically, the surface layer of the Nutall soils is black fine sand about 7 inches thick. It is underlain by mixed very dark brown and gray sand to a depth of about 11 inches. The subsurface layer, to a depth of about 17 inches, is gray sand. The subsoil, to a depth of about 26 inches, is light gray sandy clay loam. Limestone bedrock is at a depth of about 26 inches.

Of minor extent in this map unit are Chaires, Croatan, Dorovan, Nutall, Plummer, Rutlege, Surrency, and Tooles soils.

Most areas of this map unit support natural vegetation and are used mainly as habitat for wildlife. Wetness is the main limitation affecting sanitary facilities and building site development. Flooding is a hazard.

9. Croatan-Dorovan

Nearly level, very poorly drained, organic soils that are underlain by mineral material

The soils in this map unit are in broad swamps and depressions. The landscape includes ponds, small creeks, and a few higher, better drained areas. The largest area of this map unit is in the western half of the county. This area, including Bradwell Bay, is about 10 miles long and 7 miles wide.

The natural vegetation includes baldcypress, water oak, sweetbay, blackgum, sweetgum, red maple, pond pine, and slash pine.

This map unit makes up about 58,025 acres, or 15.1 percent, of Wakulla County. It is about 40 percent Croatan soils, 35 percent Dorovan soils, and 25 percent soils of minor extent.

Typically, the Croatan soils have an organic surface layer that is muck to a depth of about 27 inches. The upper part is black, and the lower part is very dark brown. Below this, to a depth of 35 inches, is very dark gray sand. The upper part of the underlying material, to a depth of about 53 inches, is grayish brown sandy loam. The lower part, to a depth of 80 inches or more, is dark gray sandy clay loam.

Typically, the surface layer of the Dorovan soils is black muck about 65 inches thick. The underlying material, to a depth of 72 inches or more, is very dark grayish brown sandy clay.

Of minor extent in this map unit are Leon, Mandarin, Plummer, Pottsburg, Rutlege, Scranton, and Surrency soils.

Most areas of this map unit support natural vegetation and are used mainly as habitat for wildlife. Ponding and low strength are the main limitations affecting sanitary facilities and building site development.

10. Meggett-Croatan

Nearly level, poorly drained and very poorly drained soils; some have a loamy surface layer and a clayey subsoil, and some have organic layers underlain by mineral material

The soils in this map unit are on flood plains along the Ochlockonee River, which forms the western boundary of the county. The landscape includes some higher, better drained areas. The width of this map unit varies from a few feet to almost 2 miles.

The natural vegetation includes cypress, red maple, water oak, blackgum, sweetgum, sweetbay, swamp birch, pond pine, and slash pine.

This map unit makes up about 5,300 acres, or 1.4 percent, of Wakulla County. It is about 55 percent Meggett soils, 30 percent Croatan soils, and 15 percent soils of minor extent.

The Meggett soils are poorly drained. Typically, the surface layer is very dark gray fine sandy loam about 8 inches thick. The subsurface layer, to a depth of 18 inches, is grayish brown fine sandy loam. The subsoil has common yellowish brown mottles. The upper part of the subsoil, to a depth of 30 inches, is light gray clay loam. The lower part, to a depth of 72 inches, is light gray clay.

The Croatan soils are very poorly drained. Typically, the upper part of the surface layer is black muck about 4 inches thick. The next part, to a depth of 27 inches, consists of more completely decomposed black muck. The lower part, to a depth of 40 inches, is very dark gray mucky sand. The underlying material, to a depth of 72 inches or more, is very dark gray sand.

Of minor extent in this map unit are Dorovan, Plummer, Pottsburg, Rutlege, Scranton, and Surrency soils.

Most areas of this map unit support natural vegetation and are used mainly as habitat for wildlife. Wetness is the main limitation affecting sanitary facilities and building site development. Flooding is a hazard.

Soils on the Flatwoods

The two general soil map units in this group consist of nearly level, poorly drained and very poorly drained, sandy soils. Some of these soils have a dark, organic-stained subsoil; some have a dark, organic-stained subsoil and a loamy subsoil; and some have a loamy subsoil that is underlain by limestone bedrock. These soils are extensive and are throughout Wakulla County.

11. Tooles-Nutall-Chaires

Nearly level, poorly drained, sandy soils; some have a loamy subsoil underlain by limestone, and some have a sandy and loamy subsoil

The soils in this map unit are on flatwoods. The landscape includes depressions, swamps, and drainageways and better drained soils on the higher knolls and rises. The largest area of this map unit is in the eastern part of the county. It is bordered on the north by Leon County, on the east by Jefferson County, on the south by a marsh, and on the west by the St. Marks River. This area is about 9 miles long and 7 miles wide.

The natural vegetation includes slash pine, laurel oak, water oak, sweetgum, baldcypress, blackgum, cabbage palm, red maple, sweetbay, and cypress. The understory consists of waxmyrtle, saw palmetto, and pineland threeawn.

This map unit makes up about 49,785 acres, or 12.9 percent, of Wakulla County. It is about 35 percent Tooles soils, 25 percent Nutall soils, 15 percent Chaires soils, and 25 percent soils of minor extent.

The Tooles soils are poorly drained. Typically, the surface layer is black fine sand about 6 inches thick. The subsurface layer is sand. It extends to a depth of 26 inches. The upper part is pale brown, and the lower part is light gray. The subsoil, to a depth of about 50 inches, is light brownish gray sandy clay loam. Limestone bedrock is at a depth of about 50 inches.

The Nutall soils are poorly drained. Typically, the surface layer is very dark gray fine sand about 5 inches thick. The subsurface layer, to a depth of about 10 inches, is gray sand. The subsoil extends to a depth of about 37 inches. It is mixed brownish yellow and gray sandy clay loam in the upper part and gray sandy clay in the lower part. Limestone bedrock is at a depth of about 37 inches.

The Chaires soils are poorly drained. Typically, the surface layer is black fine sand about 7 inches thick. The subsurface layer, to a depth of about 17 inches, is grayish brown sand. The upper part of the subsoil, to a depth of about 34 inches, is very dark brown and dark brown sand. The lower part, to a depth of 62 inches, is light gray and white sandy loam. The substratum, to a depth of 80 inches or more, is greenish gray sandy clay.

Of minor extent in this map unit are Leon, Lutterloh, Moriah, Pilgrims, Ridgewood, Plummer, and Surrency soils.

The soils in this map unit are used mostly for woodland production. Wetness and depth to bedrock are the main limitations affecting sanitary facilities and building site development.

12. Leon-Scranton-Rutlege

Nearly level, poorly drained and very poorly drained, sandy soils; some have an organic-stained subsoil

The soils in this map unit are on flatwoods, along small rivers and creeks, and in drainageways and depressions. The landscape includes better drained soils on knolls and ridges. One area of this map unit is extensive and is irregular in shape. It is in the western part of the county. This area is bordered on the north by Leon County and is adjacent to Cow Swamp, Bradwell Bay, Ditch Bay, and Grimes Bay. It is about 13 miles long and 12 miles wide.

The natural vegetation includes slash pine, laurel oak, water oak, red maple, cypress, sweetbay, sweetgum, and blackgum. The understory consists of saw palmetto, waxmyrtle, and pineland threeawn.

This map unit makes up about 97,360 acres, or 25.3 percent, of Wakulla County. It is about 30 percent Leon soils, 24 percent Scranton soils, 21 percent Rutlege soils, and 25 percent soils of minor extent.

The Leon soils are poorly drained. Typically, the surface layer is very dark gray sand about 5 inches thick. The subsurface layer, to a depth of about 18 inches, is gray sand. The upper part of the subsoil, to a depth of 38 inches, is dark brown sand. Separating the upper and lower parts of the subsoil, to a depth of 58 inches, are layers of subsurface material that is light brownish gray and light gray sand. Below that layer, the lower part of the subsoil, to a depth of 80 inches or more, is dark brown sand.

The Scranton soils are poorly drained. Typically, the surface layer is very dark grayish brown sand about 7 inches thick. The underlying material, to a depth of 80 inches or more, is grayish brown and light gray sand.

The Rutlege soils are very poorly drained. Typically, the surface layer is sand about 24 inches thick. The upper part is black, the next part is very dark gray, and the lower part is very dark grayish brown. The underlying material, to a depth of 72 inches, is grayish brown and gray sand mottled with shades of brown, gray, and yellow.

The soils in this map unit are used mostly for woodland production. Wetness is the main limitation affecting sanitary facilities and building site development.

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, Alpin fine sand, 0 to 5 percent slopes, is a phase of the Alpin series.

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

A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Tooles-Nutall fine sands is an example.

An *undifferentiated group* is made up of two or more soils that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils in a mapped area are not uniform. An area can be made up of only one of the major soils, or it can be made up of all of them. Bayvi, Isles, and Estero soils, frequently flooded, is an undifferentiated group in this survey area.

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

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

Table 3 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.

3—Lutterloh fine sand, 0 to 5 percent slopes. This nearly level to gently sloping, somewhat poorly drained soil is on low uplands and in high areas on flatwoods. The mapped areas are irregular in shape and range from 5 to 80 acres in size.

Typically, the surface layer is gray fine sand about 7 inches thick. The subsurface layer, to a depth of about 58 inches, is light gray fine sand. It is mottled with shades of yellow in the lower part. The subsoil is fine sandy loam mottled with shades of yellow and brown. The upper part, to a depth of about 70 inches, is light brownish gray. The lower part, to a depth of more than 80 inches, is light gray.

Other soils occurring in areas of this map unit include

Ocilla soils, which are similar to the Lutterloh soil but have a loamy subsoil between depths of 20 and 40 inches. Also occurring are some similar soils that are underlain by limestone bedrock.

Included in this map unit are small areas of dissimilar soils. These are Plummer, Ridgewood, Otela, and Ortega soils. Plummer soils are lower on the landscape than the Lutterloh soil and are poorly drained. Ridgewood soils are sandy throughout. Otela and Ortega soils are in the higher positions and are better drained than the Lutterloh soil. Also, Ortega soils are sandy throughout. Dissimilar soils make up about 15 percent of the map unit.

This Lutterloh soil has a seasonal high water table at a depth of 18 to 30 inches for 2 to 4 months of the year and at a depth of 30 to 72 inches for most of the remainder of the year. The available water capacity is very low in the surface layer and subsurface layer and is moderate in the subsoil. Permeability is rapid in the surface layer and subsurface layer and is moderate in the subsoil. The organic matter content is moderately low, and natural fertility is low.

The natural vegetation includes longleaf pine, slash pine, and mixed hardwoods, such as white oak, live oak, laurel oak, sweetgum, hickory, dogwood, and persimmon. The understory consists of native grasses and shrubs, such as huckleberry, briers, and pineland threeawn.

This soil has severe limitations affecting cultivated crops because of periodic wetness and droughtiness in the root zone. The variety of suitable crops that can be grown is very limited unless intensive water-control measures are used. With adequate water control, corn, soybeans, and peanuts are moderately well suited to this soil. Close-growing, soil-improving cover crops should be included in the rotation with row crops at least two-thirds of the time. Applications of lime and fertilizer are needed for the best yields.

This soil has moderate limitations affecting hay and pasture. Proper management is needed to obtain maximum yields. Coastal bermudagrass, bahiagrass, and clover are well suited to this soil. These plants respond well to applications of fertilizer and lime. A simple drainage system is needed to remove excess subsurface water during wet periods. Controlled grazing helps to maintain plant vigor and obtain optimum yields.

The potential of this soil for the production of slash pine, loblolly pine, and longleaf pine is high. A moderate equipment limitation, seedling mortality, and plant competition are the main management concerns. Slash pine and loblolly pine are the preferred trees to plant.

This soil has severe limitations affecting septic tank absorption fields, trench and area sanitary landfills, shallow excavations, dwellings with basements, small commercial buildings, lawns and landscaping, and golf fairways. It has moderate limitations affecting dwellings without basements and local roads and streets. The wetness is the main limitation.

This soil has severe limitations affecting the development of camp areas, picnic areas, playgrounds, and paths and trails. The main limitations are the wetness and the sandy texture of the surface layer.

The land capability classification is IIIe.

4—Alpin sand, 0 to 5 percent slopes. This nearly level to gently undulating, excessively drained soil is on the uplands. The mapped areas are irregular in shape and range from 5 to 200 acres in size.

Typically, the surface layer is grayish brown sand about 3 inches thick. The subsurface layer is sand. It extends to a depth of about 42 inches. The upper part is light yellowish brown, and the lower part is very pale brown. The subsoil, to a depth of 80 inches or more, is very pale brown and white sand that has thin lamellae of brownish yellow loamy sand.

Other soils occurring in areas of this map unit include Lakeland and Ortega soils, which are similar to the Alpin soil but do not have thin bands of loamy material at a depth of more than 40 inches. Ortega soils are slightly lower on the landscape than the Alpin soil.

Included in this map unit are small areas of dissimilar soils. These are Shadeville, Hurricane, and Otela soils. Shadeville soils have a loamy subsoil between depths of 20 and 40 inches and are underlain by limestone. Hurricane soils are lower on the landscape than the Alpin soil and are somewhat poorly drained. Otela soils are in the lower positions on the landscape, are moderately well drained, and have a loamy subsoil at a depth of more than 40 inches. Dissimilar soils make up about 12 percent of the map unit.

This Alpin soil has a water table at a depth of more than 72 inches. The available water capacity is low in the surface layer, very low in the subsurface layer, and low in the subsoil. Permeability is moderately rapid in the surface layer, rapid in the subsurface layer, and moderately rapid in the subsoil. The organic matter content and natural fertility are low.

The natural vegetation includes longleaf pine, turkey oak, bluejack oak, laurel oak, and blackjack oak. The understory consists of honeysuckle, pineland threeawn, and running oak.

This soil has severe limitations affecting cultivated crops. Intensive management practices are needed in cultivated areas. Droughtiness and rapid leaching of plant nutrients limit the variety of plants that can be grown and reduce the potential yield of adapted crops. In the more sloping areas, row crops should be planted on the contour in alternating strips with close-growing cover crops. The cover crops should be grown at least three-fourths of the time. Only a few crops can produce high yields without irrigation. Irrigation generally is feasible if water is readily available.

This soil has moderate limitations affecting hay and pasture. Deep-rooted plants, such as coastal bermudagrass and bahiagrass, are well suited to this soil, but yields are reduced by the periodic droughtiness. Regular applications of lime and fertilizer are needed for the best yields. Controlled grazing helps to maintain plant vigor and obtain optimum yields.

The potential of this soil for the production of slash pine and loblolly pine is moderately high. The equipment limitation and seedling mortality are the main management concerns. Slash pine and loblolly pine are the preferred trees to plant.

This soil has severe limitations affecting trench and area sanitary landfills, shallow excavations, lawns and landscaping, and golf fairways. Seepage and the sandy texture of the soil are limitations.

This soil has severe limitations affecting the development of camp areas, picnic areas, playgrounds, and paths and trails. The main limitation is the sandy texture of the surface layer.

The land capability classification is IVs.

6—Bayvi, Isles, and Estero soils, frequently flooded. These soils are nearly level and are very poorly drained. They are in the tidal marsh areas on the gulf coast and are flooded daily by high tides. Slopes are smooth and are 0 to 1 percent.

In 95 percent of the areas mapped as Bayvi, Isles, and Estero soils, frequently flooded, the major soils and similar soils make up 95 percent of the map unit. Generally, the mapped areas are about 48 percent Bayvi and similar soils, 32 percent Isles soils, and 15 percent Estero and similar soils. Dissimilar soils make up about 5 percent. Individually, the soils in this map unit may not occur in every mapped area. The relative proportion of the major soils and similar soils varies. The areas of the individual soils are large enough to map separately. Because of the present and predicted land uses, however, they were mapped as one unit. The percentage of Isles and other soils that are underlain by limestone bedrock greatly decreases in areas southwest of Spring Creek.

Typically, the Bayvi soil has a very dark brown mucky sand surface layer about 26 inches thick. The underlying material is sand. The upper part, to a depth of about 50 inches, is dark gray, and the lower part, to a depth of 80 inches or more, is dark grayish brown.

The Bayvi soil is flooded daily by normal high tides. The available water capacity is high in the surface layer and very low in the underlying material. Permeability is moderately rapid in the surface layer and rapid in the underlying material. The organic matter content is moderate in the surface layer and moderately low in the underlying material. Natural fertility is low.

Typically, the Isles soil has a black sand surface layer about 9 inches thick. The subsurface layer, to a depth of about 35 inches, is dark grayish brown sand. The subsoil, to a depth of about 51 inches, is greenish gray sandy clay loam. Limestone bedrock is at a depth of about 51 inches.

The Isles soil is flooded daily by normal high tides. The available water capacity is moderate in the surface layer, low in the subsurface layer, and high in the subsoil. Permeability is rapid in the surface layer and subsurface layer and is moderate in the subsoil. The organic matter content is moderate in the surface layer and subsurface layer and is moderately low in the subsoil. Natural fertility is low.

Typically, the upper part of the surface layer of the Estero soil is very dark gray muck about 4 inches thick. The lower part, to a depth of about 14 inches, is very dark grayish brown sand. The subsurface layer, to a depth of about 34 inches, is grayish brown sand. The subsoil, to a depth of about 54 inches, is very dark brown sand. The substratum, to a depth of 80 inches or more, is dark grayish brown sand.

The Estero soil is flooded daily by normal high tides. The available water capacity is high in the surface layer and very low or low in the subsurface layer and in the subsoil. Permeability is moderately rapid. The organic matter content is moderate in the surface layer and moderately low in the subsurface layer and in the subsoil. Natural fertility is low.

Other soils occurring in areas of this map unit include some soils that are similar to the Bayvi and Estero soils but are underlain by limestone between depths of 40 and 80 inches.

Included in this map unit are some small areas of dissimilar soils. These are Chaires, Leon, and Tooles soils, which are in slightly elevated areas. Also included are some soils that have a high concentration of saline bands in the surface layer. These soils are around the elevated areas and along transition areas to the marsh.

The natural vegetation consists mainly of needlerush, saltgrass, smooth cordgrass, and marshhay cordgrass.

The soils in this map unit generally are not used for cultivated crops, for hay crops or pasture, or for woodland. They are not suited to cultivated crops. Wetness and salinity are severe limitations affecting cropland. Trees do not grow on these soils.

These soils have severe limitations affecting septic tank absorption fields, trench and area sanitary landfills, shallow excavations, dwellings with or without basements, small commercial buildings, local roads and streets, lawns and landscaping, and golf fairways. The wetness and the flooding are the main limitations.

These soils have severe limitations affecting the development of camp areas, picnic areas, playgrounds, and paths and trails. The wetness is the main limitation.

The land capability classification is VIIIw.

7—Otela fine sand, 0 to 5 percent slopes. This nearly level to gently sloping, moderately well drained soil is on low knolls and broad uplands. The mapped areas are elongated or irregular in shape and range from 5 to 200 acres in size.

Typically, the surface layer is grayish brown fine sand about 7 inches thick. The upper part of the subsurface layer, to a depth of about 23 inches, is light gray fine sand. The next part, to a depth of about 58 inches, is white fine sand. The lower part, to a depth of about 67 inches, is a transitional layer of loamy fine sand mottled with shades of red, brown, yellow, and white. The subsoil, to a depth of about 80 inches, is light gray fine sandy loam mottled with strong brown and brownish yellow.

Other soils occurring in areas of this map unit include Shadeville soils, which are similar to the Otela soil but have a loamy subsoil between depths of 20 and 40 inches and are underlain by limestone at a depth of 30 to 60 inches.

Included in this map unit are small areas of dissimilar soils. These are Alpin, Lutterloh, and Ortega soils. Alpin soils are sandy and have lamellae. They are better drained than the Otela soil. Lutterloh soils are lower on the landscape than the Otela soil and are somewhat poorly drained. Ortega soils are sandy. Dissimilar soils make up about 15 percent of the map unit.

This Otela soil has a perched water table above the subsoil during wet periods. Generally, the water table is at a depth of more than 72 inches. The available water capacity is very low in the surface layer and subsurface layer and is moderate in the subsoil. Permeability is rapid in the surface layer and subsurface layer and is moderate in the subsoil. The organic matter content and natural fertility are low.

The natural vegetation includes mainly slash pine, loblolly pine, longleaf pine, bluejack oak, red oak, and live oak. The understory consists of dwarf huckleberry and pineland threeawn.

This soil has severe limitations affecting most cultivated crops. Droughtiness and rapid leaching of plant nutrients limit the choice of plants that can be grown and reduce the potential yield of adapted crops. In the more sloping areas, row crops should be planted on the contour in alternating strips with close-growing cover crops. Planting soil-improving cover crops and leaving crop residue on the surface help to maintain fertility and control erosion. Irrigation generally is feasible if water is readily available.

This soil has moderate limitations affecting hay and pasture. Deep-rooted plants, such as coastal bermudagrass and improved bahiagrass, are well suited to this soil, but yields are reduced by the periodic droughtiness. Regular applications of lime and fertilizer are needed for the best yields. Controlled grazing helps to maintain plant vigor and a good ground cover.

The potential of this soil for the production of pine trees is moderately high. The equipment limitation, seedling mortality, and plant competition are the main management concerns. Slash pine is the preferred tree to plant.

This soil has moderate limitations affecting septic tank absorption fields, trench sanitary landfills, dwellings with basements, lawns and landscaping, and golf fairways. It has severe limitations affecting area sanitary landfills and shallow excavations. The wetness and the sandy texture of the soil are limitations.

This soil has severe limitations affecting the development of camp areas, picnic areas, playgrounds, and paths and trails. The sandy texture of the surface layer is the main limitation.

The land capability classification is IIIs.

8—Otela sand, 5 to 8 percent slopes. This moderately sloping, moderately well drained soil is on low knolls and side slopes adjacent to stream channels in the uplands. The mapped areas are elongated or irregular in shape and range from 5 to 50 acres in size.

Typically, the surface layer is dark grayish brown sand about 6 inches thick. The subsurface layer is sand. It extends to a depth of about 48 inches. The upper part is yellowish brown, the next part is light yellowish brown, and the lower part is very pale brown. The subsoil is sandy clay loam to a depth of 80 inches or more. The upper part, to a depth of about 62 inches, is brownish yellow mottled with strong brown. The next part, to a depth of about 74 inches, is very pale brown mottled with strong brown, yellowish red, and light gray. The lower part is gray mottled with yellow and reddish yellow.

Other soils occurring in areas of this map unit include Shadeville soils, which are similar to the Otela soil but have a loamy subsoil between depths of 20 and 40 inches and are underlain by limestone at a depth of 30 to 60 inches.

Included in this map unit are small areas of dissimilar soils. These are Lakeland, Lutterloh, and Ortega soils. Lakeland and Ortega soils are sandy. Lutterloh soils are lower on the landscape than the Otela soil and are somewhat poorly drained. Dissimilar soils make up about 15 percent of the map unit.

This Otela soil has a perched water table above the subsoil during wet periods. Generally, the water table is at a depth of more than 72 inches. The available water capacity is very low in the surface layer and subsurface layer and is moderate in the subsoil. Permeability is rapid in the surface layer and subsurface layer and is moderate in the subsoil. The organic matter content and natural fertility are low.

The natural vegetation includes mainly slash pine, loblolly pine, longleaf pine, bluejack oak, red oak, and live oak. The understory consists of dwarf huckleberry and pineland threeawn.

This soil has severe limitations affecting most cultivated crops. Droughtiness, rapid leaching of plant nutrients, and slope limit the choice of plants that can be grown and reduce the potential yield of adapted crops. In the more sloping areas, row crops should be planted on the contour in alternating strips with close-growing cover crops. Planting soil-improving cover crops and leaving crop residue on the surface help to maintain fertility and control erosion. The slope can limit the effectiveness of irrigation systems.

This soil has moderate limitations affecting hay and pasture. Deep-rooted plants, such as coastal bermudagrass and improved bahiagrass, are well suited to this soil, but yields are reduced by the periodic droughtiness. Regular applications of fertilizer and lime are needed for the best yields. Controlled grazing helps to maintain plant vigor and a good ground cover.

The potential of this soil for the production of pine trees is moderately high. The equipment limitation, seedling mortality, and plant competition are the main management concerns. Slash pine is the preferred tree to plant.

This soil has moderate limitations affecting septic tank absorption fields, dwellings with basements, lawns and landscaping, and golf fairways. It has severe limitations affecting area and trench sanitary landfills and shallow excavations. The wetness and the sandy texture of this soil are the main limitations affecting these uses. The slope is a moderate limitation on sites for small commercial buildings.

This soil has severe limitations affecting the development of camp areas, picnic areas, playgrounds, and paths and trails. The sandy texture of the surface layer is the main limitation.

The land capability classification is IVs.

10—Chaires fine sand. This nearly level, poorly drained soil is in broad areas on flatwoods. The mapped areas are irregular in shape and range from 5 to 500 acres in size. Slopes are 0 to 2 percent.

Typically, the surface layer is black fine sand about 7 inches thick. The subsurface layer, to a depth of about 18 inches, is gray and light gray fine sand. The upper part of the subsoil, to a depth of about 32 inches, is dark brown sand. The lower part, to a depth of about 80 inches, is light gray sandy clay loam.

Other soils occurring in areas of this map unit include some soils that are similar to the Chaires soil but have a more shallow subsoil, have a thicker surface layer, or are underlain by fractured limestone or marl between depths of 60 and 80 inches.

Included in this map unit are small areas of dissimilar soils. These are Leon, Moriah, Nutall, Pilgrims, Plummer, Ridgewood, and Tooles soils. Leon soils are sandy. Moriah, Pilgrims, and Ridgewood soils are higher on the landscape than the Chaires soil and are better drained. Nutall, Plummer, and Tooles soils do not have a sandy, dark, organic-stained subsoil. In addition, Tooles soils are underlain by limestone. Dissimilar soils make up about 5 percent of the map unit.

In most years this Chaires soil has a seasonal high water table within 10 inches of the surface for 1 to 3 months of the year and at a depth of 10 to 40 inches for 6 months or more. The available water capacity is very low in the surface layer and subsurface layer, is low in the upper part of the subsoil, and is moderate in the lower part. Permeability is rapid in the surface layer and subsurface layer, is moderate in the upper part of the subsoil, and is moderately slow or slow in the lower part. The organic matter content is moderately low. Natural fertility is low.

The natural vegetation includes bluejack oak, blackjack oak, laurel oak, water oak, longleaf pine, slash pine, and sweetgum. The understory consists of saw palmetto, dwarf blueberry, greenbrier, fetterbush lyonia, gallberry, and pineland threeawn.

This soil has severe limitations affecting cultivated crops. The wetness is the main limitation.

This soil has severe limitations affecting hay and pasture. The seasonal high water table and rapid leaching of plant nutrients limit the choice of plants that can be grown and reduce the potential yield of adapted crops. Intensive management of soil fertility and water is required.

The potential of this soil for the production of pine trees is moderately high. If the soil is not fertilized, slash pine is the preferred tree to plant. The equipment limitation, seedling mortality, and plant competition are the main management concerns. Planting the trees on beds lowers the effective depth of the water table.

This soil has severe limitations affecting septic tank absorption fields, trench and area sanitary landfills, shallow excavations, dwellings with or without basements, small commercial buildings, local roads and streets, lawns and landscaping, and golf fairways. The wetness is the main limitation.

This soil has severe limitations affecting the development of camp areas, picnic areas, playgrounds, and paths and trails. The wetness and the sandy texture of the surface layer are the main limitations.

The land capability classification is IVw.

11—Shadeville fine sand, 0 to 5 percent slopes. This nearly level to gently undulating, moderately well drained soil is in moderately broad areas on low uplands and on broad knolls on flatwoods. The mapped areas are irregular in shape and range from 5 to 250 acres in size.

Typically, the surface layer is pale brown fine sand about 7 inches thick. The subsurface layer, to a depth of about 28 inches, is light gray fine sand. The subsoil, to a depth of about 45 inches, is brownish yellow sandy clay loam. Fractured, porous limestone is at a depth of about 45 inches.

Other soils occurring in areas of this map unit include Otela soils, which are similar to the Shadeville soil but have a loamy subsoil between depths of 40 and 50 inches.

Included in this map unit are small areas of dissimilar soils. These are Moriah, Ortega, Pilgrims, Ridgewood, Seaboard, and Tooles soils. Moriah, Pilgrims, Ridgewood, and Tooles soils are lower on the landscape than the Shadeville soil and are more poorly drained. Ortega soils are sandy. Seaboard soils do not have a loamy subsoil and are underlain by limestone between depths of 3 and 20 inches. Also included are small areas of soils that have a loamy subsoil between depths of 20 and 40 inches and are not underlain by limestone bedrock. Dissimilar soils make up about 4 percent of the map unit.

In most years this Shadeville soil has a seasonal high water table that fluctuates between depths of 60 and 72 inches for more than 6 months and is at a depth of 42 to 60 inches for 1 to 3 months during periods of heavy rainfall. The available water capacity is low in the surface layer and subsurface layer and is moderate in the subsoil. Permeability is rapid in the surface layer and is slow in the subsoil. The organic matter content and natural fertility are low.

The natural vegetation includes live oak, laurel oak, slash pine, longleaf pine, cabbage palm, and red maple. The understory consists of huckleberry and chalky bluestem.

This soil has severe limitations affecting most cultivated crops. Droughtiness and rapid leaching of plant nutrients limit the choice of plants that can be grown and reduce the potential yield of adapted crops. In the more sloping areas, row crops should be planted on the contour in alternating strips with close-growing cover crops. Planting soil-improving cover crops and leaving crop residue on the surface help to maintain fertility and control erosion. Irrigation generally is feasible if water is readily available.

This soil has moderate limitations affecting hay and pasture. Deep-rooted plants, such as coastal bermudagrass and improved bahiagrass, are moderately well suited to the soil, but yields are reduced by the periodic droughtiness (fig. 7). Regular applications of fertilizer and lime are needed for optimum yields. Controlled grazing helps to maintain plant vigor and a good ground cover.

The potential of this soil for the production of pine trees is moderately high. The equipment limitation, seedling mortality, and plant competition are the main management concerns. Slash pine is the preferred tree to plant.

This soil has severe limitations affecting septic tank absorption fields, trench sanitary landfills, lawns and landscaping, golf fairways, and shallow excavations. It has moderate limitations affecting dwellings with basements. The depth to bedrock and the sandy texture of the soil are limitations.

This soil has severe limitations affecting the development of camp areas, picnic areas, playgrounds, and paths and trails. The sandy texture of the surface layer is the main limitation.

The land capability classification is IIIs.

12—Shadeville-Seaboard fine sands, 0 to 3 percent slopes. These soils are nearly level to gently sloping and are moderately well drained. They are in broad areas on low uplands and in high positions on

Figure 7.—Bahiagrass in an area of Shadeville fine sand, 0 to 5 percent slopes, provides good forage for beef cattle.

flatwoods. The mapped areas are irregular in shape and range from 5 to 350 acres in size.

In 95 percent of the areas mapped as Shadeville-Seaboard fine sands, 0 to 3 percent slopes, these soils and similar soils make up 96 percent of the map unit. Generally, the mapped areas are about 63 percent Shadeville and similar soils and 33 percent Seaboard and similar soils. Dissimilar soils make up 4 percent. The soils in this map unit occur as areas so intermingled that mapping them separately at the scale used is not practical. The pattern of Shadeville, Seaboard, and similar soils is relatively consistent in most delineations of the map unit. Areas of each soil within the delineations range from about 0.25 acre to 4.0 acres in size.

Typically, the surface layer of the Shadeville soil is brown fine sand about 5 inches thick. The subsurface layer, to a depth of about 29 inches, is pale brown and very pale brown fine sand. The subsoil, to a depth of about 42 inches, is brownish yellow sandy clay loam. It is underlain by weathered limestone.

The Shadeville soil has a seasonal high water table that fluctuates between depths of 60 and 72 inches most of the time. For about 1 to 3 months during periods of heavy rainfall, however, the water table is at a depth of 42 to 60 inches. The available water capacity is low in the surface layer and subsurface layer and is moderate in the subsoil. Permeability is rapid in the surface layer and moderately slow in the subsoil. The organic matter content and natural fertility are low.

Typically, the surface layer of the Seaboard soil is light brownish gray fine sand about 6 inches thick. The next layer, to a depth of about 14 inches, is light gray fine sand that has white splotches of clean sand grains. It is underlain by fractured, porous limestone. The depth to limestone varies. It generally is 3 to 20 inches. About 5 percent rock outcrop is in most areas.

The seasonal high water table in the Seaboard soil is at a depth of more than 48 inches for most of the year. It is in the fractured, porous limestone. The available water capacity is low. Permeability is rapid. The organic matter content and natural fertility are low.

Other soils occurring in areas of this map unit are Otela soils, which are similar to the Shadeville soil but have a loamy subsoil between depths of 40 and 60 inches. Also occurring are soils that are similar to the Shadeville and Seaboard soils but have a loamy subsoil between depths of 12 and 20 inches.

Included in this map unit are small areas of dissimilar soils. These are Moriah, Ortega, Pilgrims, and Ridgewood soils. Moriah and Pilgrims soils are lower on the landscape than the major soils and are somewhat poorly drained. Ortega and Ridgewood soils are sandy throughout.

The natural vegetation includes loblolly pine, longleaf pine, slash pine, and mixed hardwoods, such as laurel oak, live oak, red maple, hickory, dogwood, and persimmon. The understory consists of native grasses and shrubs, such as pineland threeawn, maidencane, and greenbrier.

The soils in this map unit have severe limitations affecting most cultivated crops. Droughtiness and rapid leaching of plant nutrients limit the choice of plants that can be grown and reduce the potential yield of adapted crops. In the more sloping areas, row crops should be planted on the contour in alternating strips with close-growing cover crops. Planting soil-improving cover crops and leaving crop residue on the surface help to maintain fertility and control erosion. Irrigation generally is feasible if water is readily available.

The Shadeville soil has moderate limitations and the Seaboard soil has severe limitations affecting hay and pasture. Deep-rooted plants, such as coastal bermudagrass and improved bahiagrass, are moderately well suited to these soils, but yields are reduced by the periodic droughtiness. Regular applications of fertilizer and lime are needed for the best yields. Controlled grazing helps to maintain plant vigor and a good ground cover.

The potential of the Shadeville soil for the production of pine trees is moderately high and that of the Seaboard soil is low. The equipment limitation, seedling mortality, and plant competition are the main management concerns. Slash pine is the preferred tree to plant.

These soils have severe limitations affecting septic tank absorption fields, trench sanitary landfills, lawns and landscaping, golf fairways, and shallow excavations. The Shadeville soil has moderate limitations affecting dwellings with basements. The wetness is the main limitation. The Seaboard soil has severe limitations affecting dwellings with basements. The depth to bedrock is the main limitation.

These soils have severe limitations affecting the development of camp areas, picnic areas, playgrounds, and paths and trails. The sandy texture of the surface layer is the main limitation.

The land capability classification of the Shadeville soil is IIIs, and that of the Seaboard soil is VIs.

14—Ridgewood fine sand, 0 to 5 percent slopes. This nearly level to gently sloping, somewhat poorly drained soil is on uplands and on slightly convex knolls in the higher areas on flatwoods. The mapped areas are irregular in shape and range from 5 to 150 acres in size.

Typically, the surface layer is gray fine sand about 4 inches thick. The underlying material is fine sand to a depth of 80 inches or more. The upper part, to a depth of about 24 inches, is light yellowish brown; the next part, to a depth of about 62 inches, is light gray mottled with shades of brown and yellow; and the lower part is white mottled with yellowish brown.

Included in this map unit are small areas of dissimilar soils. These are Lutterloh, Moriah, Ortega, Scranton, and Tooles soils. Lutterloh and Moriah soils have a loamy subsoil. In addition, Moriah soils are underlain by limestone. Ortega soils are higher on the landscape than the Ridgewood soil and are moderately well drained. Scranton and Tooles soils are poorly drained and are in the lower positions on the landscape. In addition, Tooles soils have a loamy subsoil and are underlain by limestone. Dissimilar soils make up about 15 percent of the map unit.

This Ridgewood soil has a seasonal high water table at a depth of 24 to 42 inches for 2 to 4 months of the year and at a depth of 30 to 72 inches for most of the remainder of the year. The available water capacity is low in the surface layer and very low in the underlying material. Permeability is rapid. The organic matter content and natural fertility are low.

The natural vegetation includes mainly slash pine, longleaf pine, and mixed hardwoods. The understory consists of pineland threeawn.

This soil has severe limitations affecting cultivated crops. Droughtiness and rapid leaching of plant nutrients limit the choice of plants that can be grown and reduce the potential yield of adapted crops. When it is within a depth of 42 inches, the water table increases the amount of available water in the root zone. In very dry periods, however, it drops too low for any beneficial effects. In the more sloping areas, row crops should be planted on the contour in alternating strips with close-growing cover crops. The cover crops should be grown at least two-thirds of the time. Applications of lime and fertilizer are needed for the best yields. Planting soil-improving cover crops and leaving crop residue on the surface help to maintain fertility and control erosion. Irrigation generally is feasible if water is readily available. Tile drains or other drains are needed to reduce the crop damage caused by the high water table during the growing season. Intensive management of soil fertility and water is required.

The soil has moderate limitations affecting hay and pasture. Droughtiness and rapid leaching of nutrients are the main limitations. Intensive management of soil fertility and water is required. Deep-rooted plants, such as coastal bermudagrass and bahiagrass, are well suited to this soil but require regular applications of fertilizer and lime. Controlled grazing is needed to maintain plant vigor and obtain maximum yields.

The potential of this soil for the production of slash pine and longleaf pine is high. The droughtiness and the sandy texture of this soil are the main limitations. Slash pine is the preferred tree to plant.

This soil has severe limitations affecting septic tank absorption fields, trench and area sanitary landfills, shallow excavations, and dwellings with basements. It has moderate limitations affecting dwellings without basements, small commercial buildings, local roads and streets, lawns and landscaping, and golf fairways. The wetness and the hazard of seepage are the main management concerns.

This soil has severe limitations affecting the development of camp areas, picnic areas, playgrounds, and paths and trails. The sandy texture of the surface layer is the main limitation.

The land capability classification is IVs.

16—Croatan-Dorovan mucks. These soils are nearly level and are very poorly drained. They are in depressional areas and along poorly defined drainageways on flatwoods. The mapped areas are irregular in shape and range from 5 to several thousand acres in size. Slopes are 0 to 1 percent.

Generally, the mapped areas are about 45 percent Croatan soil and 40 percent Dorovan soil. Dissimilar soils make up about 15 percent. The soils in this map unit occur as areas so intermingled that mapping them separately at the scale used is not practical. The pattern of Croatan and Dorovan soils is relatively consistent in most delineations of the map unit.

Typically, the upper part of the surface layer of the Croatan soil is black muck about 15 inches thick. The next part, to a depth of about 27 inches, is very dark brown muck. The lower part, to a depth of about 35 inches, is very dark gray sand. The underlying material, to a depth of 80 inches or more, is grayish brown sandy loam and dark gray sandy clay loam.

The seasonal high water table in the Croatan soil is within 10 inches of the surface for 2 to 4 months of the year and is above the surface for 5 to 8 months. The available water capacity is very high in the surface layer and moderate in the underlying material. Permeability is moderate. The organic matter content is very high in the surface layer and low in the subsurface layer. Natural fertility is low.

Typically, the Dorovan soil has a black muck surface layer about 65 inches thick. The underlying material, to a depth of 80 inches or more, is very dark grayish brown sandy clay.

In most years the Dorovan soil has a seasonal high water table within 10 inches of the surface throughout the year and at or above the surface for 5 to 8 months. The available water capacity is very high in the surface layer and moderate in the underlying material. Permeability is moderate. The organic matter content is very high in the surface layer and low in the underlying material. Natural fertility is low.

Included in this map unit are small areas of dissimilar soils. These are Leon, Plummer, Rutlege, Scranton, and Surrency soils. All of these dissimilar soils are mineral soils and do not have a thick, organic surface layer. In addition, Leon, Plummer, and Scranton soils are higher on the landscape than the major soils and are better drained.

The natural vegetation includes water-tolerant hardwoods, such as water oak, sweetbay, blackgum, sweetgum, red maple, black willow, common alder, and cypress. Pond pine and slash pine grow on the edge of the delineations and in high areas.

The soils in this map unit generally are not used for cultivated crops, for hay crops or pasture, or for pine tree production. Severe limitations affect these uses. The wetness and the ponding are the main limitations.

These soils have severe limitations affecting septic tank absorption fields, trench and area sanitary landfills, shallow excavations, dwellings with or without basements, small commercial buildings, local roads and streets, lawns and landscaping, and golf fairways. The wetness and the ponding are the main limitations affecting most of these uses.

These soils have severe limitations affecting the development of camp areas, picnic areas, playgrounds, and paths and trails. The ponding and the excess humus are the main limitations affecting most of these uses.

The land capability classification is VIIw.

17—Ortega sand, 0 to 5 percent slopes. This nearly level to gently undulating, moderately well drained soil is on side slopes or in concave areas on the sandy uplands and is on convex knolls on flatwoods. The mapped areas are irregular in shape and range from 5 to 300 acres in size.

Typically, the surface layer is light gray sand about 3 inches thick. The underlying material extends to a depth of about 80 inches. In sequence downward, it is light yellowish brown sand, brownish yellow fine sand, very pale brown fine sand, very pale brown fine sand mottled with reddish yellow, and white sand mottled with strong brown.

Other soils occurring in areas of this map unit include Alpin and Lakeland soils, which are similar to the Ortega soil but are in slightly higher positions on the landscape and are better drained. Also occurring are small areas of soils that are similar to the Ortega soil but have a thicker surface layer.

Included in this map unit are small areas of dissimilar soils. These are Shadeville, Hurricane, Otela, Ridgewood, and Scranton soils. Shadeville and Otela soils have a loamy subsoil. Hurricane, Ridgewood, and Scranton soils are lower on the landscape than the Ortega soil and are more poorly drained. Dissimilar soils make up about 15 percent of the map unit.

In most years this Ortega soil has a seasonal high water table that fluctuates between depths of 60 and 72 inches for more than 6 months of the year and is at a depth of 42 to 60 inches for 1 to 3 months during periods of heavy rainfall. The available water capacity is low in the surface layer and very low in the underlying material. Permeability is rapid. The organic matter content and natural fertility are low.

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

This soil has severe limitations affecting most cultivated crops. Droughtiness and rapid leaching of plant nutrients limit the choice of plants that can be grown and reduce the potential yield of adapted crops. When it is within a depth of 50 inches, the water table increases the amount of available water in the root zone. In very dry periods, however, it drops too low for any beneficial effects. Cover crops should be grown at least two-thirds of the time. Applications of lime and fertilizer are needed for the best yields. Planting soil-improving cover crops and leaving crop residue on the surface help to maintain fertility and control erosion. Irrigation generally is feasible if water is readily available. Tile drains or other drains are needed to reduce the crop damage caused by the high water table during the growing season. Intensive management of soil fertility and water is required.

This soil has moderate limitations affecting hay and pasture. The droughtiness and rapid leaching of nutrients are the main limitations. Deep-rooted plants, such as coastal bermudagrass and bahiagrass, are well suited to this soil, but applications of lime and fertilizer are needed for the best yields. Controlled grazing is needed to maintain plant vigor and obtain maximum yields. Intensive management of soil fertility and water is required.

The potential of this soil for the production of longleaf pine and slash pine is moderately high. The droughtiness and the sandy texture of this soil are the main limitations. Slash pine is the preferred tree to plant.

This soil has severe limitations affecting trench and area sanitary landfills, shallow excavations, lawns and landscaping, and golf fairways. It has moderate limitations affecting septic tank absorption fields and dwellings with basements. The wetness and the hazard of seepage are the main management concerns.

This soil has severe limitations affecting the development of camp areas, picnic areas, playgrounds, and paths and trails. The sandy texture of the surface layer is the main limitation.

The land capability classification is IIIs.

18—Hurricane sand, 0 to 5 percent slopes. This nearly level to gently sloping, somewhat poorly drained soil is on flatwoods and low uplands. The mapped areas are irregular in shape and range from 5 to 60 acres in size. Slopes are smooth or slightly convex.

Typically, the surface layer is grayish brown sand about 5 inches thick. The upper part of the subsurface layer, to a depth of about 21 inches, is pale yellow sand. The next part, to a depth of about 32 inches, is light yellowish brown sand mottled with light gray and yellowish brown. The lower part, to a depth of about 55 inches, is light gray sand mottled with reddish yellow and yellowish brown. The subsoil, to a depth of about 80 inches, is very dark gray sand.

Other soils occurring in areas of this map unit include Ridgewood soils, which are similar to the Hurricane soil but do not have a sandy, dark, organic-stained subsoil.

Included in the map unit are small areas of dissimilar soils. These are Leon, Lutterloh, Ortega, and Scranton soils. Leon and Scranton soils are higher on the landscape than the Hurricane soil and are poorly drained. In addition, Leon soils have a sandy, dark, organic-stained subsoil within 30 inches of the surface, and Scranton soils do not have a subsoil. Lutterloh soils have a loamy subsoil. Ortega soils are higher on the landscape than the Hurricane soil and do not have a sandy, dark, organic-stained subsoil. Dissimilar soils make up about 7 percent of the map unit.

This Hurricane soil has a seasonal high water table at a depth of 18 to 42 inches for 2 to 4 months of the year and at a depth of 30 to 72 inches for most of the remainder of the year. The available water capacity is low in the surface layer and subsurface layer and is moderate in the subsoil. Permeability is rapid in the surface layer and subsurface layer and is moderately rapid in the subsoil. The organic matter content and natural fertility are low.

Most areas of this map unit are cutover woodland or are planted to slash pine. The natural vegetation includes slash pine, longleaf pine, bluejack oak, turkey oak, and post oak. The understory consists of saw palmetto, broomsedge bluestem, pineland threeawn, and various native shrubs.

This soil has severe limitations affecting cultivated crops. Droughtiness and rapid leaching of plant nutrients limit the choice of plants that can be grown and reduce the potential yield of adapted crops. When it is within a depth of 42 inches, the water table increases the amount of available water in the root zone. In very dry periods, it drops too low for any beneficial effects. In the more sloping areas, row crops should be planted on the contour in alternating strips with close-growing cover crops. The cover crops should be grown at least two-thirds of the time. Applications of lime and fertilizer are needed for the best yields. Planting soil-improving cover crops and leaving crop residue on the surface help to maintain fertility and control erosion. Irrigation generally is feasible if water is readily available. Tile drains or other drains are needed to reduce the crop damage caused by the high water table during the growing season. Intensive management of soil fertility and water is required.

This soil has moderate limitations affecting hay and pasture. The droughtiness and rapid leaching of nutrients are the main limitations. Intensive management of soil fertility and water is required. Deep-rooted plants, such as coastal bermudagrass and bahiagrass, are well suited to this soil but require regular applications of fertilizer and lime for the best yields. Controlled grazing is needed to maintain plant vigor and obtain maximum yields.

The potential of this soil for the production of slash pine and longleaf pine is high. The droughtiness and the sandy texture of this soil are the main limitations. Slash pine is the preferred tree to plant.

This soil has severe limitations affecting septic tank absorption fields, trench and area sanitary landfills, shallow excavations, dwellings with basements, lawns and landscaping, and golf fairways. It has moderate limitations affecting dwellings without basements, small commercial buildings, and local roads and streets. The wetness and the hazard of seepage are the main management concerns.

This soil has severe limitations affecting the development of camp areas, picnic areas, playgrounds, and paths and trails. The sandy texture of the surface layer is the main limitation.

The land capability classification is IIIw.

19—Kershaw sand, 0 to 5 percent slopes. This nearly level to gently undulating, excessively drained soil is on summits in the uplands. The mapped areas are irregular in shape and range from 5 to 100 acres in size.

Typically, the surface layer is grayish brown sand about 8 inches thick. The upper part of the underlying material, to a depth of about 47 inches, is pale brown sand. The next part, to a depth of about 59 inches, is light gray sand. The lower part, to a depth of 80 inches or more, is white, uncoated sand.

Other soils occurring in areas of this map unit include Alpin and Ortega soils, which are similar to the Kershaw soil. Alpin soils have thin bands of loamy material at a depth of more than 40 inches, and Ortega soils are in slightly lower positions on the landscape and are moderately well drained.

Included in this map unit are small areas of dissimilar soils. These are Shadeville, Otela, and Ridgewood soils. Shadeville and Otela soils have a loamy subsoil. Ridgewood soils are lower on the landscape than the Kershaw soil and are somewhat poorly drained. Dissimilar soils make up about 15 percent of the map unit.

This Kershaw soil does not have a high water table within 72 inches of the surface. The available water capacity is very low. Permeability is very rapid. The organic matter content and natural fertility are low.

The natural vegetation includes turkey oak, longleaf pine, slash pine, blackjack oak, and bluejack oak. The understory consists of pineland threeawn and wild lupine.

The sandy texture of this soil is a severe limitation affecting cultivated crops. Intensive soil management practices are needed if cultivated crops are grown. Droughtiness and rapid leaching of plant nutrients limit the choice of plants that can be grown and reduce the potential yield of adapted crops. In the more sloping areas, row crops should be planted on the contour in alternating strips with close-growing cover crops. The cover crops should be grown at least three-fourths of the time.

This soil has moderate limitations affecting hay and pasture. Deep-rooted plants, such as coastal bermudagrass and bahiagrass, are well suited to this soil, but yields are reduced by the periodic droughtiness. Regular appplications of fertilizer and lime are needed for optimum yields. Controlled grazing helps to maintain plant vigor and obtain maximum yields. Intensive management of soil fertility and water is required.

The potential of this soil for the production of pine trees is moderate. Seedling mortality and the equipment limitation are the main management concerns. Longleaf pine is the preferred tree to plant.

This soil has severe limitations affecting trench and area sanitary landfills, shallow excavations, lawns and landscaping, and golf fairways. The sandy texture of this soil and the hazard of seepage are the main management concerns.

This soil has severe limitations affecting the development of camp areas, picnic areas, playgrounds, and paths and trails. The sandy texture of the surface layer is the main limitation.

The land capability classification is VIIs.

21—Lakeland sand, 0 to 5 percent slopes. This nearly level to gently undulating, excessively drained soil is on uplands. The mapped areas are irregular in shape and range from 5 to 150 acres in size.

Typically, the surface layer is grayish brown sand about 6 inches thick. The upper part of the underlying material, to a depth of about 44 inches, is light yellowish brown 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 pale yellow sand.

Other soils occurring in areas of this map unit include Alpin and Ortega soils, which are similar to the Lakeland soil. Alpin soils have thin bands of loamy material at a depth of more than 40 inches, and Ortega soils are in slightly lower positions on the landscape and are moderately well drained.

Included in this map unit are small areas of dissimilar soils. These are Shadeville, Otela, and Ridgewood soils. Shadeville and Otela soils have a loamy subsoil. Ridgewood soils are lower on the landscape than the Lakeland soil and are somewhat poorly drained. Dissimilar soils make up about 8 percent of the map unit.

This Lakeland soil does not have a high water table within 72 inches of the surface. The available water capacity is low in the surface layer and underlying material. Permeability is rapid. The organic matter content and natural fertility are low.

The natural vegetation includes longleaf pine, slash pine, turkey oak, blackjack oak, and bluejack oak. The understory consists of pineland threeawn and wild lupine.

The sandy texture of this soil is a severe limitation affecting cultivated crops. Intensive soil management practices are needed if cultivated crops are grown. Droughtiness and rapid leaching of plant nutrients limit the choice of plants that can be grown and reduce the potential yield of adapted crops. In the more sloping areas, row crops should be planted on the contour in alternating strips with close-growing cover crops. The cover crops should be grown at least three-fourths of the time.

This soil has moderate limitations affecting hay and pasture. Deep-rooted plants, such as coastal bermudagrass and bahiagrass, are well suited to this soil, but yields are reduced by the periodic droughtiness. Regular applications of fertilizer and lime are needed for the best yields. Controlled grazing helps to maintain plant vigor and obtain maximum yields.

Intensive management of soil fertility and water is required.

The potential of this soil for the production of pine trees is moderately high. Seedling mortality and the equipment limitation are the main management concerns. Slash pine is the preferred tree to plant.

This soil has severe limitations affecting trench and area sanitary landfills, shallow excavations, lawns and landscaping, and golf fairways. The sandy texture of the soil and the hazard of seepage are the main management concerns.

This soil has severe limitations affecting the development of camp areas, picnic areas, playgrounds, and paths and trails. The sandy texture of the surface layer is the main limitation.

The land capability classification is IVs.

23—Leon sand. This nearly level, poorly drained soil is in broad areas on flatwoods. The mapped areas are irregular in shape and range from 15 to 300 acres in size. Slopes are 0 to 2 percent.

Typically, the surface layer is very dark gray sand about 5 inches thick. The subsurface layer, to a depth of about 18 inches, is gray sand. The upper part of the subsoil, to a depth of about 38 inches, is dark brown sand. Separating the upper and lower parts of the subsoil, to a depth of about 58 inches, are subsurface layers that are light brownish gray and light gray sand. The lower part of the subsoil, to a depth of 80 inches or more, is dark brown sand.

Other soils occurring in small areas of this map unit include soils that are similar to the Leon soil but have a sandy, dark, organic-stained subsoil between depths of 30 and 50 inches. Also included are some similar soils that have organic-stained layers at a depth of about 30 inches.

Included in this map unit are small areas of dissimilar soils. These are Chaires, Hurricane, Plummer, Pottsburg, Ridgewood, Rutlege, and Scranton soils. Chaires and Plummer soils have a loamy subsoil. In addition, Plummer soils do not have a sandy, dark, organic-stained subsoil. Hurricane and Ridgewood soils are higher on the landscape than the Leon soil and are better drained. Pottsburg soils have a sandy, dark, organic-stained subsoil at a depth of more than 50 inches. Rutlege soils are very poorly drained and are in the lower positions on the landscape. Scranton soils do not have a sandy, dark, organic-stained subsoil. Also included are some soils that have a loamy subsoil between depths of 20 and 40 inches. Dissimilar soils make up about 15 percent of the map unit.

In most years this Leon soil has a seasonal high water table within 10 inches of the surface for 1 to 3 months of the year and at a depth of 10 to 40 inches for more than 6 months. The available water capacity is very low in the surface layer and subsurface layer and is low in the subsoil. Permeability is rapid in the surface layer and subsurface layer and is moderately rapid in the subsoil. The organic matter content is moderately low, and natural fertility is low.

The natural vegetation includes longleaf pine, slash pine, and water oak. The understory consists of waxmyrtle, saw palmetto, running oak, fetterbush lyonia, gallberry, and pineland threeawn.

This soil has severe limitations affecting cultivated crops. The wetness is the main limitation.

This soil has severe limitations affecting hay and pasture. The seasonal high water table and rapid leaching of plant nutrients limit the choice of plants that can be grown and reduce the potential yield of adapted crops. Intensive management of soil fertility and water is required.

The potential of this soil for the production of pine trees is moderate. Slash pine is the preferred tree to plant. The equipment limitation, seedling mortality, and plant competition are the main limitations. Windthrow is a hazard. Planting the trees on beds lowers the effective depth of the water table.

This soil has severe limitations affecting septic tank absorption fields, trench and area sanitary landfills, shallow excavations, dwellings with or without basements, small commercial buildings, local roads and streets, lawns and landscaping, and golf fairways. The wetness is the main limitation.

This soil has severe limitations affecting the development of camp areas, picnic areas, playgrounds, and paths and trails. The wetness and the sandy texture of the surface layer are the main limitations.

The land capability classification is IVw.

25—Mandarin fine sand. This nearly level, somewhat poorly drained soil is on flatwoods and low uplands. The mapped areas are irregular in shape and range from 5 to 350 acres in size. Slopes are smooth or slightly convex and are 0 to 2 percent.

Typically, the surface layer is gray fine sand about 6 inches thick. The subsurface layer, to a depth of about 24 inches, is light brownish gray fine sand. The subsoil, to a depth of about 29 inches, is dark reddish brown fine sand. The upper part of the substratum, to a depth of about 32 inches, is dark brown fine sand. The next part, to a depth of about 60 inches, is light gray sand mottled with brownish yellow. The lower part, to a depth of about 80 inches, is light gray sand mottled with light brown.

Other soils occurring in areas of this map unit include

Leon soils, which are similar to the Mandarin soil but are in slightly lower positions on the landscape and are poorly drained. Also occurring are some areas of similar soils that have a sandy, dark, organic-stained subsoil between depths of 30 and 50 inches.

Included in this map unit are small areas of dissimilar soils. These are Chaires, Ortega, Ridgewood, and Scranton soils. Chaires soils have a loamy subsoil below a sandy, dark, organic-stained subsoil. Ortega, Ridgewood, and Scranton soils do not have a sandy, dark, organic-stained subsoil. Dissimilar soils make up about 15 percent of the map unit.

This Mandarin soil has a high water table at a depth of 18 to 42 inches for 4 to 6 months during most years and at a depth of 10 to 20 inches for as long as 2 weeks in some years. The available water capacity is low. Permeability is moderately rapid in weakly cemented layers and is rapid in all other layers. The organic matter content is low to moderate. Natural fertility is low.

The natural vegetation includes slash pine and longleaf pine. The understory consists of scrub oak, greenbrier, saw palmetto, pineland threeawn, creeping bluestem, lopsided indiangrass, panicum, and paspalum.

This soil has severe limitations affecting cultivated crops. Droughtiness and rapid leaching of plant nutrients limit the choice of plants that can be grown and reduce the potential yield of adapted crops. When it is within a depth of 42 inches, the water table increases the amount of available water in the root zone. In very dry periods, however, it drops too low for any beneficial effects. In the more sloping areas, row crops should be planted on the contour in alternating strips with close-growing cover crops. The cover crops should be grown at least two-thirds of the time. Applications of lime and fertilizer are needed for the best yields. Planting soil-improving cover crops and leaving crop residue on the surface help to maintain fertility and control erosion. Irrigation generally is feasible if water is readily available. Tile drains or other drains are needed to reduce the crop damage caused by the high water table during the growing season. Intensive management of soil fertility and water is required.

This soil has moderate limitations affecting hay and pasture. The droughtiness and rapid leaching of nutrients are the main limitations. Intensive management of soil fertility and water is required. Deep-rooted plants, such as coastal bermudagrass and bahiagrass, are well suited to this soil but require regular applications of fertilizer and lime for the best yields. Controlled grazing is needed to maintain plant vigor and obtain maximum yields.

The potential of this soil for the production of slash pine and longleaf pine is high. The droughtiness and the sandy texture of this soil are the main limitations. Slash pine is the preferred tree to plant.

This soil has severe limitations affecting septic tank absorption fields, trench and area sanitary landfills, shallow excavations, dwellings with basements, lawns and landscaping, and golf fairways. It has moderate limitations affecting dwellings without basements, small commercial buildings, and local roads and streets. The wetness and the hazard of seepage are the main management concerns.

This soil has severe limitations affecting the development of camp areas, picnic areas, playgrounds, and paths and trails. The sandy texture of the surface layer is the main limitation.

The land capability classification is VIs.

26—Tooles-Nutall fine sands. These soils are nearly level and are poorly drained. They are in broad areas on flatwoods. The mapped areas are irregular in shape and range from 10 to 800 acres in size. Slopes are 0 to 1 percent.

In 80 percent of the areas mapped as Tooles-Nutall fine sands, these soils and similar soils make up 75 to 91 percent of the map unit. Generally, the mapped areas are about 60 percent Tooles and similar soils and 24 percent Nutall and similar soils. Dissimilar soils make up about 16 percent. The soils in this map unit occur as areas so intermingled that mapping them separately at the scale used is not practical. The pattern of Tooles, Nutall, and similar soils is relatively consistent in most delineations of the map unit. Areas of each soil within the delineations range from about 0.25 acre to 4.0 acres in size.

Typically, the Tooles soil has a black fine sand surface layer about 6 inches thick. The upper part of the subsurface layer, to a depth of about 14 inches, is pale brown fine sand. The lower part, to a depth of about 26 inches, is light gray fine sand. The subsoil, to a depth of about 50 inches, is light brownish gray fine sandy loam. Limestone bedrock is at a depth of about 50 inches.

The Tooles soil has a seasonal high water table within 10 inches of the surface for 6 to 8 months of the year. The available water capacity is low in the surface layer and subsurface layer and is moderate in the subsoil. Permeability is rapid in the surface layer and slow in the subsoil. The organic matter content and natural fertility are low.

Typically, the Nutall soil has a very dark gray fine sand surface layer about 5 inches thick. The subsurface layer, to a depth of about 10 inches, is gray fine sand. The upper part of the subsoil, to a depth of about 20 inches, is mixed brownish yellow and gray sandy clay loam. The lower part, to a depth of about 37 inches, is gray sandy clay loam mottled with yellowish brown. Limestone bedrock is at a depth of about 37 inches.

The Nutall soil has a seasonal high water table within 10 inches of the surface for 6 to 8 months of the year. The available water capacity is low in the surface layer and subsurface layer and is moderate in the subsoil. Permeability is rapid in the surface layer and subsurface layer and is slow in the subsoil. The organic matter content and natural fertility are low.

Other soils occurring in areas of this map unit include some soils that are similar to the major soils but have a surface layer that is too thin and too light in color to be within the defined range of the Tooles or Nutall series.

Included in this map unit are small areas of dissimilar soils. These are Chaires, Leon, Plummer, and Surrency soils. Chaires and Leon soils have a sandy, dark, organic-stained subsoil. Plummer soils are not underlain by limestone. Surrency soils are lower on the landscape than the major soils and are very poorly drained. Also included are areas of soils that do not have a loamy subsoil and are underlain by limestone.

The natural vegetation includes slash pine, laurel oak, sweetgum, cabbage palm, red maple, sweetbay, and waxmyrtle.

The soils in this map unit generally are not used for cultivated crops or for hay crops or pasture. Severe limitations affect these uses. The wetness is the main limitation.

The potential of these soils for the production of pine trees is moderately high. The equipment limitation and seedling mortality are the main management concerns. Slash pine is the preferred tree to plant.

These soils have severe limitations affecting septic tank absorption fields, trench and area sanitary landfills, shallow excavations, dwellings with or without basements, small commercial buildings, local roads and streets, lawns and landscaping, and golf fairways. The wetness is the main limitation.

These soils have severe limitations affecting the development of camp areas, picnic areas, playgrounds, and paths and trails. The wetness is the main limitation.

The land capability classification of the Tooles soil is IIIw, and that of the Nutall soil is IVw.

27—Moriah-Pilgrims fine sands. These soils are nearly level and are somewhat poorly drained. They are in broad areas on flatwoods. The mapped areas are irregular in shape and range from about 5 to 300 acres in size. Slopes are 0 to 2 percent.

In 95 percent of the areas mapped as Moriah-Pilgrims fine sands, these soils make up 79 to 99 percent of the map unit. Generally, the mapped areas are about 67 percent Moriah soil and 28 percent Pilgrims soil. Dissimilar soils make up about 5 percent. The soils in this map unit occur as areas so intermingled that mapping them separately at the scale used is not practical. The pattern of Moriah and Pilgrims soils is relatively consistent in most delineations of the map unit. Areas of each soil within the delineations range from about 0.25 acre to 4.0 acres in size.

Typically, the Moriah soil has a gray fine sand surface layer about 8 inches thick. The subsurface layer, to a depth of about 25 inches, is yellowish brown and white fine sand mottled with strong brown and light gray sand splotches. The subsoil, to a depth of about 50 inches, is yellow fine sandy loam mottled with strong brown, light brownish gray, and light gray. Fractured, limestone bedrock is at a depth of about 50 inches. Depth to the bedrock varies. In some areas solution holes are within 80 inches of the surface.

In most years the Moriah soil has a high water table at a depth of 18 to 36 inches for 2 to 5 months of the year. Small, low areas are briefly ponded after periods of heavy rainfall. Because of the underlying porous limestone, this soil can become saturated by artesian flow. This saturation is most common in areas adjacent to rivers and streams during periods of high water. The available water capacity is low in the surface layer and subsurface layer and is moderate in the subsoil. Permeability is rapid in the surface layer and subsurface layer and is moderate in the subsoil. Natural fertility is low.

Typically, the Pilgrims soil has a dark grayish brown fine sand surface layer about 6 inches thick. The subsurface layer, to a depth of about 9 inches, is pale brown fine sand. The subsoil, to a depth of about 24 inches, is light yellowish brown sandy clay mottled with yellowish brown, light gray, and brownish yellow. Fractured limestone bedrock is at a depth of about 24 inches.

In most years the Pilgrims soil has a high water table at a depth of 18 to 36 inches for 2 to 5 months of the year. Small, low areas are briefly ponded after periods of heavy rainfall. Because of the underlying porous limestone, this soil can become saturated by artesian flow. This saturation is most common in areas adjacent to rivers and streams during periods of high water. The available water capacity is low in the surface layer and subsurface layer and is moderate in the subsoil. Permeability is rapid in the surface layer and subsurface layer and is slow in the subsoil. Natural fertility is low.

Included in this map unit are small areas of dissimilar soils. These are Chaires, Shadeville, Leon, Nutall, and Tooles soils. Chaires, Leon, Nutall, and Tooles soils are lower on the landscape than the major soils and are poorly drained. In addition, Chaires and Leon soils have a sandy, dark, organic-stained subsoil. Shadeville soils are in the higher positions on the landscape and are moderately well drained.

The natural vegetation includes loblolly pine, longleaf pine, slash pine, spruce pine, and mixed hardwoods, such as laurel oak, water oak, sweetgum, hickory, dogwood, and persimmon. The understory consists of native grasses and shrubs, such as pineland threeawn, huckleberry, and briers.

The wetness is a moderate limitation affecting cultivated crops. These soils are well suited to some cultivated crops, but the choice of crops that can be grown is limited because the water table is near the surface most of the time. If the soil is adequately drained, corn, soybeans, and peanuts can be grown. A close-growing cover crop should be on the land at least half of the time. Good seedbed preparation, including bedded rows, and applications of fertilizer and lime are needed to obtain maximum yields.

The potential of these soils for the production of pine trees is high. The equipment limitation and plant competition are the main management concerns. Slash pine and loblolly pine are the preferred trees to plant.

These soils have severe limitations affecting septic tank absorption fields, trench and area sanitary landfills, shallow excavations, dwellings with or without basements, small commercial buildings, local roads and streets, lawns and landscaping, and golf fairways. The wetness is the main limitation.

These soils have severe limitations affecting the development of camp areas, picnic areas, playgrounds, and paths and trails. The wetness is the main limitation.

The land capability classification of the Moriah soil is IIIs, and that of the Pilgrims soil is IVs.

28—Tooles-Nutall fine sands, frequently flooded. These soils are nearly level and are very poorly drained. They are along the major drainageways on flatwoods (fig. 8). The mapped areas are irregular in shape and range from 20 to several thousand acres in size. Slopes are 0 to 1 percent.

In 80 percent of the areas mapped as Tooles-Nutall fine sands, frequently flooded, these soils make up 80 to 90 percent of the map unit. Generally, the mapped areas are about 49 percent Tooles soil and 43 percent Nutall soil. Dissimilar soils make up 8 percent. The soils in this map unit occur as areas so intermingled that mapping them separately at the scale used is not practical. The pattern of Tooles and Nutall soils is relatively consistent in most delineations of the map unit. Areas of each soil within the delineations range from about 0.25 acre to 4.0 acres in size.

Typically, the Tooles soil has a black fine sand surface layer about 3 inches thick. The next layer, to a depth of about 8 inches, is very dark gray fine sand. The subsurface layer, to a depth of about 39 inches, is sand. It is light brownish gray in the upper part and light gray in the lower part. The subsoil, to a depth of about 59 inches, is mottled light brownish gray and very pale brown sandy clay loam. Limestone bedrock is at a depth of about 59 inches.

The Tooles soil is flooded for 6 to 8 months during the year and has a seasonal high water table within a depth of 12 inches for most of the remainder of the year. The available water capacity is low in the surface layer and high in the subsoil. Permeability is rapid in the surface layer and slow in the subsoil. The organic matter content and natural fertility are low.

Typically, the Nutall soil has a black fine sand surface layer about 7 inches thick. The next layer, to a depth of about 11 inches, is very dark brown sand. The subsurface layer, to a depth of about 17 inches, is gray sand. The subsoil, to a depth of about 26 inches, is light gray sandy clay loam. Limestone bedrock is at a depth of about 26 inches.

The Nutall soil is flooded for 6 to 8 months during the year and has a seasonal high water table within a depth of 12 inches for most of the remainder of the year. The available water capacity is moderate in the surface layer and in the subsoil. Permeability is rapid in the surface layer and slow in the subsoil. The organic matter content and natural fertility are low.

Included in this map unit are small areas of dissimilar soils. These are Chaires soils and Tooles and Nutall soils that are not subject to flooding. All of these included soils are higher on the landscape than the major soils and are poorly drained. In addition, Chaires soils have a sandy, dark, organic-stained subsoil. Also included are areas of soils that are not underlain by limestone bedrock and some soils in depressional areas that have a sandy, dark, organic-stained subsoil.

The natural vegetation includes red maple, sweetgum, sweetbay, cabbage palm, tupelo, baldcypress, and water oak.

The soils in this map unit are not suited to cultivated

Figure 8.—An area of Tooles-Nutall fine sands, frequently flooded, along a waterway. This unit provides good habitat for wetland wildlife.

crops or to hay crops or pasture. The wetness is the main limitation. The flooding is a hazard.

The potential of the soils for woodland is moderately high. Hardwoods, baldcypress, and sweetgum grow well on these soils but pine trees do not.

These soils have severe limitations affecting septic tank absorption fields, trench and area sanitary landfills, shallow excavations, dwellings with or without basements, small commercial buildings, local roads and streets, lawns and landscaping, and golf fairways. The wetness and the flooding are the main limitations.

These soils have severe limitations affecting the development of camp areas, picnic areas, playgrounds, and paths and trails. The wetness and the flooding are the main limitations.

The land capability classification is Vw.

29—Tooles-Nutall-Chaires fine sands. These soils are nearly level and are poorly drained and very poorly drained. They are in low-lying areas and depressions on flatwoods. These soils are irregular in shape and range from 4 to several hundred acres in size. Slopes are slightly concave and are less than 2 percent.

In 99 percent of the areas mapped as Tooles-Nutall-

Chaires fine sands, these soils and similar soils make up about 99 percent of the map unit. Generally, the mapped areas are about 39 percent Tooles and similar soils, 34 percent Nutall and similar soils, and 26 percent Chaires and similar soils. Dissimilar soils make up about 1 percent. The soils in this map unit occur as areas so intermingled that mapping them separately at the scale used is not practical. The pattern of Tooles, Nutall, Chaires, and similar soils is relatively consistent in most delineations of the map unit. Areas of each soil within the delineations range from 0.25 acre to 4.0 acres in size.

Typically, the Tooles soil has a very dark gray fine sand surface layer that has a salt-and-pepper appearance and is about 8 inches thick. The next layer, to a depth of about 11 inches, is dark gray fine sand. The subsurface layer, to a depth of about 31 inches, is light gray sand that has common mottles of light brown. The upper part of the subsoil, to a depth of about 49 inches, is light gray sandy clay loam that has common mottles of strong brown. The lower part, to a depth of about 57 inches, is greenish gray sandy clay loam that has many mottles of brownish yellow. Limestone bedrock is at a depth of about 57 inches.

The Tooles soil has a seasonal high water table within 10 inches of the surface for 6 to 8 months of the year. The available water capacity is low in the surface layer and subsurface layer and is moderate in the subsoil. Permeability is rapid in the surface layer and slow in the subsoil. The organic matter content and natural fertility are low.

Typically, the Nutall soil has a black fine sand surface layer about 11 inches thick. The subsurface layer, to a depth of about 16 inches, is gray sand. The upper part of the subsoil, to a depth of about 31 inches, is dark grayish brown sandy clay loam that has common mottles of brownish yellow. The lower part, to a depth of about 39 inches, is greenish gray sandy clay loam that has many mottles of reddish brown. Limestone bedrock is at a depth of about 39 inches.

In most years the Nutall soil is ponded for 4 to 6 months and has a seasonal high water table within a depth of 20 inches for the remainder of the year. The available water capacity is low in the surface layer and subsurface layer and is moderate in the subsoil. Permeability is rapid in the surface layer and subsurface layer and is slow in the subsoil. The organic matter content and natural fertility are low.

Typically, the Chaires soil has a black fine sand surface layer about 7 inches thick. The next layer, to a depth of about 13 inches, is grayish brown sand. The subsurface layer, to a depth of about 17 inches, is light brownish gray sand that has a few mottles of strong brown. The upper part of the subsoil, to a depth of about 33 inches, is very dark brown and very dark grayish brown sand. The lower part, to a depth of 80 inches or more, is very pale brown and light gray sandy loam and sandy clay loam that has common mottles of light brown.

In most years the Chaires soil is ponded for 4 to 6 months and has a seasonal high water table within a depth of 20 inches for the remainder of the year. The available water capacity is low in the surface layer and subsurface layer and is moderate in the subsoil. Permeability is rapid in the surface layer and subsurface layer, is moderate in the upper part of the subsoil, and is slow in the lower part. The organic matter content and natural fertility are low.

Other soils occurring in small areas of this map unit include Chaires, Nutall, Tooles, Rutlege, and Surrency soils. These soils are similar to the major soils, but Chaires and Nutall soils are in nondepressional areas and Rutlege and Surrency soils are not underlain by limestone and do not have a sandy, dark, organic-stained subsoil. Depth to limestone and to the subsoil varies in this map unit.

The natural vegetation includes slash pine, sweetgum, red maple, sweetbay, cypress, blackgum, and cabbage palm.

The soils in this map unit generally are not used for cultivated crops or for hay crops or pasture. Severe limitations affect these uses. The wetness is the main limitation.

The potential of these soils for woodland is moderately high, although baldcypress and blackgum grow in areas that are more wet. The equipment limitation and seedling mortality are the main management concerns. Planting the trees on beds lowers the effective depth of the water table.

These soils have severe limitations affecting septic tank absorption fields, trench and area sanitary landfills, shallow excavations, dwellings with or without basements, small commercial buildings, local roads and streets, lawns and landscaping, and golf fairways. The wetness and the ponding are the main limitations.

These soils have severe limitations affecting the development of camp areas, picnic areas, playgrounds, and paths and trails. The wetness and the ponding are the main limitations.

The land capability classification is VIIw.

30—Ocilla sand, 0 to 5 percent slopes. This gently sloping, somewhat poorly drained soil is in low areas on uplands. The mapped areas are irregular in shape and range from 4 to 70 acres in size. Slopes range from 0 to 5 percent.

Typically, the surface layer is grayish brown sand about 4 inches thick. The upper part of the subsurface layer, to a depth of about 22 inches, is pale brown sand. The lower part, to a depth of about 32 inches, is light gray sand mottled with brown and brownish yellow. The upper part of the subsoil, to a depth of about 50 inches, is light yellowish brown sandy loam. The next part, to a depth of about 60 inches, is light brownish gray sandy clay loam. The lower part, to a depth of about 80 inches or more, is light brownish gray sandy clay loam. The subsoil is mottled with shades of reddish yellow, light gray, and pale yellow.

Other soils occurring in areas of this map unit include Lutterloh soils, which are similar to the Ocilla soil but have a loamy subsoil at a depth of more than 40 inches. Also occurring are similar soils that have a loamy subsoil between depths of 15 and 20 inches.

Included in this map unit are small areas of dissimilar soils. These are Moriah, Otela, Ortega, Pilgrims, and Shadeville soils. Moriah and Pilgrims soils are underlain by limestone. Otela, Shadeville, and Ortega soils are higher on the landscape than the Ocilla soil and are better drained. Dissimilar soils make up about 7 percent of the map unit.

This Ocilla soil has a seasonal high water table at a depth of 12 to 30 inches for 2 to 4 months of the year and at a depth of 30 to 72 inches for the remainder of the year. The available water capacity is low in the surface layer and subsurface layer and is moderate in the subsoil. Permeability is rapid in the surface layer and subsurface layer and is moderately slow in the subsoil. The organic matter content and natural fertility are low.

The natural vegetation includes longleaf pine and slash pine. The understory consists of huckleberry, blueberry, gallberry, fetterbush lyonia, waxmyrtle, saw palmetto, chalky bluestem, broomsedge bluestem, pineland threeawn, and sedges.

Wetness is a severe limitation affecting cultivated crops. This soil is suited to some cultivated crops, but the choice of crops that can be grown is limited because the water table is near the surface most of the time. If the soil is adequately drained, crops, such as corn and peanuts, can be grown. Tile drains or open ditches are needed to reduce the wetness. In the more sloping areas, row crops should be planted in alternating strips with close-growing cover crops. Soil-improving cover crops should remain on the land at least half of the time. Good seedbed preparation and applications of lime and fertilizer are needed for the best yields.

This soil has moderate limitations affecting hay and pasture. Grasses, such as coastal bermudagrass and bahiagrass, grow well with proper management. White clover and other legumes are moderately suited to this soil. Regular applications of fertilizer and lime are needed for the best yields. Controlled grazing helps to maintain plant vigor and ground cover.

The potential of this soil for the production of pine trees is moderately high. The main management concerns are the equipment limitation, seedling mortality, and plant competition. Loblolly pine and slash pine are the preferred trees to plant.

This soil has severe limitations affecting septic tank absorption fields, trench and area sanitary landfills, shallow excavations, and dwellings with basements. It has moderate limitations affecting dwellings without basements, small commercial buildings, local roads and streets, lawns and landscaping, and golf fairways. The wetness is the main limitation affecting most of these uses.

This soil has severe limitations affecting the development of camp areas, picnic areas, playgrounds, and paths and trails. The sandy texture of the surface layer is the main limitation.

The land capability classification is IIIw.

32—Plummer fine sand. This nearly level, poorly drained soil is in poorly defined drainageways on uplands and flatwoods. The mapped areas are elongated or irregular in shape and range from 10 to 900 acres in size. Slopes are 0 to 2 percent.

Typically, the surface layer is dark gray fine sand about 8 inches thick. The subsurface layer is fine sand. The upper part, to a depth of about 31 inches, is grayish brown. The next part, to a depth of about 38 inches, is light brownish gray. The lower part, to a depth of about 43 inches, is light gray. The subsoil, to a depth of 80 inches or more, is light gray sandy loam. It has common mottles in shades of yellow.

Other soils occurring in areas of this map unit include Lutterloh soils, which are similar to the Plummer soil but are in slightly higher positions on the landscape and are somewhat poorly drained. Also occurring are areas of similar soils that have a darker surface layer and in places have a sandy, dark, organic-stained layer.

Included in this map unit are small areas of dissimilar soils. These are Leon, Ortega, Otela, and Scranton soils. Leon soils have a dark, organic-stained, sandy layer and do not have a loamy subsoil. Ortega and

Otela soils are higher on the landscape than the Plummer soil and are better drained. Ortega and Scranton soils are sandy. Dissimilar soils make up about 15 percent of the map unit.

This Plummer soil has a seasonal high water table at or within 15 inches of the surface for 3 to 6 months in most years. The available water capacity is low or very low in the surface layer and subsurface layer and is moderate in the subsoil. Permeability is rapid in the surface layer and subsurface layer and is moderate in the subsoil. The organic matter content is moderately low, and natural fertility is low.

The natural vegetation includes mainly sweetbay, water oak, spruce pine, loblolly pine, slash pine, sweetgum, blackgum, and cypress. The understory consists of inkberry, waxmyrtle, pineland threeawn, and various ferns.

This soil has severe limitations affecting cultivated crops. The wetness is the main limitation.

This soil has severe limitations affecting hay and pasture. Most improved grasses and legumes are poorly suited to this soil. Poor or moderate yields of pasture grasses can be produced with intensive management, which includes water control, controlled grazing, and applications of fertilizer and lime.

The potential of this soil for the production of pine trees is high in areas with adequate surface drainage. The equipment limitation, seedling mortality, and plant competition are the main management concerns. Slash pine and loblolly pine are the preferred trees to plant. Planting the trees on beds lowers the effective depth of the water table.

This soil has severe limitations affecting septic tank absorption fields, trench and area sanitary landfills, shallow excavations, dwellings with or without basements, small commercial buildings, local roads and streets, lawns and landscaping, and golf fairways. The wetness is the main limitation.

This soil has severe limitations affecting the development of camp areas, picnic areas, playgrounds, and paths and trails. The sandy texture of the surface layer and the wetness are the main limitations.

The land capability classification is IVw.

33—Pottsburg sand. This nearly level, poorly drained soil is in broad, flat areas on flatwoods. The mapped areas are irregular in shape and range from 10 to 150 acres in size. Slopes are 0 to 2 percent.

Typically, the surface layer is very dark gray sand about 8 inches thick. The subsurface layer, to a depth of about 52 inches, is light gray sand. The upper part of the subsoil, to a depth of about 72 inches, is dark brown sand. The lower part, to a depth of about 80 inches, is very dark brown sand.

Other soils occurring in areas of this map unit include Scranton and Hurricane soils, which are similar to the Pottsburg soil. Scranton soils do not have a sandy, dark, organic-stained subsoil. Hurricane soils are in slightly lower positions on the landscape and are somewhat poorly drained. Also occurring are areas of similar soils that have a darker surface layer.

Included in this map unit are small areas of dissimilar soils. These are Chaires, Leon, Plummer, Ridgewood, and Rutlege soils. Chaires and Leon soils have a sandy, dark, organic-stained subsoil within 30 inches of the surface. Chaires and Plummer soils have a loamy subsoil. Ridgewood and Rutlege soils do not have a sandy, dark, organic-stained subsoil and are in different landscape positions than the Pottsburg soil. Dissimilar soils make up about 10 percent of the map unit.

This Pottsburg soil has a seasonal high water table within 10 inches of the surface for 1 to 3 months of the year and at a depth of 10 to 40 inches for more than 6 months in most years. The available water capacity is very low in the surface layer and subsurface layer and is moderate in the subsoil. Permeability is rapid in the surface layer and subsurface layer and is moderately rapid in the subsoil. The organic matter content is moderately low, and natural fertility is low.

The natural vegetation includes longleaf pine, slash pine, water oak, and coastal live oak. The understory consists of waxmyrtle, saw palmetto, running oak, fetterbush lyonia, gallberry, and pineland threeawn.

This soil has severe limitations affecting cultivated crops. The wetness is the main limitation.

This soil has severe limitations affecting hay and pasture. The seasonal high water table and rapid leaching of plant nutrients limit the choice of plants that can be grown and reduce the potential yield of adapted crops. Intensive management of soil fertility and water is required.

The potential of this soil for the production of pine trees is moderate. Slash pine is the preferred tree to plant. The equipment limitation, seedling mortality, and plant competition are the main limitations. Windthrow is a hazard. Planting the trees on beds lowers the effective depth of the water table.

This soil has severe limitations affecting septic tank absorption fields, trench and area sanitary landfills, shallow excavations, dwellings with or without basements, small commercial buildings, local roads and streets, lawns and landscaping, and golf fairways. The wetness is the main limitation.

This soil has severe limitations affecting the development of camp areas, picnic areas, playgrounds, and paths and trails. The wetness and the sandy texture of the surface layer are the main limitations.

The land capability classification is IVw.

35—Rutlege sand. This nearly level, very poorly drained soil is in shallow depressions and natural drainageways on uplands and flatwoods. The mapped areas are irregular in shape and range from 10 to 250 acres in size. Slopes are less than 1 percent.

Typically, the upper part of the surface layer is black sand about 6 inches thick. The next part, to a depth of about 18 inches, is very dark gray sand. The lower part, to a depth of about 24 inches, is very dark grayish brown sand. The underlying material, to a depth of about 72 inches, is grayish brown and gray sand mottled with shades of brown and gray.

Other soils occurring in areas of this map unit include soils that are similar to the Rutlege soil but have a thin, mucky surface layer about 1 to 6 inches thick or have a dark, organic-stained layer.

Included in this map unit are small areas of dissimilar soils. These are Croatan, Plummer, Scranton, and Surrency soils. Croatan soils have an organic surface layer at least 16 inches thick and have loamy material in the underlying layers. Plummer and Scranton soils are higher on the landscape than the Rutlege soil and are poorly drained. Plummer and Surrency soils have a loamy subsoil. Dissimilar soils make up about 15 percent of the map unit.

This Rutlege soil has a high water table above or near the surface for about 4 to 6 months of the year and is subject to ponding after periods of heavy rainfall. The available water capacity is low. Permeability is rapid. The organic matter content and natural fertility are low.

The natural vegetation includes sweetbay, blackgum, cypress, and pine. The understory consists of black titi, sedges, and grasses. In some places, there are no trees and the vegetation consists of pitcherplant, sedges, and grasses.

This soil generally is not used for cultivated crops or for hay crops or pasture. Severe limitations affect these uses. The wetness is the main limitation.

The potential of this soil for the production of pine trees is high in areas that have adequate surface drainage. The equipment limitation, seedling mortality, and plant competition are the main management concerns. Slash pine and loblolly pine are the preferred trees to plant; however, planting trees is feasible only in areas that have adequate surface drainage.

This soil has severe limitations affecting septic tank absorption fields, trench and area sanitary landfills, shallow excavations, dwellings with or without basements, small commercial buildings, local roads and streets, lawns and landscaping, and golf fairways. The wetness and the ponding are the main limitations.

This soil has severe limitations affecting camp areas, picnic areas, playgrounds, and paths and trails. The sandy texture of the surface layer and the ponding are the main limitations.

The land capability classification is VIIw.

36—Rutlege sand, frequently flooded. This nearly level, very poorly drained soil is along natural drainageways on flatwoods and low uplands. The mapped areas are elongated or irregular in shape and range from 10 to 600 acres in size. Slopes are less than 1 percent.

Typically, the upper part of the surface layer is very dark gray sand about 5 inches thick. The lower part, to a depth of about 14 inches, is very dark grayish brown sand. The underlying material, to a depth of 72 inches or more, is light brownish gray sand.

Other soils occurring in areas of this map unit include some soils that are similar to the Rutlege soil but have a thin, mucky or mucky sand surface layer about 1 to 6 inches thick; have a dark, organic-stained layer; or do not have a dark surface layer.

Included in this map unit are small areas of dissimilar soils. These are Croatan, Plummer, Scranton, and Surrency soils. Croatan soils have an organic surface layer at least 16 inches thick and have loamy material in the underlying layers. Plummer and Scranton soils are higher on the landscape than the Rutlege soil and are poorly drained. Surrency soils have a loamy subsoil. Dissimilar soils make up about 15 percent of the map unit.

This Rutlege soil has a high water table above or near the surface for about 4 to 6 months of the year and is subject to flooding after periods of heavy rainfall. The available water capacity is low. Permeability is rapid. The organic matter content and natural fertility are low.

The natural vegetation includes sweetbay, blackgum, cypress, and pine. The understory consists of black titi, sedges, and grasses. In some places, there are no trees and the vegetation consists of pitcherplant, sedges, and grasses.

This soil generally is not used for cultivated crops or for hay crops and pasture. Severe limitations affect these uses. The wetness is the main limitation. The flooding is a hazard.

The potential of this soil for the production of pine trees is high in areas that have adequate surface drainage. The equipment limitation, seedling mortality, and plant competition are the main management concerns. Slash pine and loblolly pine are the preferred trees to plant.

This soil has severe limitations affecting septic tank absorption fields, trench and area sanitary landfills, shallow excavations, dwellings with or without basements, small commercial buildings, local roads and streets, lawns and landscaping, and golf fairways. The wetness and the flooding are the main limitations.

This soil has severe limitations affecting the development of camp areas, picnic areas, playgrounds, and paths and trails. The sandy texture of the surface layer and the flooding are the main limitations.

The land capability classification is VIw.

37—Sapelo sand. This nearly level, poorly drained soil is on flatwoods. The mapped areas are irregular in shape and range from 20 to 200 acres in size. Slopes are 0 to 2 percent.

Typically, the surface layer is black sand about 4 inches thick. The subsurface layer, to a depth of about 12 inches, is gray sand. The upper part of the subsoil, to a depth of about 20 inches, is dark reddish brown sand. Separating the upper and lower parts of the subsoil, to a depth of about 51 inches, are grayish brown, pale brown, and light gray layers of sand mottled with shades of brown and yellow. The lower part of the subsoil, to a depth of 80 inches or more, is gray sandy loam and light gray sandy clay loam.

Included in this map unit are small areas of dissimilar soils. These are Leon, Lutterloh, Plummer, and Rutlege soils. Leon soils do not have a loamy subsoil. Lutterloh and Plummer soils do not have a sandy, dark, organic-stained subsoil. Lutterloh and Rutlege soils are in different positions on the landscape than the Sapelo soil. Dissimilar soils make up about 20 percent of the map unit.

This Sapelo soil has a seasonal high water table at a depth of 15 to 30 inches for 2 to 4 months in most years. The available water capacity is very low in the surface layer and subsurface layer, low in the upper part of the subsoil, and moderate in the lower part. Permeability is rapid in the surface layer and subsurface layer, moderate in the upper part of the subsoil, and moderately slow or slow in the lower part. The organic matter content is moderately low, and natural fertility is low.

The natural vegetation includes mainly sweetbay, slash pine, loblolly pine, bayberry, blackgum, and pond pine. The understory consists of black titi, saw palmetto, blueberry, fetterbush lyonia, gallberry, and pineland threeawn.

This soil has severe limitations affecting cultivated crops. The wetness is the main limitation.

This soil has severe limitations affecting hay and pasture. Coastal bermudagrass, improved bahiagrass, and several legumes are suited to this soil. Water-control measures are needed to remove excess water during heavy rains. Regular applications of fertilizer and lime are needed for the best yields. Controlled grazing helps to maintain plant vigor and obtain maximum yields.

The potential of this soil for the production of pine trees is moderately high. The equipment limitation, seedling mortality, and plant competition are the main management concerns. Slash pine and loblolly pine are the preferred trees to plant.

This soil has severe limitations affecting septic tank absorption fields, trench and area sanitary landfills, shallow excavations, dwellings with or without basements, small commercial buildings, local roads and streets, lawns and landscaping, and golf fairways. The wetness is the main limitation.

This soil has severe limitations affecting the development of camp areas, picnic areas, playgrounds, and paths and trails. The sandy texture of the surface layer and the wetness are the main limitations.

The land capability classification is IVw.

38—Scranton sand. This nearly level, poorly drained soil is in broad areas on flatwoods. The mapped areas are irregular in shape and range from 10 to 300 acres in size. Slopes are 0 to 2 percent.

Typically, the surface layer is very dark grayish brown sand about 7 inches thick. The upper part of the underlying material, to a depth of about 18 inches, is grayish brown sand. The lower part, to a depth of 80 inches or more, is light gray sand.

Other soils occurring in areas of this map unit include Pottsburg soils, which are similar to the Scranton soil but have a sandy, dark, organic-stained subsoil at a depth of more than 50 inches.

Included in this map unit are small areas of dissimilar soils. These are Chaires, Leon, Plummer, Ridgewood, and Rutlege soils. Chaires and Leon soils have a sandy, dark, organic-stained subsoil within 30 inches of the surface. Plummer soils have a loamy subsoil. Ridgewood and Rutlege soils are in different positions on the landscape than the Scranton soil. Dissimilar soils make up about 15 percent of the map unit.

This Scranton soil has a seasonal high water table within 10 inches of the surface for 1 to 3 months of the year and at a depth of 10 to 40 inches for more than 6 months in most years. The available water capacity is very low in the surface layer and underlying material. Permeability is rapid in the surface layer and underlying material. The organic matter content is moderately low, and natural fertility is low.

The natural vegetation includes longleaf pine, slash pine, and water oak. The understory consists of waxmyrtle, saw palmetto, running oak, fetterbush lyonia, gallberry, and pineland threeawn.

This soil has severe limitations affecting cultivated crops. The wetness is the main limitation.

This soil has severe limitations affecting hay and pasture. The seasonal high water table and rapid leaching of plant nutrients limit the choice of plants that can be grown and reduce the potential yields of adapted crops. Intensive management of soil fertility and water is required.

The potential of this soil for the production of pine trees is moderate. Slash pine is the preferred tree to plant. The equipment limitation, seedling mortality, and plant competition are the main limitations. Windthrow is a hazard. Planting the trees on beds lowers the effective depth of the water table.

This soil has severe limitations affecting septic tank absorption fields, trench and area sanitary landfills, shallow excavations, dwellings with or without basements, small commercial buildings, local roads and streets, lawns and landscaping, and golf fairways. The wetness is the main limitation.

This soil has severe limitations affecting the development of camp areas, picnic areas, playgrounds, and paths and trails. The wetness and the sandy texture of the surface layer are the main limitations.

The land capability classification is IVw.

39—Surrency mucky fine sand. This nearly level, very poorly drained soil is in drainageways and depressions. The mapped areas are circular or irregular in shape and range from 3 to 80 acres in size. Slopes are less than 1 percent.

Typically, the upper part of the surface layer is very dark brown mucky fine sand about 3 inches thick. The lower part, to a depth of about 14 inches, is very dark gray fine sand. The subsurface layer, to a depth of about 39 inches, is gray fine sand. The upper part of the subsoil, to a depth of about 54 inches, is grayish brown fine sandy loam. The lower part, to a depth of 80 inches or more, is light gray sandy clay loam mottled with yellowish brown and brown.

Other soils occurring in areas of this map unit include some soils that are similar to the Surrency soil but have a loamy subsoil at a depth of more than 40 inches or have a mucky surface layer about 3 to 9 inches thick.

Included in this map unit are small areas of dissimilar soils. These are Croatan, Plummer, and Rutlege soils. Croatan soils have an organic surface layer between depths of 16 and 51 inches. Plummer soils are higher on the landscape than the Surrency soil. Rutlege soils are sandy. Dissimilar soils make up about 16 percent of the map unit.

This Surrency soil is ponded for 6 to 9 months of the year. The high water table is at or near the surface for the remainder of the year. The available water capacity is low in the surface layer and subsurface layer and is moderate in the subsoil. Permeability is rapid in the surface layer and subsurface layer and is moderate in the subsoil. The organic matter content is moderately low, and natural fertility is low.

The natural vegetation includes blackgum, cypress, sweetbay, slash pine, and pond pine. The understory consists of swamp cyrilla, littleleaf cyrilla, azalea, gallberry, smilax, and brambles.

This soil generally is not used for cultivated crops or for hay crops and pasture. Severe limitations affect these uses. The wetness is the main limitation.

The potential of this soil for the production of pine trees is high. A water control system must be installed, however, to remove excess water before trees can be planted. The wetness is the main limitation. The equipment limitation, seedling mortality, and plant competition are the main management concerns. Slash pine and loblolly pine are the preferred trees to plant.

This soil has severe limitations affecting septic tank absorption fields, trench and area sanitary landfills, shallow excavations, dwellings with or without basements, small commercial buildings, local roads and streets, lawns and landscaping, and golf fairways. The ponding is the main limitation.

This soil has severe limitations affecting the development of camp areas, picnic areas, playgrounds, and paths and trails. The ponding is the main limitation affecting most of these uses.

The land capability classification is VIIw.

44—Tooles-Nutall fine sands, depressional. These soils are nearly level and are very poorly drained. They are in depressions on flatwoods. The mapped areas are irregular in shape and range from 4 to several hundred acres in size. Slopes are concave and are less than 1 percent.

In 90 percent of the areas mapped as Tooles-Nuttall fine sands, depressional, these soils and similar soils make up 76 to 99 percent of the map unit. Generally, the mapped areas are about 52 percent Tooles and similar soils and about 38 percent Nutall and similar soils. Dissimilar soils make up about 10 percent. The soils in this map unit occur as areas so intermingled that mapping them separately at the scale used is not practical. The pattern of Tooles, Nutall, and similar soils is relatively consistent in most delineations of the map unit. Areas of each soil within the delineations range from 0.25 acre to 4.0 acres in size.

Typically, the Tooles soil has a black fine sand surface layer about 7 inches thick. The next layer, to a depth of about 15 inches, is dark grayish brown fine sand. The subsurface layer, to a depth of about 38 inches, is light gray sand that has common mottles of yellow. The subsoil is sandy clay loam to a depth of about 56 inches. The upper part is dark grayish brown and has common mottles of brownish yellow, and the lower part is gray and has common mottles of reddish brown. Limestone bedrock is at a depth of about 56 inches.

In most years the Tooles soil is ponded for 4 to 6 months and has a seasonal high water table within a depth of 20 inches for most of the remainder of the year. The available water capacity is low in the surface layer and subsurface layer and is high in the subsoil. Permeability is rapid in the surface layer and subsurface layer and is slow in the subsoil. The organic matter content and natural fertility are low.

Typically, the Nutall soil has a black fine sand surface layer about 8 inches thick. The next layer, to a depth of about 12 inches, is very dark gray fine sand. The subsurface layer, to a depth of about 18 inches, is light brownish gray sand that has many mottles of reddish yellow. The subsoil, to a depth of about 33 inches, is light gray sandy clay loam that has common mottles of strong brown. Limestone bedrock is at a depth of about 33 inches.

In most years the Nutall soil is ponded for 4 to 6 months and has a seasonal high water table within a depth of 20 inches for the remainder of the year. The available water capacity is low in the surface layer and subsurface layer and is moderate in the subsoil. Permeability is rapid in the surface layer and subsurface layer and is slow in the subsoil. The organic matter content and natural fertility are low.

Other soils occurring in areas of this map unit include other Tooles and Nutall soils, which are similar to the major soils but are in slightly higher positions on the landscape.

Included in this map unit are small areas of dissimilar soils. These are Chaires, Rutlege, and Surrency soils. Chaires soils have a sandy, dark, organic-stained subsoil. Rutlege and Surrency soils are not underlain by limestone. In addition, Rutlege soils are sandy.

The natural vegetation includes red maple, sweetgum, cabbage palm, tupelo, baldcypress, and water oak.

These soils are not suited to cultivated crops. The wetness and the ponding are the main limitations.

The potential of the soils in this map unit for woodland is moderately high. Baldcypress and gum trees grow well and are the preferred species to plant. Pine trees do not grow well.

These soils have severe limitations affecting septic tank absorption fields, trench and area sanitary landfills, shallow excavations, dwellings with or without basements, small commercial buildings, local roads and streets, lawns and landscaping, and golf fairways. The ponding and the wetness are limitations.

These soils have severe limitations affecting the development of camp areas, playgrounds, and paths and trails. The wetness and the ponding are the main limitations.

The land capability classification is VIIw.

47—Otela-Alpin fine sands, 0 to 5 percent slopes. These soils are nearly level to gently undulating and are moderately well drained and excessively drained. They are in broad areas on low uplands. The mapped areas are irregular in shape and range from 15 to 30 acres in size.

In areas mapped as Otela-Alpin fine sands, 0 to 5 percent slopes, these soils and similar soils make up about 99 percent of the map unit. Generally, the mapped areas are about 63 percent Otela and similar soils and about 36 percent Alpin and similar soils. Dissimilar soils make up about 1 percent. The soils in this map unit occur as areas so intermingled that mapping them separately at the scale used is not practical. The pattern of Otela, Alpin, and similar soils is relatively consistent in most delineations of the map unit. Areas of each soil within the delineations range from 0.25 acre to 4.0 acres in size.

Typically, the Otela soil has a dark grayish brown fine sand surface layer about 6 inches thick. The subsurface layer, to a depth of about 67 inches, is pale brown, very pale brown, and white fine sand. The subsoil, to a depth of 80 inches or more, is yellowish brown sandy clay loam mottled with strong brown and light brownish gray. Limestone is between depths of 60 and 80 inches in less than 20 percent of the map unit.

In most years the Otela soil has a perched seasonal high water table at a depth of about 60 to 72 inches. The perched water table is at a depth of 42 to 60 inches for 1 to 3 months during periods of heavy rainfall. The available water capacity is very low in the surface layer and subsurface layer and is moderate in the subsoil. Permeability is rapid in the surface layer and subsurface layer and is moderately slow in the subsoil. The organic matter content and natural fertility are low.

Typically, the Alpin soil has a grayish brown fine sand surface layer about 7 inches thick. The next layer is fine sand. The upper part, to a depth of about 36 inches, is grayish brown, and the lower part, to a depth of about 52 inches, is light brownish gray. The underlying material, to a depth of 80 inches or more, is light gray fine sand that has lamellae of brownish yellow, fine sandy loam less than 1 inch thick.

The Alpin soil has a high water table at a depth of more than 80 inches. The available water capacity is very low. Permeability is moderately rapid in the surface layer and subsurface layer and is moderate in the underlying material. The organic matter content and natural fertility are low.

Other soils occurring in areas of this map unit include Shadeville, Lakeland, and Ortega soils, which are similar to the Otela and Alpin soils. Shadeville soils have a loamy subsoil between depths of 30 and 40 inches and have limestone between depths of 40 and 80 inches. Lakeland and Ortega soils do not have thin bands of loamy material at a depth of more than 40 inches. Also included are small areas of soils that have a loamy subsoil between depths of 30 and 40 inches.

Included in this map unit are small areas of dissimilar soils. These are Lutterloh soils, which are lower on the landscape than the major soils and are somewhat poorly drained.

The natural vegetation includes mainly slash pine, loblolly pine, longleaf pine, live oak, laurel oak, turkey oak, and bluejack oak. The understory consists of huckleberry, honeysuckle, blackberry, pineland threeawn, and chalky bluestem.

The soils in this map unit have severe limitations affecting most cultivated crops. Droughtiness and rapid leaching of plant nutrients limit the choice of plants that can be grown and reduce the potential yield of adapted crops. In the more sloping areas, row crops should be planted on the contour in alternating strips with close-growing cover crops. Planting soil-improving cover crops and leaving crop residue on the surface help to maintain fertility and control erosion. Irrigation generally is feasible if water is readily available.

These soils have moderate limitations affecting hay and pasture. Deep-rooted plants, such as coastal bermudagrass and improved bahiagrass, are moderately well suited to these soils, but yields are reduced by the periodic droughtiness. Regular applications of fertilizer and lime are needed for the best yields. Controlled grazing helps to maintain plant vigor and a good ground cover.

The potential of these soils for the production of pine trees is moderately high. The equipment limitation, seedling mortality, and plant competition are the main management concerns. Slash pine is the preferred tree to plant.

The Otela soil has moderate limitations affecting septic tank absorption fields, trench sanitary landfills, dwellings with basements, lawns and landscaping, and golf fairways. It has severe limitations affecting area sanitary landfills and shallow excavations. The wetness and the sandy texture of the soil are the main limitations. The Alpin soil has severe limitations affecting trench and area sanitary landfills, shallow excavations, lawns and landscaping, and golf fairways. Seepage and the sandy texture of the soil are the main limitations.

These soils have severe limitations affecting the development of camp areas, picnic areas, playgrounds, and paths and trails. The sandy texture of the surface layer is the main limitation.

The land capability classification is IVs.

48—Otela, limestone substratum-Ortega sands, 0 to 5 percent slopes. These soils are nearly level to gently undulating and are moderately well drained. The mapped areas are irregular in shape and range from 5 to 250 acres in size. They are in broad areas on low uplands and in high positions on flatwoods.

In 80 percent of the areas mapped as Otela, limestone substratum-Ortega sands, 0 to 5 percent slopes, these soils and similar soils make up 79 to 99 percent of the map unit. Generally, the mapped areas are about 62 percent Otela and similar soils and about 29 percent Ortega and similar soils. Dissimilar soils make up about 9 percent. The soils in this map unit occur as areas so intermingled that mapping them separately at the scale used is not practical. The pattern of Otela, Ortega, and similar soils is relatively consistent in most delineations of the map unit. Areas of each soil within the delineations range from 0.25 acre to 4.0 acres in size.

Typically, the Otela soil has a light brownish gray sand surface layer about 4 inches thick. The subsurface layer, to a depth of about 50 inches, is pale brown, light gray, and white sand. It has yellow mottles in the lower part. The subsoil is sandy loam and sandy clay loam to a depth of about 63 inches. The upper part of the subsoil is brownish yellow mottled with yellowish brown. The lower part is yellowish brown mottled with light gray. Limestone is between depths of 60 and 80 inches in most areas of this map unit.

In most years the Otela soil has a seasonal high water table that fluctuates between depths of 60 and 72 inches for more than 4 months and is at a depth of 42 to 60 inches for 1 to 3 months during periods of heavy rainfall. The available water capacity is very low in the surface layer and subsurface layer and is moderate in the subsoil. Permeability is rapid in the surface layer and subsurface layer and is moderate in the subsoil. The organic matter content and natural fertility are low.

Typically, the Ortega soil has a dark grayish brown sand surface layer about 8 inches thick. The underlying material is sand to a depth of 80 inches or more. It is, in sequence downward, yellowish brown, brownish yellow, very pale brown, very pale brown mottled with yellow, and white mottled with yellow. The yellow mottles in the underlying material are indicative of wetness.

In most years the Ortega soil has a seasonal high water table that fluctuates between depths of 60 and 72 inches for more than 6 months and is at a depth of 42 to 60 inches for 1 to 3 months during periods of heavy rainfall. The available water capacity is low in the surface layer and very low in the underlying material. Permeability is rapid. The organic matter content and natural fertility are low.

Other soils occurring in areas of this map unit include Alpin, Shadeville, and Lakeland soils, which are similar to the major soils. However, Alpin and Lakeland soils are in slightly higher positions on the landscape and are better drained, and Shadeville soils have a loamy subsoil between depths of 30 and 40 inches. Also occurring are areas of similar soils that are underlain by limestone between depths of 40 and 80 inches.

Included in this map unit are small areas of dissimilar soils. These are Lutterloh soils, which are lower on the landscape than the major soils and are somewhat poorly drained.

The natural vegetation includes mainly slash pine, loblolly pine, longleaf pine, live oak, laurel oak, and red oak. The understory consists of huckleberry, pineland threeawn, and chalky bluestem.

The soils in this map unit have severe limitations affecting most cultivated crops. Droughtiness and rapid leaching of plant nutrients limit the choice of plants that can be grown and reduce the potential yield of adapted crops. When it is within a depth of 60 inches, the water table increases the amount of available water in the root zone. In very dry periods, however, it drops too low for any beneficial effects. In the more sloping areas, row crops should be planted on the contour in alternating strips with close-growing cover crops. The cover crops should be grown at least two-thirds of the time. Applications of lime and fertilizer are needed for the best yields. Planting soil-improving cover crops and leaving crop residue on the surface help to maintain fertility and control erosion. Irrigation generally is feasible if water is readily available. Tile drains or other drains are needed to reduce the crop damage caused by the high water table during the growing season. Intensive management of soil fertility and water is required.

These soils have moderate limitations affecting hay and pasture. The droughtiness and rapid leaching of nutrients are the main limitations. Deep-rooted plants, such as coastal bermudagrass and bahiagrass, are moderately well suited to these soils. Regular applications of fertilizer and lime are needed for the best yields. Controlled grazing helps to maintain plant vigor and obtain maximum yields. Intensive management of soil fertility and water is required to fully utilize this soil for pasture and hay.

The potential of these soils for producing longleaf pine and slash pine (fig. 9) is moderately high. The equipment limitation and seedling mortality are the main management concerns. Slash pine is the preferred tree to plant.

These soils have moderate limitations affecting septic tank absorption fields, trench sanitary landfills, dwellings with basements, lawns and landscaping, and golf fairways. They have severe limitations affecting area sanitary landfills and shallow excavations. The wetness and the sandy texture of the soils are the main limitations.

These soils have severe limitations affecting the development of camp areas, picnic areas, playgrounds, and paths and trails. The sandy texture of the surface layer is the main limitation.

The land capability classification is IIIs.

50—Udorthents and Quartzipsamments, excavated. These nearly level, somewhat poorly drained soils are in areas that have been excavated for fill material on the Coastal Plain. The mapped areas are irregular in shape or square and range from 1 to 25 acres in size. Slopes range from 0 to 5 percent.

Generally, the mapped areas contain about 55 percent Udorthents and similar soils and 40 percent Quartzipsamments and similar soils. Individually, the soils in this map unit may not occur in every mapped area. The relative proportion of the major soils and similar soils varies. The areas of the individual soils are

Figure 9.—A well managed stand of pine trees in an area of Otela, limestone substratum-Ortega sands, 0 to 5 percent slopes.

large enough to map separately. Because of the present and predicted land uses, however, they were mapped as one unit.

In a representative area, the Udorthents have a grayish brown sand surface layer about 3 inches thick. The underlying material extends to a depth of 80 inches or more. In sequence downward, it is dark brown sand, dark yellowish brown sand, light brownish gray sandy loam, white sand, and light gray sandy clay loam.

In a representative area, the Quartzipsamments have a grayish brown sand surface layer about 4 inches thick. The upper part of the underlying material, to a depth of about 26 inches, is brown sand. The next part, to a depth of about 38 inches, is white sand. The lower part, to a depth of 80 inches or more, is light gray sand.

Included in this map unit are small areas of dissimilar soils. These soils have limestone boulders on or near the surface. Also included are soils that have a water table that is dissimilar to that of the major soils.

In most years the soils in this map unit have a seasonal high water table at a depth of about 24 to 42 inches. Changes in surface drainage, however, make some areas of these soils subject to brief ponding after periods of heavy rainfall. The amount of excavation or backfill in some areas also can drastically alter the depth to the water table. The available water capacity is low in the surface layer of the Udorthents and moderate in the underlying material. It is low in the Quartzipsamments. Permeability is rapid in the surface layer of the Udorthents and moderate in the underlying material. It is rapid in the Quartzipsamments. The organic matter content and natural fertility are low.

The natural vegetation has been removed from these soils. Some of these areas have been replanted to slash pine.

These soils have severe limitations affecting cultivated crops and hay crops and pasture.

The potential of these soils for pine tree production is very low to moderately high. This potential varies with the original soil type and the amount of excavation. The equipment use limitation and seedling mortality are the main management concerns.

These soils generally have moderate limitations affecting urban development.

A land capability classification has not been assigned to this map unit.

51—Goldhead fine sand. This nearly level, poorly drained soil is in broad areas on flatwoods on the Lower Coastal Plain. Slopes are smooth or concave and are 0 to 2 percent.

Typically, the surface layer is black fine sand about 8 inches thick. The upper part of the subsurface layer, to a depth of about 19 inches, is dark gray fine sand. The lower part, to a depth of about 27 inches, is gray fine sand. The subsurface layer has light yellowish brown and yellowish brown mottles. The subsoil, to a depth of about 38 inches, is gray and light gray sandy loam mottled with reddish yellow. The substratum, to a depth of 80 inches, is gray sand. The content of shell fragments is about 10 percent between depths of 69 and 80 inches.

Other soils occurring in areas of this map unit include Tooles soils, which are similar to the Goldhead soil but are underlain by limestone between depths of 40 and 80 inches. Also occurring are areas of similar soils that have a thicker and darker surface layer; have a loamy subsoil between depths of 15 and 20 inches; are underlain by a highly carbonatic, bluish gray, sandy layer; or are underlain by soft limestone bedrock.

Included in this map unit are small areas of dissimilar soils. These are Chaires, Leon, Moriah, Nutall, and Scranton soils. Chaires and Leon soils have a sandy, dark, organic-stained subsoil. Moriah soils are higher on the landscape than the Goldhead soil and are somewhat poorly drained. Nutall soils have a loamy subsoil within 20 inches of the surface and are underlain by limestone. Scranton soils are sandy. Dissimilar soils make up about 13 percent of the map unit.

In most years this Goldhead soil has a high water table within 10 inches of the surface for 2 to 4 months of the year and at a depth of 10 to 40 inches for about 6 months. During periods of heavy rainfall, the soil is covered by a shallow layer of slowly moving water for periods of 7 to 30 days. The available water capacity is low in the surface layer and subsurface layer and is moderate in the subsoil. Permeability is rapid in the surface layer and subsurface layer, moderate in the subsoil, and rapid in the substratum. Natural fertility is low.

The natural vegetation includes cabbage palm, slash pine, loblolly pine, blackgum, red maple, laurel oak, and water oak. The understory consists of saw palmetto, waxmyrtle, pitcherplant, and various sedges and native grasses.

This soil generally is not used for cultivated crops or for hay crops and pasture. Severe limitations affect these uses. The wetness is the main limitation.

The potential of this soil for the production of pine trees is moderately high in areas that have adequate surface drainage. The equipment limitation, seedling mortality, and plant competition are the main management concerns. Slash pine and loblolly pine are the preferred trees to plant. Planting the trees on beds lowers the effective depth of the water table.

This soil has severe limitations affecting septic tank absorption fields, trench and area sanitary landfills, shallow excavations, dwellings with or without basements, small commercial buildings, local roads and streets, lawns and landscaping, and golf fairways. The wetness is the main limitation.

This soil has severe limitations affecting the development of camp areas, picnic areas, playgrounds, and paths and trails. The sandy texture of the surface layer and the wetness are the main limitations.

The land capability classification is IIIw.

52—Meggett and Croatan soils, frequently flooded. These nearly level, poorly drained and very poorly drained soils are on the Ochlockonee River flood plain on the Lower Coastal Plain. They are flooded during periods of heavy rainfall. Slopes are 0 to 2 percent.

Generally, the mapped areas contain about 55 percent Meggett and similar soils and 30 percent Croatan and similar soils. Dissimilar soils make up about 15 percent. Individually, the soils in this map unit may not occur in every mapped area. The relative proportion of the major soils and similar soils varies. The areas of individual soils are large enough to map separately. Because of the present and predicted land uses, however, they were mapped as one unit.

Typically, the Meggett soil has a very dark gray fine sandy loam surface layer about 8 inches thick. The subsurface layer, to a depth of about 18 inches, is grayish brown fine sandy loam. The upper part of the subsoil, to a depth of about 30 inches, is light gray clay loam that has common mottles of yellowish brown. The lower part, to a depth of about 72 inches, is light gray clay that has common mottles of yellowish brown.

The Meggett soil has a high water table at or near the surface in the winter and early in the spring. The available water capacity is moderate. Permeability is moderately rapid in the surface layer and subsurface layer and is slow in the subsoil. The organic matter content and natural fertility are low.

Typically, the Croatan soil has a black muck surface layer about 4 inches thick. The next layer, to a depth of about 25 inches, is well decomposed, black muck. The underlying material, to a depth of about 40 inches, is very dark gray mucky sand and, to a depth of 72 inches or more, very dark gray sand.

The Croatan soil has a high water table at or near the surface in the winter and early in the spring. The available water capacity is very high in the surface layer and moderate in the underlying material. Permeability is moderate. The organic matter content is very high in the surface layer and low in the underlying material. Natural fertility is low.

Other soils occurring in areas of this map unit include Dorovan soils, which are similar to the Croatan soil but have an organic surface layer more than 51 inches thick. Also occurring in this map unit are areas of soils that are similar to the Meggett soil but have stratified layers of various sizes of sand throughout the profile and soils that are similar to the Croatan soil but have stratified layers of various textures, such as muck, sand, and loamy material, below the organic surface layer.

Included in this map unit are small areas of dissimilar soils. These are Rutlege and Surrency soils. Rutlege soils are sandy. Surrency soils have sand to a depth of 20 inches or more and have a loamy subsoil between depths of 20 and 40 inches.

The natural vegetation includes red maple, water oak, blackgum, sweetgum, sweetbay, swamp birch, cypress, pond pine, and slash pine.

These soils generally are not used for cultivated crops or for hay crops or pasture. Severe limitations affect these uses. The wetness is the main limitation. The flooding is a hazard.

Under natural conditions these soils are not suitable for pine tree production.

These soils have severe limitations affecting septic tank absorption fields, trench and area sanitary landfills, shallow excavations, dwellings with or without basements, small commercial buildings, local roads and streets, lawns and landscaping, and golf fairways. The wetness is the main limitation affecting most of these uses. The flooding is a hazard.

These soils have severe limitations affecting the development of camp areas, picnic areas, playgrounds, and paths and trails. The wetness is the main limitation affecting most of these uses. The flooding is a hazard.

The land capability classification is VIIw.

53—Quartzipsamments, dredged. These soils are nearly level and are somewhat poorly drained. They formed in fill material that has been reworked and shaped by earthmoving equipment. The mapped areas are highly variable in shape and size. Slopes are 0 to 1 percent.

In a representative area, the surface layer is light brownish gray sand about 7 inches thick. The underlying material extends to a depth of about 80 inches. In sequence downward, it is dark grayish brown sand, light gray sand, light brownish gray sand, dark grayish brown mucky sand, and grayish brown sand.

Other soils occurring in small areas of this map unit are soils that are similar to the Quartzipsamments. These soils occur as areas so small that mapping them separately at the scale used is not practical.

Included in this map unit are areas of dissimilar soils. These are other manmade soils. Similar and dissimilar soils make up less than 25 percent of this map unit.

The depth to the high water table in the Quartzipsamments varies with the amount of fill material and extent of artificial drainage in the map unit; however, the seasonal high water table is commonly at a depth of 24 to 42 inches. The available water capacity is low. Permeability is rapid. Natural fertility is low.

These soils are not used for cultivated crops, for hay crops or pasture, or for woodland.

Because of the highly variable nature of these soils, no overall suitability rating has been given for urban or recreational development.

A land capability classification has not been assigned to this map unit.

54—Maurepas muck, frequently flooded. This nearly level, very poorly drained, organic soil is in broad, mixed tidal and freshwater marsh areas on the gulf coast. Slopes are smooth or slightly convex and are 0 to 1 percent.

Typically, the surface layer is very dark grayish brown, decomposed muck about 5 inches thick. The underlying organic material to a depth of about 72 inches or more is very dark grayish brown, well decomposed muck.

Other soils occurring in areas of this map unit include some soils that are similar to the Maurepas soil but have thin, discontinuous bands of sandy or loamy material in the organic layers.

Included in this map unit are small transitional areas of dissimilar soils. These are Croatan, Leon, Plummer, Rutlege, and Scranton soils. They are not flooded by normal high tides. Leon, Plummer, Rutlege, and Scranton soils are mineral soils. Croatan soils have an organic surface layer about 16 to 51 inches thick and are underlain by mineral material. Also included are Leon, Plummer, and Scranton soils in a few isolated high areas. Dissimilar soils make up less than 15 percent of the map unit.

This Maurepas soil is flooded daily by normal high tides, and the high water table is 1 foot above the surface to 2 feet below. The available water capacity is high. Permeability is rapid.

The natural vegetation consists of needlerush and sawgrass.

This soil has severe limitations affecting cultivated crops. The wetness and salinity are the main limitations.

This soil is not suited to woodland.

This soil has severe limitations affecting septic tank absorption fields, trench and area sanitary landfills, shallow excavations, dwellings with or without basements, small commercial buildings, local roads and streets, lawns and landscaping, and golf fairways. The wetness and the flooding are the main limitations.

This soil has severe limitations affecting the development of camp areas, picnic areas, playgrounds, and paths and trails. The wetness and the flooding are the main limitations.

The land capability classification is VIIIw.

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 all or part of 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, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others 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

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils are identified; 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 listed for each soil.

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

About 7,600 acres in Wakulla County is used for crops and pasture. Of this acreage, 4,000 acres is used as pasture and 3,600 acres for field crops, mainly corn and peanuts. The acreage in crops and pasture is decreasing because of urban development and economic conditions.

Erosion control practices provide a protective surface cover, reduce runoff, and increase infiltration. A cropping system that keeps plant cover on the soil for extended periods helps to control erosion and maintains the productive capacity of the soil. On livestock farms where hay crops and pasture are grown, legumes and grasses should be included in the cropping system to help control erosion, provide nitrogen, and improve tilth for the next crop.

Applying a system of conservation tillage and leaving crop residue on the surface increase infiltration and reduce runoff and the hazard of erosion, which is caused by periods of intense rainfall.

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 4. 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.

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 4 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.

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.

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.

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 the 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.

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

Woodland Management and Productivity

Soils vary in their ability to produce trees. Depth, 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, some are more susceptible to erosion after roads are built and timber is harvested, and some require special efforts to reforest. In the section "Detailed Soil Map Units," each map unit in the survey area suitable for producing timber presents information about productivity, limitations for harvesting timber, and management concerns for producing timber. The common forest understory plants are also listed. Table 5 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 5 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. 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 *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. 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 *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, bedrock, or by a combination of 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 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 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. Desired product, topographic position (such as a low, wet area), and personal preference are three factors of many that can influence the choice of trees to use for reforestation.

Recreation

The Apalachicola National Forest in Wakulla County provides a variety of recreational opportunities, including hiking in the Bradwell Bay Wilderness Area and canoeing on the Sopchoppy River. Of special interest are the unique examples of the vegetative and geologic diversity in the Morrison Hammock and the River Sinks areas. The Morrison Hammock is a hardwood hammock that has specimen trees of spruce pine and loblolly pine, and the River Sinks is a hardwood hammock that has many interspersed sinkholes. The Pope Still, Brownhouse, Pine Creek, and Mack Slough public hunt camps provide camping areas during the hunting season. The major game species are deer, squirrel, quail, turkey, dove, bear, and wood duck. About 25 miles of the Florida Trail are in the Apalachicola National Forest, mainly along the Sopchoppy River and through the Bradwell Bay Wilderness Area. The Ochlockonee River and Lost Creek also provide opportunities for superior primitive canoeing.

In table 6, 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 6, 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 6 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 9 and interpretations for dwellings without basements and for local roads and streets in table 8.

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. If grading is needed, the depth of the soil over bedrock should be considered.

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

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

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

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

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, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are ryegrass, bahiagrass, hairy indigo, clover, and lespedeza.

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

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, the available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, saw palmetto, dogwood, hickory, blackberry, and gallberry.

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

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, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, cattail, rushes, sedges, and reeds.

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

The habitat for various kinds of wildlife is 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. Wildlife attracted to these areas include bobwhite quail, dove, meadowlark, field sparrow, cottontail, and sparrow hawk.

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, wild hog, and owl.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, coots, egrets, herons, ibis, kingfishers, otters, alligators, and beavers.

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. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

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

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

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, 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 8 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 the depth to bedrock or 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, depth to bedrock, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

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

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

Sanitary Facilities

Table 9 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 requires special design, extra maintenance, or alteration.

Table 9 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, depth to bedrock, and flooding affect absorption of the effluent. Large stones and bedrock interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand 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 9 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, depth to a high water table, depth to bedrock, flooding, large stones, and content of organic matter.

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

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

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

The ratings in table 9 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock, depth to a water table, slope, and flooding affect both types of landfill. Texture, highly organic layers, soil reaction, and content of salts and 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 bedrock or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 10 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

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

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

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

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

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 10, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

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

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick. All other soils are rated as an improbable source. Coarse fragments of soft limestone bedrock are not considered to be sand and gravel.

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

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

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They have slope of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

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

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of soluble salts, have slope 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 plant-available nutrients as it decomposes.

Water Management

Table 11 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 excavated 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 salts 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, permeability of the aquifer, and the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; and subsidence of organic layers. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock, 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 salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

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

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock 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, slope, and depth to bedrock affect the construction of grassed waterways. A hazard of soil blowing, low available water capacity, restricted rooting depth, salts or 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 grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 18.

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 12 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 *(3)* and the system adopted by the American Association of State Highway and Transportation Officials *(2)*.

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.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

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

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

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

Physical and Chemical Properties

Table 13 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.

Salinity is a measure of soluble salts in the soil at saturation. It is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of nonirrigated soils. The salinity of irrigated soils is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of soils in individual fields can differ greatly from the value given in the table. Salinity affects the suitability of a soil for crop production, the stability of soil if used as construction material, and the potential of the soil to corrode metal and concrete.

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

3. Coarse sandy loams, 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 loams, silt loams, clay loams, and silty clay loams. These soils are erodible. Crops can be grown if intensive measures to control soil blowing are used.

4. Clays, silty clays, noncalcareous 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. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material. These soils are slightly erodible. Crops can be grown if measures to control soil blowing are used.

6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay. These soils are very slightly erodible. Crops can be grown if ordinary measures to control soil blowing are used.

7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material. These soils are very slightly erodible. Crops can be grown if ordinary measures to control soil blowing are used.

8. Soils that are not subject to soil blowing because of coarse fragments on the surface or because of surface wetness.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 13, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

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

Soil and Water Features

Table 14 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 14, 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 14 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. 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 gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons, which are characteristic of 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 14 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 14.

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.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Subsidence is the settlement of organic soils or of saturated mineral soils of very low density. Subsidence results from either desiccation and shrinkage or oxidation of organic material, or both, following drainage. Subsidence takes place gradually, usually over a period of several years. Table 14 shows the expected initial subsidence, which usually is a result of drainage, and total subsidence, which results from a combination of factors.

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

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

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

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

Physical, Chemical, and Mineralogical Analyses of Selected Soils

Dr. Victor W. Carlisle, professor, Soil Science Department, University of Florida, prepared this section.

Parameters for physical, chemical, and mineralogical properties of representative pedons sampled in Wakulla County are presented in tables 15, 16, and 17. 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 the 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 *(38)*.

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 circulated from volumetric water percentages divided by bulk density. Samples were ovendried 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. Aluminum, carbon, and iron were extracted from probable spodic horizons with 0.1 molar sodium pyrophosphate. Determination of aluminum and iron was by atomic absorption, and determination of extracted carbon was by the Walkley-Black wet combustion method.

Mineralogy of the clay fraction less than 2 microns was ascertained by x-ray diffraction. Peak heights at

18-, 14-, 7.2-, 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 the 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 Wakulla County are inherently very sandy (table 15); however, many of these soils have an argillic horizon in the lower part of the solum. All of the soils sampled have one horizon or more in which the total sand content is more than 90 percent. Ridgewood soils and two Ortega pedons contain more than 95 percent sand to a depth of 2 meters or more. Alpin and Hurricane soils contain more than 90 percent sand to a depth of 2 meters or more. Lutterloh soils and two Otela pedons contain more than 90 percent sand to a depth of slightly more than 1 meter.

The content of clay in these sandy horizons is rarely more than 2 percent. Deeper argillic horizons in Lutterloh, Moriah, Nutall, Otela, Pilgrims, Shadeville, and Tooles soils contain large amounts of clay ranging from 12.5 to 39.0 percent.

The content of silt ranges from 0.3 percent in Ortega soils to 12.0 percent in Nutall soils. All of the horizons sampled in Nutall and Shadeville soils contain more than 5 percent silt. In most soils the silt content ranges from 2 to 5 percent.

Fine sand dominates the sand fractions of all soils except Hurricane soils. All horizons of Ortega, Ridgewood, and Tooles soils and one Otela pedon contain more than 50 percent fine sand. The content of very fine sand is more than 20 percent in all horizons of Lutterloh, Moriah, Nutall, Pilgrims, and Tooles soils. The content of medium sand generally ranges from 6 to 30 percent but is somewhat higher in all horizons of the Hurricane soils. The content of coarse sand is 2 percent or less throughout Lutterloh, Moriah, Nutall, Ortega, Pilgrims, Shadeville, and Tooles soils. Alpin, Hurricane, and Lakeland soils contain more than 10 percent coarse sand. The content of very coarse sand generally is less than 4 percent and is nondetectable throughout all horizons of Lutterloh and Ortega soils. The sandy soils in Wakulla County rapidly become very droughty during periods of low precipitation when rainfall is widely scattered. Conversely, these sandy soils are rapidly saturated when high amounts of rainfall occur. Soils with inherently poor drainage, such as Nutall and Tooles soils, can remain saturated because the ground water is close to the surface for long periods.

Hydraulic conductivity values exceed 30 centimeters per hour throughout Hurricane and Ortega soils. Considerably lower values are recorded for most other soils with sandy epipedons. Hydraulic conductivity values in the lower part of the solum in soils that have argillic horizons rarely exceed 1 centimeter per hour. Low hydraulic conductivity values at a shallow depth in soils, such as Pilgrims soils, could affect the design and function of septic tank absorption fields. Hydraulic conductivity values in the Bh horizon of Hurricane soils are much higher than those generally recorded for spodic horizons in most soils in Florida. The available water for plants can be estimated from bulk density and water content data. Soils that have an excessive content of sand, such as Lakeland soils, retain very low amounts of available water for plants; conversely, soils that have a higher content of fine textured material, such as Nutall fine sand, retain larger amounts of available water for plants.

Chemical Properties

Chemical analyses (table 16) show that soils in the county have a wide range of extractable bases. All of the soils have one horizon or more that has less than 1 milliequivalent per 100 grams extractable bases except Nutall soils. Nutall soils have the highest amount of extractable bases ranging from 4.88 to 48.54 milliequivalents per 100 grams. Alpin, Hurricane, and Ridgewood soils and two Ortega have less than 1 milliequivalent per 100 grams extractable bases in all pedons. Only one horizon in Moriah soils has more than 1 milliequivalent per 100 grams extractable bases. The relatively mild, humid climate in Wakulla County results in a rapid depletion of basic soil cations (calcium, magnesium, sodium, and potassium) through leaching.

Calcium is the dominant base in all of the soils sampled; however, the higher content of calcium in the lower horizons of Moriah, Pilgrims, Shadeville, and Tooles soils reflects the close proximity of limestone at a shallow depth in these soils. Alpin, Hurricane, and Ridgewood soils and two Ortega pedons contain 0.60 milliequivalent per 100 grams extractable calcium or less in all pedons. The content of extractable magnesium is more than 1 milliequivalent per 100 grams only in one or two horizons of the two Otela pedons and Shadeville soils. Combined amounts of extractable calcium and magnesium rarely exceed 1 milliequivalant per 100 grams in the surface layer of the soils. The content of sodium generally is less than 0.20 milliequivalent per 100 grams; however, one horizon in the Pilgrims and Tooles soils exceeds this amount. All of the soils have horizons that have 0.10 milliequivalent per 100 grams or less extractable potassium. Alpin, Hurricane, Lutterloh, Moriah, Ridgewood, and Tooles soils and two of each of the Ortega and Otela pedons have one horizon or more that has nondetectable amounts of extractable potassium.

Values for cation-exchange capacity, an indicator of plant nutrient-holding capacity, are more than 10 milliequivalents per 100 grams in the surface layer of Nutall and Tooles soils. A large cation-exchange capacity parallels the higher content of clay in the deeper horizons of Lutterloh, Moriah, Nutall, Otela, Pilgrims, Shadeville, and Tooles soils. Soils, such as Hurricane sand, that have a low cation-exchange capacity in the surface layer require only small amounts of lime or sulfur to significantly alter their base status and soil reaction. Generally, soils of low inherent soil fertility are associated with low values for extractable bases and low cation-exchange capacities. Fertile soils are associated with high extractable base values, high base saturation values, and high cation-exchange capacities.

The content of organic carbon is less than 1 percent in Hurricane, Lutterloh, Moriah, Ortega, Pilgrims, and Shadeville soils, in two Otela pedons, and in all horizons below the surface layer in Alpin, Nutall, Ortega, Ridgewood, and Tooles soils. Only Ortega sand and Tooles soils contain more than 3 percent organic carbon. In most soils sampled the content of organic carbon decreases rapidly as depth increases; however, slight increases in the content of organic carbon are recorded in some Bt horizons and in the Bh horizon of Hurricane soils. 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 are low in all soils sampled. They generally range from 0.01 millimhos per centimeter to nondetectable amounts. They are nondetectable throughout the Pilgrims and Shadeville soils. These data indicate that the content of soluble salt in soils sampled in Wakulla County is insufficient to detrimentally affect the growth of salt-sensitive plants except in areas immediately adjacent to the Gulf of Mexico.

Soil reaction in water generally ranges between pH 4.5 and 6.0; however, reaction of more than pH 6.0 occurs in one horizon or more of Nutall, Pilgrims, Shadeville, and Tooles soils and in one of the Otela soils. With few exceptions, soil reaction values are about 0.5 to 1.0 pH unit lower in calcium chloride and potassium chloride than in water. The maximum plant nutrient availability is generally attained when soil reaction is between pH 6.5 and 7.5; however, under Florida conditions, maintaining soil reaction above pH 6.0 is not economically feasible for most agricultural production purposes.

The ratio of sodium pyrophosphate extractable carbon and aluminum to clay in the Bh horizon of Hurricane soils is sufficient to meet the chemical criteria for spodic horizons. Pyrophosphate extractable iron and aluminum are also sufficient to meet the spodic horizon criteria for Hurricane soils. Sodium pyrophosphate extractable iron is 0.01 percent and citrate-dithionite extractable iron is 0.12 percent in Hurricane soils.

Citrate-dithionite extractable iron in the Bt horizon of Lutterloh, Moriah, Nutall, Pilgrims, Shadeville, and Tooles soils and in two Otela pedons ranges from 0.12 to 0.92 percent and is frequently less than 0.60 percent. Aluminum extracted by citrate-dithionite from the Bt horizon in these soils ranges from 0.06 to 0.34 percent. A larger amount of citrate-dithionite extractable iron occurs in the Bt horizon as compared to that in the Bh horizon in Hurricane soils. The amount of extractable iron and aluminum in the soils in the county is not sufficient to detrimentally affect phosphorus availability.

Mineralogical Properties

Sand fractions of 2.0 millimeters to 0.05 millimeter are siliceous and quartz is overwhelmingly dominant in all pedons. Varying amounts of heavy minerals are in most horizons with the greatest concentrations in the very fine sand fraction. No weatherable minerals are observed. Crystalline mineral components of the clay fraction of less than 0.002 millimeter are shown in table 17 for major horizons of the pedons sampled. The clay mineralogical suite was made up mostly of montmorillonite, a 14-angstrom intergrade mineral, kaolinite, and quartz.

Montmorillonite occurs in all of the soils sampled except in Ortega soils. The 14-angstrom intergrade mineral occurs throughout all pedons sampled. Kaolinite occurs throughout all of the sampled soils except the Bt horizon of Pilgrims soils. Quartz occurs throughout all pedons. The content of calcite, mica, and gibbsite is insufficient for the assignment of numerical values.

Montmorillonite in the soils in Wakulla County was generally inherited from the sediments in which these soils formed. The stability of montmorillonite is generally favored by a high level of pH or an alkaline condition. Montmorillonite generally is more abundant in areas where the alkaline elements have not been leached by percolating rainwater; however, montmorillonite can occur in moderate amounts regardless of drainage or chemical conditions. The content of montmorillonite was most consistently higher in areas adjacent to the Gulf of Mexico.

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

Kaolinite was most likely inherited from the parent material; however, it also may have been formed as a weathering product of other materials. Kaolinite is relatively stable in the acidic environments of the soils in the county. The weathering environment is less severe with increased depth; therefore, the content of kaolinite frequently increases in the lower part of the solum. 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 that have a higher content of clay. Soils that contain montmorillonite clay have a higher capacity for retention of plant nutrient than soils dominated by kaolinite, 14-angstrom intergrade minerals, or quartz. The large content of montmorillonitic clay that occurs in Pilgrims soils creates problems for most types of construction because of the large amounts of swelling when the clay is wet and of shrinking when it is dry. The clay mineralogy influences the use and management of most soils in the county less frequently than the total content of clay.

Engineering Index Test Data

Table 18 shows laboratory test data for several pedons sampled at carefully selected sites in the county. 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 Materials Office, Florida Department of Transportation. These tests were made to help evaluate the soils for engineering purposes. The classifications given are based on data obtained by mechanical analyses and by tests to determine liquid limit and plastic limit.

The mechanical analyses were made by combined sieve and hydrometer methods. The various grain-size fractions are calculated on the basis of all the material in the soil sample, including material coarser than 2 millimeters in diameter. The mechanical analyses should not be used in naming textural classes of soils.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(37)*. 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 19 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

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

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

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 Psammaquents (*Psamm*, meaning sandy texture, plus *aquent*, the suborder of the Entisols that has an aquic moisture regime).

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

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

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 underlying material 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 (36)*. Many of the technical terms used in the descriptions are defined in *Soil Taxonomy (37)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

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

Alpin Series

The Alpin series consists of nearly level to gently undulating, excessively drained soils that formed in thick beds of sandy eolian or marine sediment. These soils are on ridges and in broad areas on uplands on the Coastal Plain. The water table is below a depth of 72 inches during the year. Slopes range from 0 to 5 percent. These soils are thermic, coated Typic Quartzipsamments.

The Alpin soils are geographically associated with Otela, Lakeland, and Ortega soils. Otela soils have an argillic horizon at a depth of 40 to 80 inches. Lakeland and Ortega soils do not have lamellae. Also, Ortega soils are moderately well drained.

Typical pedon of Alpin sand, 0 to 5 percent slopes; about 900 feet east of U.S. Highway 98, 0.5 mile south of Medart, in a wooded area, NW¼ sec. 1, T. 5 S., R. 2 W.

A—0 to 3 inches; grayish brown (10YR 5/2) sand; single grained; loose; medium acid; clear wavy boundary.

E1—3 to 31 inches; light yellowish brown (10YR 6/4) sand; single grained; loose; strongly acid; gradual wavy boundary.

E2—31 to 42 inches; very pale brown (10YR 7/4) sand; few fine light gray (10YR 7/2) splotches of clean sand grains; single grained; loose; strongly acid; clear wavy boundary.

E/Bt1—42 to 61 inches; very pale brown (10YR 7/3) sand (E); common continuous brownish yellow (10YR 6/6) loamy sand lamellae (Bt) 0.5 to 1 centimeter thick; single grained; loose; strongly acid; gradual wavy boundary.

E/Bt2—61 to 80 inches; white (10YR 8/1) sand (E); common continuous brownish yellow (10YR 6/6) loamy sand lamellae (Bt) 0.25 centimeter to 2 centimeters thick; single grained; loose; strongly acid.

The thickness of the solum is 80 inches or more. Reaction is very strongly acid to slightly acid. The lamellae are at a depth of 40 to 78 inches.

The A or Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 2 or 3. The texture is sand or fine sand.

The E horizon has hue of 10YR. It has value of 5 and chroma of 4 to 6, value of 6 or 7 and chroma of 3 to 8, or value of 8 and chroma of 2. The texture is fine sand or sand.

The E part of the E/Bt horizon has hue of 10YR, value of 7 or 8, and chroma of 1 to 4. The texture is fine sand or sand, and the sand grains are mostly uncoated. The Bt part of the E/Bt horizon has hue of 7.5YR, value of 5, and chroma of 6 or 8; hue of 10YR, value of 5, and chroma of 4 to 7; or hue of 10YR, value of 6, chroma of 6 or 8. It occurs as lamellae of loamy fine sand, fine sandy loam, or loamy sand 0.1 centimeter to 2 centimeters thick.

Some pedons have an argillic horizon at a depth of more than 80 inches, but this horizon is not diagnostic for the series.

Bayvi Series

The Bayvi series consists of nearly level, very poorly drained soils that formed in marine sediment. These soils are in the coastal tidal marshes and are flooded daily by normal high tides. Slopes are 0 to 1 percent. These soils are sandy, siliceous, thermic Cumulic Haplaquolls.

The Bayvi soils are geographically associated with Chaires, Estero, Isles, Nutall, and Tooles soils. Chaires, Nutall, and Tooles soils have an argillic horizon. They are slightly higher on the landscape than the Bayvi soils and are adjacent to the tidal marsh. Estero soils have a spodic horizon. Isles soils have an argillic horizon and are underlain by limestone.

Typical pedon of Bayvi mucky sand, in an area of Bayvi, Isles, and Estero soils, frequently flooded; about 1,200 feet east of County Road 372-A, 100 feet north of Dickerson Bay, about 3.7 miles south of Hartsfield lot 111 southeast corner, on the south end of Porter Island:

A—0 to 26 inches; very dark brown (10YR 2/2) mucky sand; massive; loose; many fine and medium roots; moderately alkaline; gradual wavy boundary.

C1—26 to 50 inches; dark gray (10YR 4/1) sand; few clean sand grains; single grained; loose; common fine and medium roots; moderately alkaline; gradual wavy boundary.

C2—50 to 80 inches; dark grayish brown (10YR 4/2) sand; single grained; loose; moderately alkaline.

Reaction ranges from slightly acid to moderately alkaline when the soil is wet.

The A horizon has hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 1 or 2. The texture is mucky loamy sand, mucky sand, sand, loamy sand, or muck. The thickness of the A horizon generally ranges from 24 to 48 inches. If the surface layer is muck, however, this horizon is less than 8 inches thick.

The C horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. The texture is sand.

Chaires Series

The Chaires series consists of nearly level, poorly drained soils that formed in sandy and loamy marine sediment. These soils are on broad flatwoods on the Coastal Plain. The seasonal high water table usually is within 10 inches of the surface for 1 to 3 months of the year and at a depth of 10 to 40 inches for 6 months or more. Slopes are 0 to 2 percent. These soils are sandy, siliceous, thermic Alfic Haplaquods.

The Chaires soils are geographically associated with Pilgrims, Leon, Moriah, Nutall, Tooles, and Surrency soils. Pilgrims and Nutall soils do not have a spodic horizon and are underlain by limestone between depths of 20 and 40 inches. Also, Pilgrims soils are somewhat poorly drained. Leon soils do not have an argillic horizon. Moriah and Tooles soils do not have a spodic horizon and are underlain by limestone between depths of 40 and 60 inches. Also, Moriah soils are somewhat poorly drained. Surrency soils are very poorly drained and do not have a spodic horizon.

Typical pedon of Chaires fine sand; about 900 feet west of the Jefferson County line, 2.6 miles north of U.S. Highway 98, in a stand of planted pine, SE¼ sec. 12, T. 3 S., R. 2 E.

Ap—0 to 7 inches; black (10YR 2/1) fine sand; moderate fine granular structure; very friable; strongly acid; clear smooth boundary.

E1—7 to 12 inches; gray (10YR 5/1) fine sand; weak fine granular structure; very friable; strongly acid; clear wavy boundary.

E2—12 to 18 inches; light gray (10YR 7/1) fine sand; few medium prominent brown (7.5YR 5/4) mottles; single grained; loose; strongly acid; abrupt wavy boundary.

Bh1—18 to 23 inches; dark brown (7.5YR 3/2) sand; moderate medium subangular blocky structure; firm; few very fine roots; strongly acid; clear wavy boundary.

Bh2—23 to 32 inches; dark brown (7.5YR 3/4) sand; weak medium subangular blocky structure; friable; strongly acid; abrupt wavy boundary.

Btg—32 to 80 inches; light gray (10YR 7/2) sandy clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; slightly sticky and slightly plastic; medium acid.

The thickness of the solum ranges from 60 to 80 inches or more. Reaction ranges from extremely acid to strongly acid in the A, E, and Bh horizons and from very strongly acid to neutral in the Btg horizon. The combined thickness of the A and E horizons is less than 30 inches.

The Ap or A horizon has hue of 10YR or 7.5YR, value of 2 to 4, and chroma of 2 or less. The thickness of this horizon ranges from 4 to 13 inches. If value is less than 3.5, the thickness of this horizon is less than 10 inches. The texture is sand or fine sand.

The E horizon has hue of 10YR, value of 5 to 8, and chroma of 1 or 2. The texture is sand or fine sand. In some pedons the E horizon has organic-stained sand grains.

The Bh horizon has hue of 10YR, value of 2 or 3, and chroma of 1 to 3 or hue of 7.5YR, value of 3 or 4, and chroma of 2 to 4. The texture is fine sand, sand, or loamy fine sand.

Some pedons have an E′ horizon, which has hue of 10YR, value of 5 to 7, and chroma of 2 to 4. The texture is sand or fine sand.

Some pedons have a Bh′ horizon, which has colors similar to those in the Bh horizon. The texture is fine sand, sand, or loamy fine sand.

The Btg horizon has hue of 10YR, value of 6 or 7, and chroma of 1 or 2 or hue of 5GY, value of 5 to 7, and chroma of 1 or 2. The texture is sandy loam, fine sandy loam, or sandy clay loam. Some pedons have sandy clay in the lower part of the Btg horizon and have few or common red, brown, or gray mottles.

Some pedons have a C horizon, which has hue of 5GY, 5G, or 5BG, value of 5 or 6, and chroma of 1. The texture is sandy clay or sandy clay loam. This horizon generally has a highly mixed matrix color and gleyed mottles.

Croatan Series

The Croatan series consists of nearly level, very poorly drained soils that formed in moderately thick, highly decomposed organic material underlain by mineral material. These soils are in depressional areas on flatwoods and low uplands on the Coastal Plain. The high water table is within 10 inches of the surface for 2 to 4 months of the year and at or above the surface for 5 to 8 months. Slopes are 0 to 1 percent. These soils are loamy, siliceous, dysic, thermic Terric Medisaprists. The Croatan soils in this survey area are taxadjuncts to the series because they have a sandy Ag horizon.

The Croatan soils are geographically associated with Dorovan, Leon, Plummer, Rutlege, Scranton, and Surrency soils. These associated soils are mineral soils, except for Dorovan soils, which have an organic layer more than 51 inches thick. In addition, Leon, Plummer, and Scranton soils are poorly drained.

Typical pedon of Croatan muck, in an area of Croatan-Dorovan mucks; about 0.25 mile west of Forest Route 313, 2 miles south of Florida State Road 267, in a swamp, NW¼SE¼ sec. 35, T. 2 S., R. 2 W.

Oa1—0 to 15 inches; black (10YR 2/1) muck; partly decomposed roots, leaves, and grass; about 10 percent fiber, unrubbed, and less than 5 percent fiber, rubbed; massive; very friable; extremely acid; gradual wavy boundary.

Oa2—15 to 27 inches; very dark brown (10YR 2/2) muck; about 10 percent fiber, unrubbed, and less than 5 percent fiber, rubbed; massive; very friable; extremely acid; clear wavy boundary.

Ag—27 to 35 inches; very dark gray (10YR 3/1) sand; single grained; loose; very strongly acid; gradual wavy boundary.

Cg1—35 to 53 inches; grayish brown (10YR 5/2) sandy loam; weak fine granular structure; friable; extremely acid; gradual wavy boundary.

Cg2—53 to 80 inches; dark gray (10YR 4/1) sandy clay loam; massive; firm; extremely acid.

The combined thickness of the organic horizons commonly ranges from 16 to 35 inches. In places, however, they extend to a depth of 51 inches. Reaction is slightly acid to extremely acid.

The Oa horizon has hue of 10YR or 7.5YR, value of 2 or 3, and chroma of 1 or 2. The content of fiber is less than 5 percent after rubbing.

The Ag horizon has hue of 10YR, value of 2 to 5, and chroma of 1 or 2. The texture is sand, loamy sand, mucky sand, or sandy loam.

The Cg horizon has hue of 10YR, value of 3 to 7, and chroma of 1 or 2. The texture ranges from sand to sandy clay.

Dorovan Series

The Dorovan series consists of nearly level, very poorly drained soils that formed in highly decomposed organic material that is more than 51 inches thick and is underlain by mineral sediment. These soils are in depressional areas on flatwoods and low uplands on the Coastal Plain. The high water table is within 10 inches of the surface for 2 to 4 months of the year and at or above the surface for 5 to 8 months. Slopes are 0 to 1 percent. These soils are dysic, thermic Typic Medisaprists.

The Dorovan soils are geographically associated with Croatan, Leon, Plummer, Rutlege, Scranton, and Surrency soils. These associated soils are mineral soils, except for Croatan soils, which have an organic layer that is 16 to 51 inches thick. Leon, Plummer, and Scranton soils are poorly drained.

Typical pedon of Dorovan muck, in an area of Croatan-Dorovan mucks; about 0.2 mile south of Forest Road 347, 0.4 mile east of Farm Road 353, in a depressional area, SW¼NW¼ sec. 12, T. 3 S., R. 1 W.

Oa—0 to 65 inches; black (10YR 2/1) muck; partly decomposed roots, leaves, and grass; about 10 percent fiber, rubbed; massive; very friable; extremely acid; clear wavy boundary.

C—65 to 80 inches; very dark grayish brown (10YR 3/2) sandy clay; massive; firm; very strongly acid.

The thickness of the organic material ranges from 51 to more than 80 inches. Reaction is extremely acid in the organic layer and is strongly acid or very strongly acid in the C horizon.

The Oa horizon has hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 to 3. The content of fiber is less than 10 percent after rubbing.

The C or Cg horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 1 or 2. The texture is sand, loamy sand, sandy loam, or sandy clay.

Estero Series

The Estero series consists of nearly level, very poorly drained soils that formed in marine sediment. These soils are in coastal tidal marshes and are flooded daily by normal high tides. Slopes are 0 to 1 percent. These soils are sandy, siliceous, hyperthermic Typic Haplaquods. The Estero soils in this survey area are more alkaline in the Bh and C horizons than is definitive for the series.

The Estero soils are geographically associated with Bayvi, Chaires, Isles, Nutall, and Tooles soils. Bayvi soils do not have a spodic horizon. Chaires, Nutall, and Tooles soils have an argillic horizon. They are slightly higher on the landscape than Estero soils and are adjacent to the tidal marsh. Isles soils have an argillic horizon and are underlain by limestone.

Typical pedon of Estero muck, in an area of Bayvi, Isles, and Estero soils, frequently flooded; about 3,800 feet east of County Road 59, 200 feet south of dike, NW¼ sec. 28, T. 4 S., R. 2 E.

Oa—0 to 4 inches; very dark gray (10YR 3/1) muck; about 90 percent fiber, unrubbed, and less than 10 percent fiber, rubbed; massive; friable; moderately alkaline; abrupt smooth boundary.

A—4 to 14 inches; very dark grayish brown (10YR 3/2) sand; weak fine granular structure; very friable;

many fine roots; moderately alkaline; clear smooth boundary.

E—14 to 34 inches; grayish brown (10YR 5/2) sand; single grained; loose; few fine roots; moderately alkaline; clear wavy boundary.

Bh—34 to 54 inches; very dark brown (10YR 2/2) sand; massive; very friable; moderately alkaline; gradual wavy boundary.

C—54 to 80 inches; dark grayish brown (10YR 4/2) sand; single grained; loose; moderately alkaline.

Reaction ranges from neutral to moderately alkaline.

The Oa horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. Some pedons do not have an Oa horizon.

The A horizon has hue of 10YR. It has value of 2 and chroma of 1 or value of 3 or 4 and chroma of 1 or 2. The texture is sand and mucky sand.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. The texture is fine sand or sand.

The Bh horizon has hue of 10YR. It has value of 2 or 3 and chroma of 1 or value of 3 and chroma of 1 or 2. The texture is sand or fine sand.

The C horizon has hue of 10YR, value of 4 to 7, and chroma of 1 to 3. The texture is sand or fine sand.

Goldhead Series

The Goldhead series consists of deep, nearly level, poorly drained soils that formed in thick beds of stratified, unconsolidated, loamy and sandy marine sediment. These soils are in broad areas on flatwoods. The seasonal high water table usually is within 10 inches of the surface for 2 to 4 months of the year and at a depth of 10 to 40 inches for 6 months or more. Slopes are 0 to 2 percent. These soils are loamy, siliceous, thermic Arenic Ochraqualfs.

The Goldhead soils are geographically associated with Chaires, Leon, Nutall, Scranton, and Tooles soils. Chaires and Leon soils have a spodic horizon. Leon soils do not have an argillic horizon. Nutall soils have an argillic horizon within 20 inches of the surface and are underlain by limestone between depths of 20 and 40 inches. Scranton soils do not have an argillic horizon between depths of 40 and 60 inches. Tooles soils are underlain by limestone between depths of 40 and 80 inches.

Typical pedon of Goldhead fine sand; about 0.9 mile north of U.S. Highway 98, 0.8 mile east of the St. Marks River, 950 feet southwest of radio tower, in a stand of planted pine, SW¼NW¼ sec. 20, T. 3 S., R. 2 E.

Ap—0 to 8 inches; black (10YR 2/1) fine sand; weak fine granular structure; loose; medium acid; abrupt smooth boundary.

Eg1—8 to 19 inches; dark gray (10YR 4/1) fine sand; few fine distinct light yellowish brown (10YR 6/4) mottles; single grained; loose; slightly acid; gradual wavy boundary.

Eg2—19 to 27 inches; gray (10YR 5/1) fine sand; common medium prominent yellowish brown (10YR 5/8) mottles; single grained; loose; neutral; clear smooth boundary.

Btg—27 to 38 inches; mixed gray (10YR 5/1) and light gray (10YR 7/1) sandy loam; few medium prominent reddish yellow (7.5YR 7/6) mottles; weak medium subangular blocky structure; very friable; neutral; clear smooth boundary.

Cg—38 to 69 inches; gray (10YR 6/1) sand; single grained; loose; mildly alkaline; gradual wavy boundary.

2Cg—69 to 80 inches; gray (10YR 5/1) sand; about 10 percent shell fragments; single grained; loose; moderately alkaline.

The thickness of the solum ranges from 35 to 60 inches. Reaction ranges from strongly acid to mildly alkaline in the A and E horizons and from slightly acid to moderately alkaline in the B and C horizons.

The A horizon has hue of 10YR, value of 2 to 5, and chroma of 1 or 2. The texture is sand or fine sand.

The Eg horizon has hue of 10YR, value of 4 to 7, and chroma of 1 or 2. Common or many pale brown or yellowish brown mottles are in this horizon. The texture is sand or fine sand.

The Btg horizon has hue of 10YR, value of 4 to 7, and chroma of 1 or 2. Common or many white, light gray, reddish yellow, and brownish yellow mottles are in this horizon. The texture is sandy loam or sandy clay loam.

The Cg horizon has hue of 10YR, value of 4 to 8, and chroma of 1 or 2. The texture is sand or loamy sand. The 2Cg horizon has hue of 10YR, value of 6 to 8, and chroma of 1 or 2. Less than 20 percent shell fragments are in this horizon. Some pedons do not have a 2Cg horizon.

Hurricane Series

The Hurricane series consists of nearly level to gently sloping, somewhat poorly drained soils that formed in thick beds of sandy marine sediment. These soils are in the higher areas on flatwoods and on low uplands on the Coastal Plain. The seasonal high water table is at a depth of 18 to 42 inches for 2 to 4 months of the year and at a depth of 30 to 72 inches for most of the remainder of the year. Slopes range from 0 to 5 percent. These soils are sandy, siliceous, thermic Grossarenic Entic Haplohumods.

The Hurricane soils are geographically associated with Lutterloh, Ridgewood, Ortega, Leon, and Scranton soils. Lutterloh soils have an argillic horizon at a depth of 40 to 80 inches and do not have a spodic horizon. Ridgewood and Ortega soils are sandy and do not have a spodic horizon. In addition, Ortega soils are higher on the landscape than the Hurricane soils and are moderately well drained. Leon soils are poorly drained and have a spodic horizon at a depth of 10 to 30 inches. Scranton soils are poorly drained and do not have a spodic horizon.

Typical pedon of Hurricane sand, 0 to 5 percent slopes; about 1.7 miles west of U.S. Highway 98 at Medart, 1 mile north of U.S. Highway 319 on the east side of the Forest Service Road, in a planted pine area, NE¼SE¼ sec. 34, T. 4 S., R. 2 W.

Ap—0 to 5 inches; grayish brown (2.5Y 5/2) sand; single grained; loose; very strongly acid; clear smooth boundary.

E1—5 to 21 inches; pale yellow (2.5Y 7/4) sand; single grained; loose; strongly acid; clear smooth boundary.

E2—21 to 32 inches; light yellowish brown (2.5Y 6/4) sand; many medium and fine light gray (2.5Y 7/2) and white (10YR 8/2) splotches of clean sand grains; common medium and fine prominent yellowish brown (10YR 5/8) and strong brown (7.5YR 5/8) iron segregation mottles; single grained; loose; strongly acid; gradual smooth boundary.

E3—32 to 55 inches; light gray (2.5Y 7/2) sand; many coarse prominent reddish yellow (7.5YR 6/6) and yellowish brown (10YR 5/6) iron segregation mottles; single grained; loose; very strongly acid; abrupt smooth boundary.

Bh—55 to 80 inches; very dark gray (10YR 3/1) sand; single grained; loose; very strongly acid.

Reaction ranges from medium acid to very strongly acid. The thickness of the sand is more than 80 inches. The spodic horizon is at a depth of more than 50 inches.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 1 to 3. The texture of the A horizon is sand or fine sand.

The E horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 to 6. The texture is sand or fine sand. Iron segregation mottles can occur at a depth of more than 20 inches.

The Bh horizon has hue of 10YR, 7.5YR, or 5YR, value of 2 to 4, and chroma of 1 to 4. The texture is sand, fine sand, or loamy sand. The sand grains in this horizon are well coated with organic matter.

Isles Series

The Isles series consists of very poorly drained soils that formed in loamy marine sediment that is 40 to 60 inches thick and is underlain by limestone. These soils are in tidal marshes and are flooded daily by high tides. The slopes are smooth or slightly convex and are 0 to 1 percent. These soils are loamy, siliceous, hyperthermic Arenic Ochraqualfs. The Isles soils in this survey area are slightly more alkaline in the A and E horizons than is definitive for the series.

The Isles soils are geographically associated with Bayvi, Chaires, Estero, Leon, and Scranton soils. Bayvi soils are not underlain by limestone, do not have an argillic horizon, and are sandy throughout. Chaires and Leon soils have a spodic horizon, are higher on the landscape than the Isles soils, and are better drained. Estero soils have a spodic horizon. Scranton soils are poorly drained and are sandy throughout.

Typical pedon of Isles sand, in an area of Bayvi, Isles, and Estero soils, frequently flooded; about 2 miles west of the Jefferson County line, 25 feet south of the Florida Trail west of the dike loop on Deep Creek, in a black needlerush area, NW¼SW¼ sec. 26, T. 4 S., R. 2 E.

A—0 to 9 inches; black (10YR 2/1) sand; about 5 percent well decomposed organic material; single grained; loose; mildly alkaline; clear smooth boundary.

E—9 to 35 inches; dark grayish brown (10YR 4/2) sand; single grained; loose; mildly alkaline; abrupt wavy boundary.

Btg—35 to 51 inches; greenish gray (5GY 6/1) sandy clay loam; massive; sticky and nonplastic; neutral; abrupt wavy boundary.

R—51 inches; limestone bedrock.

Reaction ranges from neutral to moderately alkaline. The thickness of the solum ranges from 40 to 60 inches.

Some pedons have an Oa horizon, which has hue of 10YR, value of 2 or 3, and chroma of 1 or 2.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1 or 2. The texture is sand or fine sand.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. The texture is sand or fine sand.

The Bt horizon has hue of 5GY, value of 4 to 6, and chroma of 1 to 3. Yellowish brown, dark greenish gray, light olive brown, or greenish gray mottles are in this horizon. The texture ranges from sandy loam to sandy clay loam.

Kershaw Series

The Kershaw series consists of nearly level to gently undulating, excessively drained soils that formed in thick deposits of eolian or marine sand. These soils are in the uplands on the Coastal Plain. Depth to the water table is more than 72 inches. Slopes range from 0 to 5 percent. These soils are thermic, uncoated Typic Quartzipsamments.

The Kershaw soils are geographically associated with Alpin, Otela, and Ortega soils. Alpin soils have lamellae at a depth of more than 40 inches. Otela and Ortega soils are moderately well drained and are lower on the landscape than the Kershaw soils. In addition, Otela soils have an argillic horizon at a depth of more than 40 inches.

Typical pedon of Kershaw sand, 0 to 5 percent slopes; about 1,200 feet north of the Zion Hill Church, 3,000 feet west of U.S. Highway 319, in a wooded area, SW¼NE¼ sec. 6, T. 3 S., R. 1 W.

A—0 to 8 inches; grayish brown (10YR 5/2) sand; weak fine granular structure; very friable; common fine and few medium roots; strongly acid; clear wavy boundary.

C1—8 to 47 inches; pale brown (10YR 6/3) sand; few white (10YR 8/1) splotches of clean sand grains; single grained; loose; common fine and medium roots; strongly acid; gradual wavy boundary.

C2—47 to 59 inches; light gray (10YR 7/2) sand; common white (10YR 8/1) splotches of clean sand grains; single grained; loose; common medium and few coarse roots; medium acid; gradual wavy boundary.

C3—59 to 80 inches; white (10YR 8/1) sand; single grained; loose; few medium roots; medium acid.

Reaction ranges from medium acid to very strongly acid except where lime has been added to the surface layer. The content of clay plus silt in the control section is less than 5 percent. The texture is sand or fine sand to a depth of 80 inches or more.

The A or Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2.

The C horizon has hue of 10YR, value of 5 to 8, and chroma of 1 to 8.

Lakeland Series

The Lakeland series consists of nearly level to gently undulating, excessively drained soils that formed in thick deposits of eolian or marine sand. These soils are in the uplands on the Coastal Plain. Depth to the water table is more than 72 inches. Slopes range from 0 to 5 percent. These soils are thermic, coated Typic Quartzipsamments.

The Lakeland soils are geographically associated with Alpin, Otela, and Ortega soils. Alpin soils have lamellae at a depth of more than 40 inches. Otela and Ortega soils are moderately well drained and are lower on the landscape than the Lakeland soils. In addition, Otela soils have an argillic horizon at a depth of more than 40 inches.

Typical pedon of Lakeland sand, 0 to 5 percent slopes; about 1.1 miles west of U.S. Highway 98, 0.2 mile north of County Road 272A near Panacea Park, in a wooded area, NE¼SW¼ sec. 23, T. 5 S., R. 2 W.

Ap—0 to 6 inches; grayish brown (10YR 5/2) sand; single grained; loose; strongly acid; gradual smooth boundary.

C1—6 to 44 inches; light yellowish brown (10YR 6/4) sand; coated sand grains; single grained; loose; strongly acid; diffuse irregular boundary.

C2—44 to 55 inches; very pale brown (10YR 7/4) sand; single grained; loose; strongly acid; gradual wavy boundary.

C3—55 to 80 inches; pale yellow (2.5Y 7/4) sand; many fine and medium white (10YR 8/1) splotches of clean sand grains; single grained; loose; strongly acid.

Reaction ranges from medium acid to very strongly acid except where lime has been added to the surface layer. The content of clay plus silt in the control section ranges from 5 to 10 percent. The texture is sand or fine sand to a depth of 80 inches or more.

The A or Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 1 to 3.

The C horizon has hue of 10YR, value of 4 to 7, and chroma of 3 to 6 or hue of 2.5Y, value of 7 or 8, and chroma of 4 to 8. Small pockets of white sand grains are in some pedons.

Leon Series

The Leon series consists of nearly level, poorly drained soils that formed in thick deposits of sandy marine sediment. These soils are in broad areas on flatwoods on the Coastal Plain. The seasonal high water table usually is within 10 inches of the surface for 1 to 3 months of the year and at a depth of 10 to 40 inches for more than 6 months. Slopes are 0 to 2 percent. These soils are sandy, siliceous, thermic Aeric Haplaquods.

The Leon soils are geographically associated with Chaires, Ridgewood, Hurricane, Plummer, Pottsburg, Rutlege, Scranton, and Surrency soils. Chaires and Plummer soils have an argillic horizon. Ridgewood and Hurricane soils are higher on the landscape than the Leon soils and are somewhat poorly drained. Pottsburg soils have a spodic horizon at a depth of more than 51 inches. Rutlege and Surrency soils are very poorly drained and are in the lower positions on the landscape. In addition, Surrency soils have an argillic horizon. Scranton soils do not have a spodic horizon.

Typical pedon of Leon sand; about 4,000 feet south of Cypress Pond, 3,000 feet west of Arran, NE¼NW¼ sec. 34, T. 3 S., R. 2 W.

A—0 to 5 inches; very dark gray (10YR 3/1) sand; weak fine granular structure; very friable; common very fine, fine, medium, and coarse roots; many clean sand grains; very strongly acid; abrupt smooth boundary.

E—5 to 18 inches; gray (10YR 5/1) sand; many clean sand grains; single grained; loose; common very fine, fine, medium, and coarse roots; very strongly acid; abrupt wavy boundary.

Bh1—18 to 27 inches; dark brown (7.5YR 3/2) sand; moderate medium subangular blocky structure; firm and friable; few very fine, fine, and medium roots; very strongly acid; clear wavy boundary.

Bh2—27 to 38 inches; dark brown (7.5YR 4/2) sand; weak medium and fine subangular blocky structure; friable; few very fine and fine roots; very strongly acid; clear wavy boundary.

E'1—38 to 53 inches; light brownish gray (10YR 6/2) sand; single grained; loose; very strongly acid; gradual wavy boundary.

E'2—53 to 58 inches; light gray (10YR 7/2) sand; common coarse faint gray (10YR 6/1) mottles; single grained; loose; very strongly acid; clear wavy boundary.

B'h1—58 to 65 inches; dark brown (7.5YR 4/2) sand; few pinkish gray (7.5YR 6/2) streaks and pockets; single grained; loose; very strongly acid; clear wavy boundary.

B'h2—65 to 80 inches; dark brown (10YR 4/3) sand; common light brownish gray (10YR 6/2) streaks and pockets; single grained; loose; strongly acid.

Reaction ranges from strongly acid to extremely acid. The texture is sand or fine sand.

The Ap or A horizon has hue of 10YR, value of 2 to 4, and chroma of 1 or 2. When this horizon is dry, it has a salt-and-pepper appearance as a result of the mixed organic matter and white sand grains.

The E horizon has hue of 10YR, value of 5 to 8, and chroma of 1 or 2. Some pedons have black or very dark gray, organic-stained material along root channels.

The Bh horizon has hue of 10YR, 7.5YR, or 5YR, value of 2 or 3, and chroma of 1 to 3.

The E' horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. Some pedons do not have an E' horizon.

The B'h horizon is similar to the Bh horizon and is below the E' horizon. Some pedons do not have a B'h horizon.

Some pedons do not have a bisequum of E' and B'h horizons but have a C horizon, which has hue of 7.5YR or 10YR, value of 4 to 8, and chroma of 1 to 4.

Lutterloh Series

The Lutterloh series consists of nearly level to gently sloping, somewhat poorly drained soils that formed in sandy and loamy marine sediment. These soils are on low uplands and in the higher areas on flatwoods on the Coastal Plain. The seasonal high water table is at a depth of 18 to 42 inches for 2 to 4 months of the year and at a depth of 30 to 72 inches for most of the remainder of the year. Slopes range from 0 to 5 percent. These soils are loamy, siliceous, thermic Grossarenic Paleudalfs.

The Lutterloh soils are geographically associated with Otela, Shadeville, Ridgewood, Pilgrims, Moriah, Ortega, and Tooles soils. Otela soils are moderately well drained and are slightly higher on the landscape than the Lutterloh soils. Shadeville soils are in the higher positions and are moderately well drained. They have an argillic horizon between depths of 20 and 40 inches and are underlain by limestone at a depth of 40 to 80 inches. Ridgewood soils do not have an argillic horizon. Pilgrims soils have an argillic horizon at a depth of less than 20 inches. Moriah soils are underlain by limestone below the argillic horizon. Ortega soils are moderately well drained, are sandy throughout, and are slightly higher on the landscape than the Lutterloh soils. Tooles soils are poorly drained and are underlain by limestone between depths of 40 and 80 inches.

Typical pedon of Lutterloh fine sand, 0 to 5 percent slopes; about 2,700 feet south of the Leon County line, 1,700 feet west of Old Plank Road, NW¼SE¼ sec. 31, T. 2 S., R. 2 E.

Ap—0 to 7 inches; gray (10YR 5/1) fine sand; weak fine granular structure; very friable; very strongly acid; clear smooth boundary.

E1—7 to 22 inches; light gray (10YR 7/2) fine sand; many medium white (10YR 8/1) splotches of clean sand grains; few coarse prominent yellow (10YR 7/6) mottles; single grained; loose; very strongly acid; gradual wavy boundary.

E2—22 to 31 inches; light gray (10YR 7/1) fine sand; many medium white (10YR 8/1) splotches of clean sand grains; single grained; loose; very strongly acid; clear smooth boundary.

E3—31 to 58 inches; light gray (10YR 7/2) fine sand; many fine prominent reddish yellow (7.5YR 6/8) iron segregation mottles; single grained; loose; very strongly acid; abrupt smooth boundary.

Btg1—58 to 70 inches; light brownish gray (10YR 6/2) fine sandy loam; many coarse prominent strong brown (7.5YR 5/8), few medium prominent brown (7.5YR 5/4), and few fine distinct reddish yellow (7.5YR 6/6) mottles; weak medium subangular blocky structure; friable; very strongly acid; clear smooth boundary.

Btg2—70 to 80 inches; light gray (N 7/0) fine sandy loam; common fine and few coarse prominent brownish yellow (10YR 6/6) and yellowish brown (10YR 5/6) mottles; few thin clay films on faces of peds; moderate medium subangular blocky structure; firm; very strongly acid.

Reaction ranges from slightly acid to very strongly acid in the A or Ap horizon and from medium acid to very strongly acid in the E and Bt horizons. The thickness of the solum is 80 inches or more.

The A or Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2. The texture is fine sand or sand.

The E horizon has hue of 10YR, value of 5 to 8, and chroma of 1 to 4. Few to many brown, yellow, or gray mottles are in this horizon. The texture is fine sand or sand.

The Btg horizon has hue of 10YR, 7.5YR, or 2.5Y or is neutral in hue. It has value of 5 to 7 and chroma of 2 or less. Few or common brown, yellow, and gray mottles are in this horizon. The texture is fine sandy loam, sandy loam, or sandy clay loam. In some pedons the lower part of the Btg horizon is gleyed.

Mandarin Series

The Mandarin series consists of nearly level, somewhat poorly drained soils that formed in sandy marine sediment. These soils are on flatwoods. The water table is at a depth of 18 to 42 inches for 4 to 6 months during most years. Slopes are 0 to 2 percent. These soils are sandy, siliceous, thermic Typic Haplohumods. The Mandarin soils in this survey area are taxadjuncts to the series because the Bh horizon is thinner than is defined as the range for the series. This difference, however, does not significantly affect the use, management, and behavior of these soils.

The Mandarin soils are geographically associated with Ridgewood, Ortega, Leon, Rutlege, Sapelo, and Scranton soils. Ridgewood and Ortega soils do not have a spodic horizon. In addition, Ortega soils are in higher positions on the landscape than the Mandarin soils and are better drained. Leon, Rutlege, Sapelo, and Scranton soils are in the lower positions and are not so well drained as the Mandarin soils. Also, Scranton and Rutlege soils do not have a spodic horizon.

Typical pedon of Mandarin fine sand; about 400 feet east of Lost Creek, 700 feet north of County Road 374, in a wooded area, NW¼NW¼ sec. 1, T. 4 S., R. 2 W.

Ap—0 to 6 inches; gray (10YR 5/1) fine sand; weak fine granular structure; very friable; extremely acid; abrupt smooth boundary.

E—6 to 24 inches; light brownish gray (10YR 6/2) fine sand; single grained; loose; extremely acid; abrupt smooth boundary.

Bh—24 to 29 inches; dark reddish brown (5YR 3/2) fine sand; moderate medium subangular blocky structure; friable; extremely acid; clear wavy boundary.

BC—29 to 32 inches; dark brown (7.5YR 4/4) fine sand; weak medium subangular blocky structure; friable; extremely acid; clear wavy boundary.

C1—32 to 60 inches; light gray (10YR 7/1) sand; common fine prominent brownish yellow (10YR 6/6) mottles; single grained; loose; extremely acid; clear wavy boundary.

C2—60 to 80 inches; light gray (10YR 7/2) sand; common fine distinct light brown (7.5YR 6/4) mottles; single grained; loose; very strongly acid.

Reaction ranges from medium acid to extremely acid in the A, E, and Bh horizons and from neutral to very strongly acid in the BE, B'h, and E' horizons, when present. The texture is sand or fine sand.

The A horizon has hue of 10YR, value of 2 to 5, and chroma of 1.

The E horizon has hue of 10YR, value of 5 to 8, and chroma of 1 or 2.

The Bh horizon has hue of 10YR, value of 2, and chroma of 1; hue of 7.5YR, value of 3, and chroma of 2; or hue of 5YR, value of 2 or 3, and chroma of 1 or 2. The BE horizon, when present, or the BC horizon has hue of 10YR, value of 4 to 6, and chroma of 2 to 4; hue of 7.5YR, value of 4, and chroma of 2 to 4; or hue of 7.5YR, value of 5, and chroma of 4.

The C horizon has hue of 10YR, value of 6 to 8, and chroma of 1 or 2. Some pedons have a bisequum of E′ and B′h horizons between the BE and C horizons. Some pedons have an E′ horizon, which has hue of 10YR, value of 5 to 8, and chroma of 1 to 3. Some pedons have a B′h horizon, which has colors similar to those in the Bh horizon.

Maurepas Series

The Maurepas series consists of deep, nearly level, very poorly drained soils that formed in organic material. These soils are in broad tidal marsh areas and are flooded daily by high tides. Slopes are smooth or slightly convex and are 0 to 1 percent. These soils are euic, thermic Typic Medisaprists.

The Maurepas soils are geographically associated with Croatan, Leon, Meggett, Plummer, Rutlege, and Scranton soils. These associated soils are in different landscape positions than the Maurepas soils and are not directly influenced by salt water.

Typical pedon of Maurepas muck, frequently flooded; 3.5 miles west of Ochlockonee Bay Bridge, 4,000 feet north of Littleman Creek, 120 feet west of the confluence of the Sopchoppy and Shell Rivers, on Thoms Island, NW¼NE¼ sec. 4, T. 6 S., R. 2 W.

Oa1—0 to 5 inches; very dark grayish brown (10YR 3/2) muck; about 25 percent fiber, unrubbed, and less than 5 percent fiber, rubbed; massive; very friable; slightly acid; gradual smooth boundary.

Oa2—5 to 25 inches; very dark grayish brown (10YR 3/2) muck; about 15 percent fiber, unrubbed, and less than 3 percent fiber, rubbed; massive; very friable; neutral; diffuse smooth boundary.

Oa3—25 to 72 inches; very dark grayish brown (10YR 3/2) muck; about 15 percent fiber, unrubbed, and less than 3 percent fiber, rubbed; massive; very friable; mildly alkaline.

The organic material in all tiers is dominantly sapric, but hemic material is in some pedons. Reaction ranges from slightly acid to moderately alkaline. This material has hue of 10YR, value of 2 or 3, and chroma of 2. The content of fiber in the surface tier ranges from about 10 to 35 percent before rubbing and from 3 to 20 percent after rubbing. The content of fiber in the subsurface tiers is less than 40 percent before rubbing and less than 10 percent after rubbing. Thin, discontinuous mineral layers are in some pedons.

Meggett Series

The Meggett series consists of nearly level, poorly drained soils that formed in marly and clayey marine sediment. These soils are on flood plains on the Lower Coastal Plain and are frequently flooded. This flooding usually occurs in the winter. The high water table is at or near the surface in winter and early spring. Slopes are 0 to 2 percent. These soils are fine, mixed, thermic Typic Albaqualfs.

The Meggett soils are geographically associated with Croatan, Dorovan, Plummer, Rutlege, and Surrency soils. Croatan and Dorovan soils are organic soils and are very poorly drained. Plummer soils have a sandy layer more than 40 inches thick above the argillic horizon. Rutlege soils do not have an argillic horizon and are lower on the landscape than the Meggett soils. Surrency soils have 20 to 40 inches of sand above the argillic horizon and are lower on the landscape.

Typical pedon of Meggett fine sandy loam, in an area of Meggett and Croatan soils, frequently flooded; about 0.3 mile east of Red Lake, 30 feet south of road, on a flood plain, NW¼NE¼ sec. 20, T. 4 S., R. 4 W.

A—0 to 8 inches; very dark gray (10YR 3/1) fine sandy loam; weak fine granular structure; very friable; slightly acid; clear wavy boundary.

E—8 to 18 inches; grayish brown (10YR 5/2) fine sandy loam; weak fine granular structure; very friable; slightly acid; abrupt smooth boundary.

Btg1—18 to 30 inches; light gray (10YR 6/1) clay loam; common medium prominent yellowish brown (10YR 5/4) mottles; moderate medium subangular blocky structure; sticky and plastic; moderately alkaline; clear wavy boundary.

Btg2—30 to 72 inches; light gray (10YR 7/1) clay; common medium prominent yellowish brown (10YR 5/4) mottles; weak medium subangular blocky structure; very sticky and very plastic; moderately alkaline.

The thickness of the solum is 60 to more than 72 inches. Reaction ranges from very strongly acid to slightly acid in the A horizon and from slightly acid to moderately alkaline in the Btg horizon.

The A horizon has hue of 10YR, value of 2 to 5, and chroma of 1 or 2. The texture is loamy sand, sandy loam, or fine sandy loam.

The E horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. The texture is loamy sand, sandy loam, or fine sandy loam. Some pedons do not have an E horizon.

The Btg horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2. Few to many distinct mottles that have higher chroma are in this horizon. The texture is sandy clay, clay loam, or clay. The average content of clay in the upper 20 inches of this horizon is, by weight, more than 35 percent. Calcareous concretions and marl lenses can occur in the lower part.

Some pedons have a C or 2C horizon of clay loam, sandy clay, or clay, which is commonly mixed with shell fragments, marl, or sand.

Moriah Series

The Moriah series consists of nearly level, somewhat poorly drained soils that formed in sandy and loamy marine sediment underlain by limestone. These soils are in the higher areas on flatwoods and on low uplands. The high water table is at a depth of 18 to 36 inches for 2 to 5 months in most years. Also, the porous nature of the underlying limestone permits these soils to become saturated by artesian flow. This saturation is most common in areas adjacent to rivers and streams during periods of high water. Slopes are 0 to 2 percent. These soils are loamy, siliceous, thermic Aquic Arenic Hapludalfs.

The Moriah soils are geographically associated with Chaires, Shadeville, Pilgrims, Leon, Nutall, and Tooles soils. Chaires and Leon soils are poorly drained and have a spodic horizon. Shadeville soils are moderately well drained and are slightly higher on the landscape than the Moriah soils. Pilgrims soils are less than 40 inches deep over limestone bedrock. The thickness of their A horizon combined with that of their E horizon is less than 20 inches. Nutall and Tooles soils are poorly drained and are lower on the landscape than the Moriah soils.

Typical pedon of Moriah fine sand, in an area of Moriah-Pilgrims fine sands; about 2,000 feet west of the St. Marks River, 2.5 miles north of Newport, in a mixed stand of pines and hardwoods, NE¼SW¼ sec. 8, T. 3 S., R. 2 E.

Ap—0 to 8 inches; gray (10YR 6/1) fine sand; weak fine granular structure; very friable; extremely acid; clear smooth boundary.

E1—8 to 13 inches; yellowish brown (10YR 5/8) fine sand; light gray uncoated sand grains; common fine distinct strong brown (7.5YR 4/6) mottles; single grained; loose; very strongly acid; abrupt wavy boundary.

E2—13 to 25 inches; white (10YR 8/2) fine sand; common streaks or pockets of clean sand grains; common charcoal chips; single grained; loose; very strongly acid; abrupt wavy boundary.

Bt—25 to 50 inches; yellow (10YR 7/6) fine sandy loam; common fine distinct strong brown (7.5YR 5/8), common fine prominent light brownish gray (10YR 6/2), common medium distinct very pale brown (10YR 7/4) and light gray (10YR 7/2), and few fine yellowish red (5YR 5/8) mottles; moderate medium subangular blocky structure; firm; medium acid; abrupt irregular boundary.

2R—50 inches; porous limestone bedrock.

The thickness of the solum and the depth to limestone bedrock ranges from 40 to 60 inches; however, the depth to limestone varies. Reaction is extremely acid or very strongly acid in the A and E horizons and ranges from medium acid to moderately alkaline in the Bt horizon.

The A or Ap horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. The texture is fine sand or sand.

The E horizon has hue of 10YR, value of 5 to 8, and chroma of 1 to 8. The texture is fine sand or sand. White streaks or pockets of clean sand grains are common. Yellow, light yellowish brown, brown, or strong brown mottles are in the lower part of some pedons.

The Bt horizon has hue of 10YR, value of 5 to 7, and chroma of 1 to 6. Few or common, fine and medium mottles in shades of gray, brown, yellow, or red are in this horizon. The texture is fine sandy loam or sandy clay loam. Some pedons have a Btg horizon at a depth of 40 inches. This horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. Mottles are in shades of gray, yellow, or brown. The texture of the Btg horizon is similar to that of the Bt horizon.

The 2R horizon is fractured, porous limestone bedrock.

Nutall Series

The Nutall series consists of nearly level, poorly drained and very poorly drained soils that formed in thin, sandy and clayey marine sediment underlain by limestone bedrock. These soils are on the Coastal Plain in broad, poorly defined drainageways; on flood plains; in depressions; and on flatwoods. They have a seasonal high water table within a depth of 10 inches for 6 to 8 months in most years. In depressions and other low-lying areas, these soils are subject to flooding or ponding for 4 to 6 months of the year. Slopes are 0 to 1 percent. These soils are fine-loamy, siliceous, thermic Mollic Albaqualfs.

The Nutall soils are geographically associated with Chaires, Leon, Surrency, and Tooles soils. Chaires and Leon soils have a spodic horizon. Surrency soils are not underlain by limestone bedrock and have a base saturation of less than 35 percent in the subsoil. Tooles soils have a sandy surface layer more than 20 inches thick.

Typical pedon of Nutall fine sand, in an area of Tooles-Nutall fine sands; about 2.5 miles north of Newport, 2,500 feet west of Old Plank Road, in a wooded area, NE¼SE¼ sec. 12, T. 3 S., R. 1 E.

Ap—0 to 5 inches; very dark gray (10YR 3/1) fine sand; salt-and-pepper appearance; weak fine granular structure; very friable; medium acid; abrupt smooth boundary.

E—5 to 10 inches; gray (10YR 5/1) fine sand; common fine prominent brownish yellow (10YR 6/8) mottles; single grained; loose; slightly acid; abrupt wavy boundary.

Bt—10 to 20 inches; mixed brownish yellow (10YR 6/8) and gray (10YR 6/1) sandy clay loam; moderate medium subangular blocky structure; firm; mildly alkaline; common fine limestone chips; clear wavy boundary.

Btg—20 to 37 inches; gray (10YR 6/1) sandy clay loam; many fine and medium prominent yellowish brown (10YR 5/6) mottles; strong medium subangular blocky structure; very firm; common fine limestone chips; 5 percent granular rock fragments; mildly alkaline; clear wavy boundary.

R—37 inches; limestone bedrock.

The A horizon has hue of 10YR to 5Y, value of 2 or 3, and chroma of 1 or 2. Reaction is very strongly acid or medium acid, except for where lime has been added. The E horizon has hue of 10YR, value of 4 to 7, and chroma of 1 to 3. Reaction ranges from strongly acid to neutral. The combined thickness of the A and E horizons ranges from 10 to 20 inches. The texture of both horizons is fine sand or sand.

The Bt horizon has hue of 10YR to 5GY, value of 4 to 7, and chroma of 1 or 2. Few to many red, brown, yellow, or gray mottles are in this horizon. In many pedons the upper part of the B horizon has no matrix color but is coarsely mottled. The texture of the Bt horizon is sandy clay or sandy clay loam. Reaction ranges from neutral to moderately alkaline. Depth to limestone bedrock ranges from 24 to 40 inches.

Ocilla Series

The Ocilla series consists of deep, gently sloping, somewhat poorly drained soils that formed in sandy and loamy marine sediment. These soils are in the lower areas in the uplands on the Coastal Plain. The seasonal high water table is at a depth of 18 to 42 inches for 2 to 4 months of the year and at a depth of 30 to 72 inches for most of the remainder of the year. Slopes range from 0 to 5 percent. These soils are loamy, siliceous, thermic Aquic Arenic Paleudults.

The Ocilla soils are geographically associated with Alpin, Otela, Shadeville, Pilgrims, Ortega, and Moriah soils. Alpin soils are excessively drained and do not have an argillic horizon. Otela soils are moderately well drained and have an argillic horizon at a depth of more than 40 inches. Shadeville soils are moderately well drained and have limestone below the argillic horizon. Pilgrims soils have an argillic horizon within 20 inches of the surface and are underlain by limestone. Ortega soils are sandy throughout and are moderately well drained. Moriah soils have limestone below the argillic horizon.

Typical pedon of Ocilla sand, 0 to 5 percent slopes; about 3,200 feet west of U.S. Highway 319, 1.2 miles south of Jump Creek, NW¼SE¼ sec. 18, T. 3 S., R. 1 W.

A—0 to 4 inches; grayish brown (10YR 5/2) sand; weak fine granular structure; very friable; very strongly acid; many very fine and few fine roots; clear smooth boundary.

E1—4 to 22 inches; pale brown (10YR 6/3) sand; single grained; loose; very strongly acid; many very fine and few fine roots; clear wavy boundary.

E2—22 to 32 inches; light gray (10YR 7/2) sand; few medium prominent brown (7.5YR 4/4) and few fine distinct brownish yellow (10YR 6/8) mottles; single grained; loose; very strongly acid; common very fine and few fine roots; gradual wavy boundary.

Bt1—32 to 50 inches; light yellowish brown (2.5Y 6/4) sandy loam; common medium prominent reddish yellow (7.5YR 6/8) and many medium and coarse prominent light gray (10YR 7/1) mottles; moderate medium subangular blocky structure; very friable; very strongly acid; few fine roots; gradual wavy boundary.

Bt2—50 to 60 inches; light brownish gray (2.5Y 6/2) sandy clay loam; many medium and coarse prominent reddish yellow (7.5YR 6/8) and few medium distinct pale yellow (2.5Y 7/4) mottles; weak medium subangular blocky structure; friable; slightly sticky and slightly plastic; very strongly acid; clear wavy boundary.

Bt3—60 to 80 inches; light brownish gray (10YR 6/2) sandy clay loam; few medium prominent reddish yellow (7.5YR 6/8) mottles; weak medium subangular blocky structure; firm; slightly sticky and slightly plastic; very strongly acid.

The thickness of the solum is more than 50 inches. Reaction is strongly acid or very strongly acid.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2. The texture is sand or fine sand.

The E horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 2 to 4. The texture is sand or fine sand. The E2 horizon has mottles in shades of brown, strong brown, and brownish yellow. In some pedons the E2 horizon does not have mottles.

Some pedons have a BE horizon, which has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 4 to 6. Mottles of strong brown and light brownish gray are in this horizon. The texture is loamy sand.

The Bt1 horizon has hue of 10YR, value of 6 or 7, and chroma of 2 to 4 or hue of 2.5Y, value of 6 or 7, and chroma of 4 to 6. Mottles are in shades of light gray, yellowish brown, strong brown, and reddish yellow. The texture is sandy loam or sandy clay loam. The Bt2 and Bt3 horizons have hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2 to 4. Mottles are in shades of reddish yellow, strong brown, light brownish gray, brownish yellow, yellowish red, yellow, and light olive brown. The texture generally is sandy loam or sandy clay loam, but sandy clay is in the lower part of some pedons.

Ortega Series

The Ortega series consists of nearly level to gently undulating, moderately well drained soils that formed in thick beds of sandy eolian or marine sediment. These soils are on side slopes or in concave areas on the sandy uplands on the Coastal Plain and on low ridges and in slightly higher undulating areas that are not so well drained. The water table is between depths of 42 and 60 inches for 1 to 3 months in most years and at a depth of 60 to 72 inches for most of the remainder of the year. It recedes to a depth of more than 72 inches during dry periods. Slopes range from 0 to 5 percent. These soils are thermic, uncoated Typic Quartzipsamments.

The Ortega soils are geographically associated with Alpin, Otela, Ridgewood, Lakeland, and Scranton soils. Alpin and Lakeland soils are excessively drained. In addition, Alpin soils have lamellae. Otela soils have an argillic horizon. Ridgewood soils are somewhat poorly drained. Scranton soils are poorly drained.

Typical pedon of Ortega sand, 0 to 5 percent slopes; about 1.4 miles north of Renfro Lake, 0.5 mile west of Otter Lake, in a wooded area, SE¼SE¼ sec. 21, T. 5 S., R. 2 W.

A—0 to 3 inches; gray (10YR 5/1) sand; single grained; loose; strongly acid; abrupt smooth boundary.

C1—3 to 34 inches; light yellowish brown (10YR 6/4) sand; single grained; loose; strongly acid; gradual smooth boundary.

C2—34 to 49 inches; brownish yellow (10YR 6/6) fine sand; single grained; few fine and medium white (10YR 8/1) splotches of clean sand grains; single grained; loose; strongly acid; gradual smooth boundary.

C3—49 to 59 inches; very pale brown (10YR 7/4) fine sand; common medium white (10YR 8/1) splotches of clean sand grains; single grained; loose; strongly acid; gradual smooth boundary.

C4—59 to 71 inches; very pale brown (10YR 8/4) fine sand; many medium white (10YR 8/1) splotches of clean sand grains; many fine and medium prominent reddish yellow (7.5YR 6/8) iron segregation mottles; single grained; loose; strongly acid; gradual smooth boundary.

C5—71 to 80 inches; white (10YR 8/2) sand; many fine and medium prominent strong brown (7.5YR 5/6) iron segregation mottles; single grained; loose; strongly acid.

Reaction ranges from very strongly acid to slightly acid. The texture is sand or fine sand to a depth of 80 inches or more.

The Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2.

The C1 and C2 horizons have hue of 10YR, value of 5 to 7, and chroma of 3 to 6. Few or common, fine to coarse splotches of uncoated sand grains can occur in the C1 and C2 horizons. They are not indicative of wetness. The C3, C4, and C5 horizons have hue of 10YR, value of 6 to 8, and chroma of 1 to 4. Few to many, distinct or prominent, fine to coarse iron segregation mottles of red, yellow, or brown are in these horizons. If above the seasonal high water table, the C3 horizon has colors similar to those of the C1 and C2 horizons.

Otela Series

The Otela series consists of nearly level to sloping, moderately well drained soils that formed in sandy and loamy marine or eolian sediment. These soils are on low knolls, broad uplands, and side slopes adjacent to stream channels on the Coastal Plain. A perched water table is above the subsoil during wet periods and at a depth of more than 72 inches for the remainder of the year. Slopes range from 0 to 8 percent. These soils are loamy, siliceous, thermic Grossarenic Paleudalfs. Otela fine sand, 0 to 5 percent slopes, and Otela sand, 5 to 8 percent slopes, are taxadjuncts to the series because they do not have an argillic horizon that is clayey in the lower part.

The Otela soils are geographically associated with Lutterloh, Alpin, Shadeville, and Ortega soils. Lutterloh soils are somewhat poorly drained. Alpin and Ortega soils are sandy to a depth of more than 80 inches. In addition, Alpin soils are excessively drained. Shadeville soils have sandy A and E horizons that, combined, are 20 to 40 inches thick.

Typical pedon of Otela fine sand, 0 to 5 percent slopes; 1.2 miles north of Florida State Road 267, 1.5 miles east of County Road 363, in a planted pine stand, NE¼NW¼ sec. 11, T. 3 S., R. 1 E.

Ap—0 to 7 inches; grayish brown (10YR 5/2) fine sand; weak fine granular structure; very friable; very strongly acid; clear smooth boundary.

E1—7 to 23 inches; light gray (10YR 7/2) fine sand; common coarse white (10YR 8/1) splotches; common medium very pale brown (10YR 7/4) mottles; single grained; loose; strongly acid; gradual wavy boundary.

E2—23 to 39 inches; white (10YR 8/2) fine sand; common coarse white (10YR 8/1) splotches; many medium brownish yellow (10YR 6/6) mottles; loose; strongly acid; gradual wavy boundary.

E3—39 to 58 inches; white (10YR 8/1) fine sand; single grained; loose; strongly acid; abrupt wavy boundary.

EB—58 to 67 inches; reticulately mottled red (2.5YR 4/8), strong brown (7.5YR 5/8), brownish yellow (10YR 6/6), and white (10YR 8/2) loamy fine sand; moderate medium subangular blocky structure; friable; strongly acid; clear irregular boundary.

Btg—67 to 80 inches; light gray (10YR 7/1) fine sandy loam; common fine prominent red (2.5YR 4/8), strong brown (7.5YR 5/8), and brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; firm; strongly acid.

The thickness of the solum and the depth to limestone bedrock range from 60 to more than 80 inches. Reaction ranges from very strongly acid to neutral in the surface and subsurface layers and from very strongly acid to moderately alkaline in the Bt horizon.

The Ap or A horizon has hue of 10YR, value of 4 to 6, and chroma of 2 or 3. The texture is sand or fine sand. The E horizon has hue of 10YR. It has value of 6 or 7 and chroma of 2 to 6 or value of 8 and chroma of 1 to 3. Some pedons have many pockets of white uncoated sand grains. Common mottles in shades of brown or yellow are in the lower part of the E horizon. The texture is fine sand or sand. The combined thickness of the A and E horizons is 40 to 78 inches.

Some pedons have a thin EB horizon, which has texture of loamy fine sand, has colors similar to those in the Bt horizon, and is underlain by the Bt horizon.

The Bt horizon has hue of 10YR, value of 5 to 7, and chroma of 3 to 8. Few or common mottles of brown, yellow, gray, or red are in this horizon. The Btg horizon has hue of 10YR, value of 6 or 7, and chroma of 1 or 2. Mottles are in shades of yellow, red, and brown. The Bt and Btg horizons extend to a depth of more than 80 inches. Their texture is sandy clay loam, sandy loam, or fine sandy loam.

Pilgrims Series

The Pilgrims series consists of nearly level, somewhat poorly drained soils that formed in sandy and clayey marine sediment underlain by limestone. These soils are in the higher areas on flatwoods and on low uplands. The water table is at a depth of 18 to 36 inches for 2 to 5 months of most years. Also, the porous nature of the underlying limestone permits these soils to become saturated by artesian flow. This saturation is most common in areas adjacent to rivers and streams during periods of high water. Slopes are 0 to 2 percent. These soils are fine, montmorillonitic, thermic Albaquic Hapludalfs.

The Pilgrims soils are geographically associated with Chaires, Shadeville, Leon, Moriah, Nutall, and Tooles soils. Chaires and Leon soils are poorly drained and have a spodic horizon. Shadeville soils are moderately well drained and are in the slightly higher positions on the landscape. Moriah soils have A and E horizons that, combined, are more than 20 inches thick and have limestone bedrock at a depth of more than 40 inches. Nutall and Tooles soils are poorly drained.

Typical pedon of Pilgrims fine sand, in an area of Moriah-Pilgrims fine sands; 1.4 miles west of Old Plank Road, about 0.5 mile north of Blue Sink, in an area of planted pine, SE¼NE¼ sec. 11, T. 3 S., R. 1. E.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) fine sand; weak fine granular structure; very friable; extremely acid; clear smooth boundary.

E—6 to 9 inches; pale brown (10YR 6/3) fine sand; common white streaks or pockets of uncoated sand grains; many fine distinct dark yellowish brown (10YR 4/6) mottles; single grained; loose; very strongly acid; abrupt wavy boundary.

Bt—9 to 24 inches; light yellowish brown (10YR 6/4) sandy clay; common medium distinct yellowish brown (10YR 5/6), many fine distinct light gray (10YR 7/2), and many fine prominent brownish yellow (10YR 6/8) mottles; strong medium subangular blocky structure; firm; many thin clay skins; neutral; abrupt irregular boundary.

R—24 inches; porous limestone bedrock.

The thickness of the solum and the depth to limestone bedrock range from 20 to 40 inches. Solution holes extend to a depth of more than 80 inches in some pedons. Reaction is extremely acid or very strongly acid in the A and E horizons and ranges from medium acid to moderately alkaline in the Bt horizon.

The A or Ap horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. The texture is fine sand or sand.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 1 to 3. In some pedons yellowish brown and dark yellowish brown mottles are in the lower part of the E horizon. The texture is fine sand or sand. Some pedons have streaks and pockets of clean sand grains.

The Bt horizon has hue of 10YR, value of 5 to 7, and chroma of 2 to 6. Mottles are in shades of brown, gray, and yellow. The texture is sandy clay loam or sandy clay. The average content of clay in the control section ranges, by weight, from 35 to 45 percent. The thickness of the Bt horizon ranges from 8 to 20 inches.

Plummer Series

The Plummer series consists of nearly level, poorly drained, sandy soils that formed in marine or fluvial sediment. These soils are in level or depressional areas and along poorly defined drainageways. The high water table is at the surface or within 10 inches of the surface for 3 to 6 months in most years. Slopes are 0 to 2 percent. These soils are loamy, siliceous, thermic Grossarenic Paleaquults.

The Plummer soils are geographically associated with Lutterloh, Otela, Ortega, and Leon soils. Lutterloh, Otela, and Ortega soils are higher on the landscape than the Plummer soils and are better drained. Ortega and Leon soils do not have an argillic horizon. Leon soils have a spodic horizon.

Typical pedon of Plummer fine sand; about 2.1 miles north of Smith Creek School, 2.3 miles west of Old Lake on the Ochlockonee River, in a wooded area, SE¼NW¼ sec. 16, T. 3 S., R. 4 W.

A—0 to 8 inches; dark gray (10YR 4/1) fine sand; weak fine granular structure; very friable; strongly acid; gradual wavy boundary.

Eg1—8 to 16 inches; grayish brown (10YR 5/2) fine sand; single grained; loose; strongly acid; gradual wavy boundary.

Eg2—16 to 31 inches; grayish brown (10YR 5/2) fine sand; few fine prominent strong brown (7.5YR 5/8) mottles; single grained; loose; strongly acid; gradual wavy boundary.

Eg3—31 to 38 inches; light brownish gray (10YR 6/2) fine sand; common medium prominent yellow (10YR 7/8) mottles; single grained; loose; strongly acid; gradual wavy boundary.

Eg4—38 to 43 inches; light gray (10YR 7/2) fine sand; single grained; loose; strongly acid; clear wavy boundary.

Btg1—43 to 50 inches; light gray (10YR 7/2) sandy loam; common coarse distinct yellow (10YR 7/6 and 7/8) mottles; weak medium subangular blocky structure; friable; strongly acid; gradual wavy boundary.

Btg2—50 to 58 inches; light gray (10YR 7/1) sandy loam; weak medium subangular blocky structure; friable; strongly acid; gradual wavy boundary.

Btg3—58 to 80 inches; gray (10YR 6/1) sandy loam; weak medium subangular blocky structure; friable; strongly acid.

Reaction ranges from strongly acid to extremely acid. The thickness of the solum is more than 80 inches.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 1 or 2. The thickness of this horizon is less than 8 inches if the horizon has a value of less than 3.5. The texture is sand, fine sand, or loamy sand. The Eg horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. Mottles are in shades of yellow or brown. The texture is sand, fine sand, or loamy sand.

The combined thickness of the A and Eg horizons ranges from 40 to 75 inches.

The Btg horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2. It has few to many mottles in shades of yellow, red, or brown. The texture is sandy loam or sandy clay loam.

Pottsburg Series

The Pottsburg series consists of nearly level, poorly drained soils that formed in thick beds of sandy marine sediment. These soils are in broad areas on flatwoods. The seasonal high water table usually is within 10 inches of the surface for 1 to 3 months of the year and at a depth of 10 to 40 inches for more than 6 months. Slopes are 0 to 2 percent. These soils are sandy, siliceous, thermic Grossarenic Haplaquods.

The Pottsburg soils are geographically associated with Lutterloh, Chaires, Ridgewood, Leon, Rutlege, and Scranton soils. Lutterloh and Ridgewood soils are somewhat poorly drained and do not have a spodic horizon. In addition, Lutterloh soils have an argillic horizon between depths of 40 and 80 inches. Chaires soils have a spodic horizon within 30 inches of the surface and have an argillic horizon between depths of 40 and 80 inches. Leon soils have a spodic horizon within 30 inches of the surface. Rutlege soils are very poorly drained. Scranton soils do not have a spodic horizon.

Typical pedon of Pottsburg sand; about 800 feet north of Old Creek on the east side of the road, 1.5 miles west of Spring Creek, in an area of pines and mixed oak, NW¼SW¼ sec. 113, Hartsfield Survey:

A—0 to 8 inches; very dark gray (10YR 3/1) sand; many fine clean sand grains; weak medium granular structure; very friable; very strongly acid; clear smooth boundary.

E1—8 to 23 inches; light gray (10YR 6/1) sand; few medium prominent brownish yellow (10YR 6/6) mottles; single grained; loose; very strongly acid; gradual wavy boundary.

E2—23 to 52 inches; light gray (10YR 7/1) sand; single grained; loose; very strongly acid; abrupt wavy boundary.

Bh1—52 to 72 inches; dark brown (10YR 3/3) sand; weak medium subangular blocky structure; friable; strongly acid; clear wavy boundary.

Bh2—72 to 80 inches; very dark brown (10YR 2/2) sand; weak medium subangular blocky structure; friable; few firm weakly cemented sand grain fragments; medium acid.

Reaction is very strongly acid or strongly acid in the A and E horizons. It ranges from very strongly acid to medium acid in the Bh horizon.

The A horizon has hue of 10YR, value of 2 to 5, and chroma of 1 or 2.

The upper part of the E horizon has hue of 10YR, value of 4 to 7, and chroma of 1 to 3. The lower part has hue of 10YR or 2.5Y, value of 5 to 8, and chroma of 1 or 2. Few to many, fine to coarse brownish yellow, yellowish brown, or very pale brown mottles are in this horizon.

The Bh horizon has hue of 10YR. It has value and chroma of 2 to 4 or value of 4 and chroma of 3 or 4. Sand grains in this horizon are well coated with organic matter, and some are weakly cemented.

Ridgewood Series

The Ridgewood series consists of nearly level to gently sloping, somewhat poorly drained soils that formed in thick deposits of sandy marine sediment. These soils are on low knolls, in the higher areas on flatwoods, and in the uplands on the Coastal Plain. The seasonal high water table is at a depth of 24 to 42 inches for 2 to 4 months of the year and at a depth of 30 to 72 inches for the remainder of the year. Slopes range from 0 to 5 percent. These soils are thermic, uncoated Aquic Quartzipsamments.

The Ridgewood soils are geographically associated with Alpin, Ortega, Scranton, and Tooles soils. Alpin soils have lamellae at a depth of more than 40 inches and are excessively drained. Ortega soils are moderately well drained. Scranton soils are poorly drained. Tooles soils are poorly drained, have an argillic horizon between depths of 20 and 40 inches, and are underlain by limestone at a depth of 80 inches or less.

Typical pedon of Ridgewood fine sand, 0 to 5 percent slopes; 0.8 mile west of Otter Lake, 1.5 miles north of Renfro Lake, on St. Marks Refuge, SW¼SE¼ sec. 21, T 5 S., R. 2 W.

Ap—0 to 4 inches; gray (10YR 5/1) fine sand; single grained; loose; very strongly acid; clear smooth boundary.

C1—4 to 24 inches; light yellowish brown (10YR 6/4) fine sand; single grained; loose; very strongly acid; gradual smooth boundary.

C2—24 to 37 inches; light gray (10YR 7/2) fine sand; common coarse white (10YR 8/1) splotches; common fine and medium prominent yellowish brown (10YR 5/6) and strong brown (7.5YR 5/6) iron segregation mottles; single grained; loose; very strongly acid; gradual smooth boundary.

C3—37 to 62 inches; light gray (10YR 7/2) fine sand; few coarse white (10YR 8/1) splotches; few coarse prominent brownish yellow (10YR 6/6) and many fine and medium prominent reddish yellow (7.5YR 6/8) iron segregation mottles; single grained; loose; very strongly acid; gradual smooth boundary.

C4—62 to 80 inches; white (10YR 8/1) fine sand; few medium prominent yellowish brown (10YR 5/6) iron segregation mottles; single grained; loose; very strongly acid.

Reaction is extremely acid or very strongly acid in the surface layer and ranges from strongly acid to medium acid in the other horizons. The texture is sand or fine sand to a depth of 80 inches or more.

The A or Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2.

The C horizon has hue of 10YR, value of 5 to 7, and chroma of 2 to 6. Common or many mottles in shades of red, yellow, and gray are at a depth of 24 to 40 inches.

Rutlege Series

The Rutlege series consists of nearly level, very poorly drained soils that formed in sandy marine sediment. These soils are in shallow depressions and natural drainageways on the Coastal Plain. The water table is above or near the surface for 4 to 6 months of the year. These soils are subject to ponding after periods of heavy rainfall. Slopes are less than 1 percent. These soils are sandy, siliceous, thermic Typic Humaquepts.

The Rutlege soils are geographically associated with Chaires, Ridgewood, Leon, Plummer, and Scranton soils. Chaires and Leon soils have a spodic horizon and are poorly drained. Ridgewood soils are higher on the landscape than the Rutlege soils and are somewhat poorly drained. Plummer soils are poorly drained, do not have an umbric epipedon, and have an argillic horizon. Scranton soils are poorly drained.

Typical pedon of Rutlege sand; about 0.75 mile west of U.S. Highways 98 and 319, about 0.5 mile south of Lake Ellen, in a wooded area, SE¼SE¼ sec. 26, T. 4 S., R. 2 W.

A1—0 to 6 inches; black (10YR 2/1) sand; weak medium granular structure; very friable; many very fine, fine, and medium and common coarse roots; extremely acid; abrupt wavy boundary.

A2—6 to 18 inches; very dark gray (10YR 3/1) sand; weak fine granular structure; very friable; many very fine, fine, and medium and common coarse roots; extremely acid; clear wavy boundary.

A3—18 to 24 inches; very dark grayish brown (10YR 3/2) sand; single grained; loose; common very fine, fine, medium, and coarse roots; very strongly acid; clear wavy boundary.

Cg1—24 to 43 inches; grayish brown (10YR 5/2) sand; common fine distinct light yellowish brown (10YR 6/4) mottles; single grained; loose; common very fine, fine, and medium and few coarse roots; very strongly acid; gradual wavy boundary.

Cg2—43 to 72 inches; gray (10YR 6/1) sand; single grained; loose; few fine roots; very strongly acid.

Reaction ranges from strongly acid to extremely acid.

The A horizon has hue of 10YR to 5Y, value of 2 or 3, and chroma of 1 or 2. The texture is sand, fine sand, loamy fine sand, or loamy sand.

The Cg horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2. Mottles are in shades of brown, gray, and yellow. The texture is sand or fine sand.

Sapelo Series

The Sapelo series consists of nearly level, poorly drained soils that formed in thick deposits of sandy and loamy marine or fluvial sediment. These soils are on flatwoods on the Coastal Plain. The seasonal high water table is at a depth of 6 to 18 inches for 2 to 4 months during most years. Slopes are 0 to 2 percent. These soils are sandy, siliceous, thermic Ultic Haplaquods.

The Sapelo soils are geographically associated with Lutterloh, Plummer, Rutlege, and Surrency soils. Lutterloh, Plummer, and Surrency soils do not have a spodic horizon. Lutterloh soils are somewhat poorly drained, and Surrency and Rutlege soils are very poorly drained.

Typical pedon of Sapelo sand; 3.1 miles east of Old Lake on the Ochlockonee River, about 2.9 miles north of the Smith Creek School, sec. 10, T. 3 S., R. 4 W.

A—0 to 4 inches; black (10YR 2/1) sand; weak fine granular structure; very friable; many fine and medium roots; very strongly acid; clear wavy boundary.

E—4 to 12 inches; gray (10YR 5/1) sand; single grained; loose; common fine and medium roots; very strongly acid; abrupt wavy boundary.

Bh—12 to 20 inches; dark reddish brown (5YR 3/2) sand; many fine prominent yellowish brown (10YR 5/6) mottles; single grained; loose; few roots; very strongly acid; gradual wavy boundary.

E'1—20 to 25 inches; grayish brown (10YR 5/2) sand; many fine prominent yellowish brown (10YR 5/6) and common medium distinct dark reddish brown (5YR 3/2) mottles; single grained; loose; few fine roots; very strongly acid; gradual wavy boundary.

E'2—25 to 40 inches; pale brown (10YR 6/3) sand; common medium distinct yellowish brown (10YR 5/6) mottles; single grained; loose; very strongly acid; gradual wavy boundary.

E'3—40 to 45 inches; light gray (10YR 7/2) sand; common medium prominent brownish yellow (10YR 6/6) mottles; single grained; loose; very strongly acid; gradual wavy boundary.

Btg1—45 to 50 inches; gray (10YR 6/1) sandy loam; common fine prominent strong brown (7.5YR 5/8) mottles; weak fine subangular blocky structure; very friable; clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg2—50 to 59 inches; light gray (10YR 7/2) sandy clay loam; many strong brown (7.5YR 5/8) streaks; weak medium subangular blocky structure; friable; clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg3—59 to 80 inches; light gray (10YR 7/1) sandy clay loam; many fine distinct brownish yellow (10YR 6/6) mottles; weak medium subangular blocky structure; friable; clay films on faces of peds; very strongly acid.

The thickness of the solum ranges from 70 to more than 80 inches. Reaction ranges from extremely acid to strongly acid. Depth to the Bh horizon ranges from 10 to 30 inches. Depth to the Bt horizon ranges from 40 to 70 inches.

The A or Ap horizon has hue of 10YR, value of 2 to 4, and chroma of 1. The texture is fine sand or sand.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. The texture is fine sand or sand.

The Bh horizon has hue of 10YR, value of 2, and chroma of 1 or 2; hue of 10YR and value and chroma of 3; hue of 7.5YR, value of 3 or 4, and chroma of 2; or hue of 5YR, value of 2 or 3, and chroma of 2 to 4. The texture is sand or fine sand.

The E' horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 2 or 3 or hue of 5Y, value of 8, and chroma of 1 or 2. The texture is fine sand or sand. Common or many gray, brown, and yellow mottles are in this horizon.

The Bt horizon has hue of 10YR, value of 6 or 7, and chroma of 1 or 2. Common or many yellow, red, and brown mottles are in this horizon. The texture is sandy loam or sandy clay loam.

Scranton Series

The Scranton series consists of nearly level, poorly drained soils that formed in thick beds of sandy marine sediment. These soils are in broad areas on flatwoods. The seasonal high water table usually is within 10 inches of the surface for 1 to 3 months of the year and at a depth of 10 to 40 inches for more than 6 months. Slopes are 0 to 2 percent. These soils are siliceous, thermic Humaqueptic Psammaquents.

The Scranton soils are geographically associated with Lutterloh, Chaires, Ridgewood, Leon, Pottsburg, and Rutlege soils. Lutterloh and Ridgewood soils are somewhat poorly drained. In addition, Lutterloh soils have an argillic horizon between depths of 40 and 80 inches. Chaires, Leon, and Pottsburg soils have a spodic horizon. Also, Chaires soils have an argillic horizon between depths of 40 and 80 inches. Rutlege soils are lower on the landscape than the Scranton soils and are very poorly drained.

Typical pedon of Scranton sand; 1.5 miles south of County Road S375, 1 mile east of U.S. Highway 98, in an area of planted pines and mixed oaks, SW¼SE¼ sec. 101, Hartsfield Survey:

A—0 to 7 inches; very dark grayish brown (10YR 3/2) sand; weak fine granular structure; very friable; strongly acid; clear wavy boundary.

Cg1—7 to 18 inches; grayish brown (10YR 5/2) sand; common fine prominent reddish yellow (7.5YR 6/6) and yellow (10YR 7/8) mottles; single grained; loose; strongly acid; gradual wavy boundary.

Cg2—18 to 61 inches; light gray (10YR 7/2) sand; few coarse faint very pale brown (10YR 8/3) mottles; single grained; loose; strongly acid; gradual wavy boundary.

Cg3—61 to 80 inches; light gray (10YR 7/1) sand; single grained; loose; strongly acid.

Reaction ranges from very strongly acid to slightly acid in the A horizon and from very strongly acid to medium acid in the C horizon. The texture is sand to a depth of 80 inches or more.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 0 to 2.

The C horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2, except in the upper part, which has value of 4 or 5. Mottles in shades of brown and yellow are in most pedons.

Seaboard Series

The Seaboard series consists of nearly level to gently sloping, moderately well drained soils that formed in shallow deposits of sandy marine and eolian sediment underlain by fractured, porous limestone. These soils are in broad areas on low uplands and on broad knolls on flatwoods on the Lower Coastal Plain. The seasonal high water table is in the fractured limestone at a depth of more than 48 inches for most of the year. Slopes range from 0 to 3 percent. These soils are thermic, coated Lithic Quartzipsamments.

The Seaboard soils are geographically associated with Otela, Shadeville, Ridgewood, Ortega, and Moriah soils. Otela soils are not underlain by limestone bedrock and have an argillic horizon below a depth of 40 inches. Shadeville soils have an argillic horizon between depths of 20 and 40 inches and are underlain by limestone at a depth of more than 40 inches. Ridgewood and Ortega soils are not underlain by limestone. In addition, Ridgewood soils are somewhat poorly drained. Moriah soils are somewhat poorly drained, have an argillic horizon, and are underlain by limestone at a depth of more than 40 inches.

Typical pedon of Seaboard fine sand, in an area of Shadeville-Seaboard fine sands, 0 to 3 percent slopes; about 20 feet west of the major power line, 1,200 feet south of County Road 365, about 0.5 mile southwest of Wakulla, in a planted pine stand, NW¼NE¼ sec. 16, T. 3 S., R. 1 E.

Ap—0 to 6 inches; light brownish gray (10YR 6/2) fine sand; single grained; loose; strongly acid; clear smooth boundary.

C—6 to 14 inches; light gray (10YR 7/2) fine sand; many coarse white (10YR 8/1) streaks and pockets of clean sand grains; single grained; loose; slightly acid; abrupt irregular boundary.

R—14 inches; fractured, porous limestone bedrock.

Reaction is strongly acid or medium acid in the surface layer and ranges from medium acid to neutral in the underlying material. The depth to limestone is less than 20 inches.

The A or Ap horizon has hue of 10YR, value of 4 to 7, and chroma of 1 or 2. The texture is sand or fine sand.

The C horizon has hue of 10YR, value of 5 to 8, and chroma of 2 to 5. Few or common, fine to coarse mottles or pockets of white or light gray uncoated sand grains are in some pedons. The mottles are not indicative of wetness.

Shadeville Series

The Shadeville series consists of nearly level to gently undulating, moderately well drained soils that formed in loamy marine sediment. These soils are in moderately broad areas on low uplands and on broad knolls on flatwoods on the Lower Coastal Plain. The seasonal high water table is between depths of 42 and 60 inches for 1 to 3 months in most years and between depths of 60 and 72 inches for most of the remainder of the year. During dry periods the water table is at a depth of more than 72 inches. Slopes range from 0 to 5 percent. These soils are loamy, siliceous, thermic Arenic Hapludalfs.

The Shadeville soils are geographically associated with Otela, Ridgewood, Pilgrims, Ortega, Moriah, Nutall, and Tooles soils. Otela soils have an argillic horizon between depths of 40 and 80 inches. Ridgewood soils are lower on the landscape than the Shadeville soils, are somewhat poorly drained, and are sandy throughout. Pilgrims and Moriah soils are in the lower positions on the landscape and are somewhat poorly drained. Pilgrims soils have an argillic horizon at a depth of less than 20 inches. Ortega soils are sandy throughout. Nutall and Tooles soils are poorly drained. Nutall soils have an argillic horizon at a depth of less than 20 inches.

Typical pedon of Shadeville fine sand, 0 to 5 percent slopes; about 1 mile south of County Road 61, 3,500 feet west of the Wakulla River, in an area of planted pines, NW¼NW¼ R.S. 3 Hartsfield Survey, R. 1 E., T. 3 S.

Ap—0 to 7 inches; pale brown (10YR 6/3) fine sand; few coarse white (10YR 8/2) splotches of clean sand grains; weak fine granular structure; very friable; medium acid; clear smooth boundary.

E—7 to 28 inches; light gray (10YR 7/2) fine sand; many coarse white (10YR 8/2) splotches of clean sand grains; single grained; loose; slightly acid; abrupt wavy boundary.

Bt—28 to 45 inches; brownish yellow (10YR 6/8) sandy clay loam; few limestone chips; few fine prominent light gray (10YR 7/1) mottles in lower part; strong medium subangular blocky structure; firm; slightly acid; abrupt irregular boundary.

2R—45 inches; fractured, porous limestone bedrock.

The thickness of the solum, which is underlain by fractured, porous limestone, ranges from 40 to 60 inches. Solution holes are in about 15 to 30 percent of the pedons. The solum extends to a depth of more than

60 inches in these solution holes. Reaction ranges from slightly acid to strongly acid in the A and E horizons and from slightly acid to moderately alkaline in the Bt horizon.

The A horizon has hue of 10YR, value of 4 to 6, and chroma of 1 to 3. The texture is sand or fine sand.

The E horizon has hue of 10YR, value of 6 or 7, and chroma of 2 to 4. In some pedons this horizon has splotches of white (10YR 8/1) clean sand grains, and in the lower part of some pedons, it has brown (10YR 5/3) or yellow (10YR 7/6) mottles. The texture is sand or fine sand.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 6 to 8. Mottles in shades of brown or yellow are in some pedons. The texture is sandy loam, fine sandy loam, or sandy clay loam.

The 2R horizon is fractured, porous limestone interspersed with solution holes that are filled with Bt material. The depth to limestone varies. This limestone is soft enough to be dug with lightweight power equipment.

Surrency Series

The Surrency series consists of nearly level, very poorly drained soils that formed in loamy marine or fluvial deposits. These soils are in level drainageways and depressions on the Coastal Plain. This soil is ponded for 6 to 9 months in most years, and the high water table is at or near the surface for the remainder of the year. Slopes are less than 1 percent. These soils are loamy, siliceous, thermic Arenic Umbric Paleaquults.

The Surrency soils are geographically associated with Lutterloh, Chaires, Ridgewood, Leon, and Plummer soils. Lutterloh and Ridgewood soils are somewhat poorly drained and are higher on the landscape than the Surrency soils. Chaires and Leon soils are poorly drained and have a spodic horizon. Plummer soils are poorly drained, do not have an umbric epipedon, and are in the slightly higher positions on the landscape.

Typical pedon of Surrency mucky fine sand; 2.7 miles east of Florida State Road 61, 200 feet south of the Leon-Wakulla county line, NW¼NE¼ sec. 19, T. 2 S., R. 1 E.

A1—0 to 3 inches; very dark brown (10YR 2/2) mucky fine sand; moderate fine granular structure; very friable; common very fine, fine, medium, and coarse roots; extremely acid; abrupt smooth boundary.

A2—3 to 14 inches; very dark gray (10YR 3/1) fine sand; weak fine granular structure; very friable; common very fine, fine, medium, and coarse roots; extremely acid; clear wavy boundary.

E1—14 to 23 inches; gray (10YR 5/1) fine sand; single grained; loose; few very fine, fine, and medium roots; very strongly acid; clear wavy boundary.

E2—23 to 39 inches; gray (10YR 6/1) fine sand; single grained; loose; few very fine, fine, and medium roots; very strongly acid; abrupt wavy boundary.

Btg1—39 to 54 inches; grayish brown (10YR 5/2) fine sandy loam; few medium distinct yellowish brown (10YR 5/4) mottles; weak fine subangular blocky structure; friable; few very fine and fine roots; very strongly acid; clear wavy boundary.

Btg2—54 to 80 inches; light gray (5Y 6/1) sandy clay loam; few medium prominent yellowish brown (10YR 5/4) and brown (10YR 5/3) mottles; weak medium subangular blocky structure; firm; very strongly acid.

Reaction is extremely acid or very strongly acid in the A and E horizons and is very strongly acid or strongly acid in the Bt horizon.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The E horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. Mottles are in shades of brown and yellow. Their number ranges from common to none. The texture of the A and E horizons is mucky fine sand, fine sand, or sand.

The Btg horizon has hue of 10YR or 5Y, value of 5 to 7, and chroma of 1 or 2 or hue of 2.5Y, value of 5 or 6, and chroma of 2. Common or many mottles in shades of brown or yellow are in this horizon. The texture is fine sandy loam, sandy loam, or sandy clay loam. The Btg horizon extends to a depth of 80 inches or more.

Tooles Series

The Tooles series consists of nearly level, poorly drained and very poorly drained soils that formed in sandy and clayey marine sediment underlain by limestone bedrock. These soils are on the Coastal Plain in broad, poorly defined drainageways, on flood plains, in depressions, and on flatwoods. The seasonal high water table is within a depth of 10 inches for 6 to 8 months in most years. In depressional areas it is above the surface for 8 to 10 months. In some areas these soils are subject to flooding for 6 to 8 months in most years. Slopes are 0 to 2 percent. These soils are loamy, siliceous, thermic Arenic Albaqualfs.

The Tooles soils are geographically associated with Chaires, Leon, Nutall, Scranton, and Surrency soils. Chaires and Leon soils have a spodic horizon. Nutall soils have a sandy surface layer less than 20 inches thick. Scranton soils do not have an argillic horizon and are not underlain by limestone. Surrency soils are not underlain by limestone bedrock and have a base saturation of less than 35 percent in the subsoil.

Typical pedon of Tooles fine sand, in an area of Tooles-Nutall fine sands; about 2 miles east of Newport, 800 feet south of U.S. Highway 98, in a wooded area, SW¼NW¼ sec. 28, T. 3 S., R. 2 E.

Ap—0 to 6 inches; black (10YR 2/1) fine sand; weak fine granular structure; very friable; strongly acid; abrupt smooth boundary.

E1—6 to 14 inches; pale brown (10YR 6/3) fine sand; single grained; loose; medium acid; gradual wavy boundary.

E2—14 to 26 inches; light gray (10YR 7/2) fine sand; few fine prominent yellowish brown (10YR 5/6) mottles; few charcoal chips; single grained; loose; medium acid; abrupt wavy boundary.

Btg—26 to 50 inches; light brownish gray (10YR 6/2) fine sandy loam; many coarse prominent brownish yellow (10YR 6/6) mottles; strong medium subangular blocky structure; firm; slightly acid in the upper part to moderately alkaline in the lower part; abrupt irregular boundary.

R—50 inches; limestone and marl.

The thickness of the solum and the depth to limestone range from 40 to 60 inches.

The A horizon has hue of 10YR or 5Y, value of 2 or 3, and chroma of 1 or 2. The texture is fine sand or sand. Reaction ranges from very strongly acid to medium acid, except where lime has been added. The E horizon has hue of 10YR, value of 4 to 7, and chroma of 1 to 4. The texture is fine sand or sand. Reaction ranges from strongly acid to neutral. The combined thickness of the A and E horizons ranges from 20 to 40 inches.

The Bt horizon has hue of 10YR, 2.5Y, or 5GY, value of 4 to 7, and chroma of 1 or 2 or it is neutral in hue and has value of 4 to 7. Few to many red, brown, yellow, and gray mottles are in this horizon. The texture is fine sandy loam, sandy loam, or sandy clay loam. Reaction ranges from slightly acid to moderately alkaline. In many pedons the upper part of the B horizon has no matrix color and is coarsely mottled.

Formation of the Soils

In this section the factors of the soil formation are described and related to the soils in Wakulla County. The processes of soil formation are also explained.

Factors of Soil Formation

Soil is produced by forces of weathering on parent material. The kind of soil that develops depends on five major factors. These factors are the type of parent material, the climate under which soil material has existed after accumulation, the plant and animal life in and on the soil, the relief of the land, and the length of time that the forces of soil formation have acted on the soil material.

The five soil-forming factors are interdependent: each modifies the effect of the others. Any of the five factors can have more influence than the others on the formation of a soil and can account for most of its properties. For example, if the parent material is quartz sand, the soil generally has only weakly expressed horizons. The effect of the parent material is modified greatly in some places by the effects of climate, relief, and plants and animals. A difference in any of the factors results in a different soil.

Parent Material

Parent material is the unconsolidated mass in which a soil formed. It determines the limits of the chemical and mineralogical characteristics of soils and their physical constitution. Many differences among the soils in Wakulla County reflect original differences in the parent material.

The soils in the county have three major kinds of parent material. The sandy, loamy, and clayey deposits on the uplands and flatwoods are sediments of Miocene age and Pleistocene age that were deposited by the ocean. Other relatively new soils are still forming in the water-deposited material along streams and rivers. If a considerable quantity of plant material accumulates and decay is limited by too much water, organic matter, or muck, will gradually develop.

Climate

Wakulla County has a warm, humid climate. The climate was similar during most of the period of soil formation. Summers are long and warm, and winters are short and mild. Climate is uniform throughout the county; therefore, the climate causes few differences among soils. Rainfall and temperature are the major factors of climate that influence soil formation.

Because of the warm temperatures and abundant rainfall, chemical and biological actions are rapid. These conditions are favorable for the rapid decomposition of organic matter and hasten the chemical reaction in the soil. The large amount of rainfall leaches soluble bases, plant nutrients, and colloidal material downward. Consequently, most of the soils in the county have a low content of organic matter, are low in natural fertility, and have a high level of acidity.

Plants and Animals

Plants and animals have an important role in the formation of soils. The kinds and numbers of plants and animals that live in and on the soil are governed largely by climate and, to lesser and varying degrees, by each of the other soil-forming factors.

Plants and animals furnish organic matter, mix and stir the soil, and move plant nutrients to different horizons in the soil. Living organisms also help to change soil structure and porosity.

Micro-organisms, including bacteria and fungi, help to weather and break down minerals and to decompose organic matter. They are most numerous in the upper few inches of the soil. Earthworms and other small animals that live in the soil alter the chemical composition of the soil and mix the different layers. Plants also act on the soil chemically and churn it by root penetration.

Relief

Relief, or topography, modifies the soil by influencing the quantity of precipitation absorbed and retained in the soil, thus affecting moisture relations; by influencing the rate that erosion removes soil material; and by directing movement of materials in suspension or solution from one area to another.

Poorly drained or very poorly drained soils generally are in low, nearly level areas and in depressions. Water is received as runoff from the adjacent higher areas. The absence of air in these waterlogged soils results in a reduction of iron in the soils. As a result, the soils are dominantly gray. In Wakulla County these soils are mainly along drainageways, in large swamps, and on flatwoods.

The well drained soils in the uplands are on nearly level to sloping ridges and side slopes where excess water readily drains away. As the slope increases, runoff increases in intensity and erosion accelerates. These soils are well aerated and are mainly yellow, brown, or red.

Where relief and position are intermediate, moderately well drained and somewhat poorly drained soils are dominant. They are brown or yellow but have gray mottles in the subsoil. The gray mottles indicate a fluctuating water table.

Time

The length of time for a soil to form depends mainly on the combined influences of the other soil-forming factors. If soil-forming factors have been active for a long time, horizonation is stronger than if the same factors have been active for a relatively short time. Some basic minerals from which soils are formed weather fairly rapidly; other minerals are chemically inert and show little change over long periods. The rate of movement of fine particles in the soil to form horizons varies under different conditions. In geologic terms, relatively little time has elapsed since the material in which the soils formed was laid down by or emerged from the sea.

The dominant geologic materials are inactive in Wakulla County. The sand is almost pure quartz and is highly resistant to weathering. The finer textured silt and clay are the products of earlier weathering.

Processes of Soil Formation

The main processes involved in the formation of soil horizons are accumulation of organic matter, leaching of calcium carbonate and bases, reduction and transfer of iron, and formation and translocation of silicate clay minerals. These processes can occur in combination or singly, depending on the integration of the factors of soil formation.

Gleying, the chemical reduction and transfer of iron, is evident in the wet soils in the county. It is indicated by gray in the subsoil and gray mottles in other horizons. In some sandy soils the clean sand grains are gray but have no relation to gleying. Some horizons have reddish brown mottles and concretions that indicate segregation of iron.

Leaching of carbonates and bases has occurred in all of the productive soils. This process has contributed to the development of the horizons and to the inherent poor fertility of these soils.

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

AC soil. A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep rocky slopes.

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.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

California bearing ratio (CBR). The load-supporting capacity of a soil as compared to that of a standard crushed limestone, expressed as a ratio. First standardized in California. A soil having a CBR of 16 supports 16 percent of the load that would be supported by standard crushed limestone, per unit area, with the same degree of distortion.

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.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but that have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels, i.e., clay coating, clay skin.

Climax vegetation. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

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.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Compressible (in tables). The volume of soft soil decreases excessively under load.

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.

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.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

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.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

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 fines (in tables). Excess silt and clay are in the soil. The soil is not a source of gravel or sand for construction purposes.

Excess salts (in tables). Excess water-soluble salts in the soil restrict the growth of most plants.

Excess sodium (in tables). Excess exchangeable sodium is in the soil. The resulting poor physical properties restrict the growth of 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.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity*.

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.

Forb. Any herbaceous plant that is not a grass or a sedge.

Fragile (in tables). The soil is easily damaged by use or disturbance.

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.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.5 centimeters) in diameter.

Green-manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

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.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric material.

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.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

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.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

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

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Karst (topography). The relief of an area underlain by limestone that dissolves in differing degrees, thus forming numerous depressions or small basins.

Large stones (in tables). Rock fragments that are 3 inches (7.5 centimeters) or more across. Large stones adversely affect the specified use of the soil.

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.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

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.

Moderately coarse textured soil. Sandy loam and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

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.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Muck. Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

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

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Open space. A relatively undeveloped green or wooded area provided mainly within an urban area to minimize feelings of congested living.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

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.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

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.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

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.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

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

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rippable. Rippable bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 draw bar horsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). There is a shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant 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.

Saline soil. A soil containing soluble salts in an amount that impairs the growth of plants. A saline soil does not contain excess exchangeable sodium.

Salty water (in tables). Water is too salty for consumption by livestock.

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.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

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.

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.

Silica-sesquioxide ratio. The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

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 in 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.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

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.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

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.

Small stones (in tables). Rock fragments less than 3 inches (7.5 centimeters) in diameter. Small stones adversely affect the specified use of 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.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to soil blowing 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).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from soil blowing and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

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.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

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.

Trace elements. Chemical elements, such as zinc, cobalt, manganese, copper, and iron, are in soils in extremely small amounts. They are essential to plant growth.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

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.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. This contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--FREEZE DATA

[Recorded in the period 1951-80 at Tallahassee Municipal Airport, Tallahassee, Florida]

Freeze threshold temperature	Mean date of last spring occurrence	Mean date of first fall occurrence	Mean number of days between dates	Number of occurrences in spring	Number of occurrences in fall
°F					
32	Feb. 26	Dec. 3	280	29	23
28	Feb. 4	Dec. 16	316	25	16
24	Jan. 18	Dec. 22	338	15	11
20	Jan. 6	Dec. 27	356	7	7
16	Jan. 2	---	---	5	0

TABLE 2.--TEMPERATURE AND PRECIPITATION

[Recorded in the period 1951-80 at Tallahassee Municipal Airport, Tallahassee, Florida]

Month	Temperature					Precipitation				
	Monthly normal mean	Normal daily maximum	Normal daily minimum	Mean number of days with temperature: 90°F or higher	32°F or lower	Normal total	Maximum total	Minimum total	Mean number of days with rainfall of--: 0.10 inch or more	0.50 inch or more
	°F	°F	°F			In	In	In		
January----	53.9	65.1	42.7	0	10	3.42	9.27	0.40	5	2
February---	55.6	67.0	44.2	0	8	4.18	11.50	2.43	5	4
March------	60.6	72.2	49.0	0	4	5.18	11.49	1.29	6	3
April------	67.5	79.0	55.9	2	0	4.64	7.14	1.05	5	3
May--------	74.9	86.4	63.3	10	0	4.10	8.23	*	7	3
June-------	80.2	90.5	69.9	20	0	6.54	12.62	2.96	9	4
July-------	81.3	90.5	72.0	21	0	8.05	20.12	4.87	13	5
August-----	81.1	90.3	71.8	21	0	6.93	10.75	4.88	9	4
September--	78.1	87.2	68.9	15	0	5.51	15.92	1.57	7	4
October----	69.6	80.6	58.6	2	0	2.43	10.48	*	5	2
November---	59.2	71.1	47.3	0	5	2.44	7.42	.88	4	2
December---	54.1	65.4	42.8	0	9	3.44	12.65	2.44	4	3
Year-----	68.0	78.8	57.2	90	37	56.86	---	---	79	39

* Trace.

TABLE 3.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
3	Lutterloh fine sand, 0 to 5 percent slopes	7,415	1.9
4	Alpin sand, 0 to 5 percent slopes	8,353	2.2
6	Bayvi, Isles, and Estero soils, frequently flooded	20,467	5.3
7	Otela fine sand, 0 to 5 percent slopes	7,931	2.1
8	Otela sand, 5 to 8 percent slopes	340	0.1
10	Chaires fine sand	8,748	2.3
11	Shadeville fine sand, 0 to 5 percent slopes	5,859	1.5
12	Shadeville-Seaboard fine sands, 0 to 3 percent slopes	2,199	0.6
14	Ridgewood fine sand, 0 to 5 percent slopes	24,547	6.3
16	Croatan-Dorovan mucks	60,979	15.8
17	Ortega sand, 0 to 5 percent slopes	28,198	7.3
18	Hurricane sand, 0 to 5 percent slopes	3,238	0.8
19	Kershaw sand, 0 to 5 percent slopes	389	0.1
21	Lakeland sand, 0 to 5 percent slopes	7,064	1.8
23	Leon sand	29,902	7.8
25	Mandarin fine sand	4,394	1.1
26	Tooles-Nutall fine sands	21,028	5.5
27	Moriah-Pilgrims fine sands	7,546	2.0
28	Tooles-Nutall fine sands, frequently flooded	6,245	1.6
29	Tooles-Nutall-Chaires fine sands	17,160	4.5
30	Ocilla sand, 0 to 5 percent slopes	406	0.1
32	Plummer fine sand	5,656	1.5
33	Pottsburg sand	1,423	0.4
35	Rutlege sand	21,981	5.7
36	Rutlege sand, frequently flooded	9,864	2.5
37	Sapelo sand	3,698	1.0
38	Scranton sand	24,202	6.3
39	Surrency mucky fine sand	10,335	2.7
44	Tooles-Nutall fine sands, depressional	4,100	1.1
47	Otela-Alpin fine sands, 0 to 5 percent slopes	14,000	3.6
48	Otela, limestone substratum-Ortega sands, 0 to 5 percent slopes	7,324	1.9
50	Udorthents and Quartzipsamments, excavated	349	0.1
51	Goldhead fine sand	1,376	0.4
52	Meggett and Croatan soils, frequently flooded	5,357	1.4
53	Quartzipsamments, dredged	416	0.1
54	Maurepas muck, frequently flooded	2,356	0.6
	Total	384,845	100.0

TABLE 4.--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]

Map symbol and soil name	Land capability	Peanuts	Corn	Bahiagrass	Soybeans
		Lbs	Bu	AUM*	Bu
3------------------------- Lutterloh	IIIe	1,700	65	7.0	35
4------------------------- Alpin	IVs	1,600	35	6.0	15
6------------------------- Bayvi, Isles, and Estero	VIIIw	---	---	---	---
7------------------------- Otela	IIIs	2,500	35	6.5	33
8------------------------- Otela	IVs	2,200	---	---	---
10------------------------ Chaires	IVw	---	50	9.0	20
11------------------------ Shadeville	IIIs	2,700	65	8.0	25
12:					
Shadeville----------------	IIIs	2,700	65	8.0	25
Seaboard------------------	VIs	---	---	---	---
14------------------------ Ridgewood	IVs	---	40	7.0	20
16------------------------ Croatan-Dorovan	VIIw	---	---	---	---
17------------------------ Ortega	IIIs	1,600	35	6.0	15
18------------------------ Hurricane	IIIw	2,000	40	7.0	20
19------------------------ Kershaw	VIIs	2,000	35	5.5	20
21------------------------ Lakeland	IVs	2,000	35	6.0	20
23------------------------ Leon	IVw	2,000	50	7.5	---
25------------------------ Mandarin	VIs	2,000	---	5.0	---
26:					
Tooles--------------------	IIIw	---	---	---	---
Nutall--------------------	IVw	---	---	---	---

See footnote at end of table.

TABLE 4.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Land capability	Peanuts	Corn	Bahiagrass	Soybeans
		Lbs	Bu	AUM*	Bu
27:					
Moriah	IIIs	2,500	65	8.0	30
Pilgrims	IVs	2,500	60	8.0	25
28 Tooles-Nutall	Vw	---	---	---	---
29 Tooles-Nutall-Chaires	VIIw	---	---	---	---
30 Ocilla	IIIw	2,200	75	8.0	35
32 Plummer	IVw	---	---	5.0	---
33 Pottsburg	IVw	2,000	50	7.0	20
35 Rutlege	VIIw	---	---	---	---
36 Rutlege	VIw	---	---	---	---
37 Sapelo	IVw	2,000	50	7.5	20
38 Scranton	IVw	---	85	10.0	30
39 Surrency	VIIw	---	---	---	---
44 Tooles-Nutall	VIIw	---	---	---	---
47 Otela-Alpin	IVs	2,960	---	7.0	---
48 Otela-Ortega	IIIs	---	---	6.3	---
50. Udorthents and Quartzipsamments					
51 Goldhead	IIIw	---	---	7.5	---
52 Meggett and Croatan	VIIw	---	---	---	---
53. Quartzipsamments					
54 Maurepas	VIIIw	---	---	---	---

* 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 5.--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]

Map symbol and soil name	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
3-------------------- Lutterloh	10W	Slight	Moderate	Moderate	Slight	Moderate	Slash pine----------	80	10	Slash pine, loblolly pine.
							Loblolly pine-------	80	8	
							Longleaf pine-------	65	5	
4-------------------- Alpin	8S	Slight	Moderate	Moderate	Slight	Slight	Loblolly pine-------	85	8	Slash pine, loblolly pine.
							Slash pine----------	90	11	
							Longleaf pine-------	70	6	
							Turkey oak----------	---	---	
							Post oak------------	---	---	
							Blackjack oak-------	---	---	
							Bluejack oak--------	---	---	
7, 8---------------- Otela	10S	Slight	Moderate	Severe	Slight	Moderate	Slash pine----------	80	10	Slash pine.
							Longleaf pine-------	80	7	
							Loblolly pine-------	70	6	
							Live oak------------	---	---	
							Black cherry--------	---	---	
							Southern redcedar---	---	---	
10------------------- Chaires	10W	Slight	Moderate	Moderate	Slight	Moderate	Slash pine----------	80	10	Slash pine.
							Longleaf pine-------	65	5	
							Water oak-----------	---	---	
							Laurel oak----------	---	---	
11------------------- Shadeville	11S	Slight	Moderate	Moderate	Slight	Moderate	Slash pine----------	85	11	Slash pine, loblolly pine, longleaf pine.
							Longleaf pine-------	65	5	
							Hickory-------------	---	---	
							Live oak------------	---	---	
							Laurel oak----------	---	---	
							Red maple-----------	---	---	
12:										
Shadeville---------	11S	Slight	Moderate	Moderate	Slight	Moderate	Slash pine----------	85	11	Slash pine, loblolly pine, longleaf pine.
							Longleaf pine-------	65	5	
							Hickory-------------	---	---	
							Live oak------------	---	---	
							Laurel oak----------	---	---	
							Red maple-----------	---	---	
Seaboard**---------	10S	Slight	Moderate	Moderate	Moderate	Moderate	Slash pine----------	80	10	
							Laurel oak----------	---	---	
							Hickory-------------	---	---	
							Live oak------------	---	---	

See footnotes at end of table.

TABLE 5.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	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
14-----------------Ridgewood	10W	Slight	Moderate	Moderate	Slight	Moderate	Slash pine----------	80	10	Slash pine, longleaf pine.
							Longleaf pine-------	65	5	
							Laurel oak----------	---	---	
							Live oak------------	---	---	
							Water oak-----------	---	---	
							Turkey oak----------	---	---	
16:										
Croatan**---------	4W	Slight	Severe	Severe	--------	--------	Pond pine-----------	55	4	
							Water tupelo--------	60	6	
							Baldcypress---------	---	---	
							Loblolly pine-------	70	6	
							Sweetgum------------	---	---	
							Swamp tupelo--------	---	---	
							Atlantic white cedar	---	---	
Dorovan-----------	7W	Slight	Severe	Severe	--------	--------	Blackgum------------	70	7	Baldcypress.
							Sweetbay------------	---	---	
							Baldcypress---------	---	---	
							Swamp tupelo--------	---	---	
							Green ash-----------	---	---	
							Red maple-----------	---	---	
17-----------------Ortega	10S	Slight	Moderate	Moderate	Slight	Moderate	Slash pine----------	80	10	Slash pine, loblolly pine, longleaf pine.
							Longleaf pine-------	70	6	
							Loblolly pine-------	80	8	
							Blackjack oak-------	---	---	
							Post oak------------	---	---	
							Turkey oak----------	---	---	
18-----------------Hurricane	11W	Slight	Moderate	Moderate	Slight	Moderate	Slash pine----------	90	11	Slash pine, loblolly pine, longleaf pine.
							Longleaf pine-------	75	6	
							Loblolly pine-------	90	9	
							Blackjack oak-------	---	---	
							Post oak------------	---	---	
							Turkey oak----------	---	---	
19-----------------Kershaw	8S	Slight	Moderate	Severe	Slight	Slight	Slash pine----------	65	8	Sand pine, slash pine, longleaf pine.
							Longleaf pine-------	55	3	
21-----------------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------------	---	---	

See footnotes at end of table.

TABLE 5.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	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
23----------------- Leon	8W	Slight	Moderate	Moderate	Moderate	Moderate	Slash pine---------- Longleaf pine-------	70 65	8 5	Slash pine.
25----------------- Mandarin	8S	Slight	Moderate	Severe	Slight	Moderate	Slash pine---------- Longleaf pine------- Live oak------------	70 60 ---	8 4 ---	Slash pine.
26: Tooles------------	11W	Slight	Severe	Moderate	Moderate	Severe	Slash pine---------- Loblolly pine------- Cabbage palm-------- Laurel oak---------- Sweetgum------------ Sweetbay------------ American elm-------- Live oak------------	85 95 --- --- --- --- --- ---	11 9 --- --- --- --- --- ---	Slash pine, loblolly pine.
Nutall------------	6W	Slight	Severe	Moderate	Moderate	Severe	Longleaf pine------- Slash pine---------- Cabbage palm-------- Laurel oak---------- Sweetgum------------ Red maple----------- Sweetbay------------ American elm-------- Live oak------------	75 85 --- --- --- --- --- --- ---	6 11 --- --- --- --- --- --- ---	Longleaf pine, slash pine.
27: Moriah------------	11S	Slight	Moderate	Moderate	Slight	Moderate	Slash pine---------- Loblolly pine------- Water oak----------- Laurel oak---------- Hickory-------------	85 --- --- --- ---	11 --- --- --- ---	Slash pine, loblolly pine.
Pilgrims----------	11S	Slight	Moderate	Moderate	Moderate	--------	Slash pine---------- Loblolly pine------- Spruce pine--------- Water oak----------- Laurel oak---------- Hickory-------------	85 --- --- --- --- ---	11 --- --- --- --- ---	Slash pine, loblolly pine.
28: Tooles**----------	7W	Slight	Severe	Moderate	Moderate	Severe	Baldcypress--------- Red maple----------- Water tupelo-------- Water oak-----------	108 --- --- ---	7 --- --- ---	

See footnotes at end of table.

TABLE 5.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	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
28:										
Nutall	6W	Slight	Severe	Moderate	Moderate	Severe	Longleaf pine	75	6	Longleaf pine, slash pine.
							Slash pine	85	11	
							Cabbage palm	---	---	
							Laurel oak	---	---	
							Sweetgum	---	---	
							Red maple	---	---	
							Sweetbay	---	---	
							American elm	---	---	
							Live oak	---	---	
29:										
Tooles	11W	Slight	Severe	Moderate	Moderate	Severe	Slash pine	85	11	Slash pine, loblolly pine.
							Loblolly pine	95	9	
							Cabbage palm	---	---	
							Laurel oak	---	---	
							Sweetgum	---	---	
							Sweetbay	---	---	
							American elm	---	---	
							Live oak	---	---	
Nutall**	2W	Slight	Severe	Severe	Moderate	Severe	Pondcypress	75	2	
							Red maple	---	---	
							Sweetgum	---	---	
							Water tupelo	---	---	
							Baldcypress	---	---	
							Water oak	---	---	
							Blackgum	---	---	
Chaires**	2W	Slight	Severe	Severe	Moderate	Severe	Pondcypress	75	2	
							Red maple	---	---	
							Sweetbay	---	---	
							Baldcypress	---	---	
							Blackgum	---	---	
							Pond pine	---	---	
30 Ocilla	8W	Slight	Moderate	Moderate	--------	--------	Loblolly pine	85	8	Loblolly pine, slash pine.
							Slash pine	90	11	
							Longleaf pine	77	7	
32 Plummer	11W	Slight	Severe	Severe	--------	--------	Slash pine	88	11	Loblolly pine, slash pine.
							Loblolly pine	91	9	
							Longleaf pine	70	6	

See footnotes at end of table.

TABLE 5.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	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
33. Pottsburg	8W	Slight	Moderate	Moderate	Moderate	Moderate	Slash pine	70	8	Slash pine, loblolly pine, longleaf pine.
							Longleaf pine	60	4	
							Loblolly pine	70	6	
							Live oak	---	---	
							Water oak	---	---	
35. Rutlege	9W	Slight	Severe	Severe	Slight	--------	Loblolly pine	90	9	Loblolly pine, baldcypress, slash pine.
							Sweetgum	90	7	
							Pin oak	85	4	
36. Rutlege	9W	Slight	Severe	Severe	Slight	--------	Loblolly pine	90	9	Loblolly pine, baldcypress.
							Sweetgum	90	7	
							Pin oak	85	5	
37. Sapelo	7W	Slight	Moderate	Moderate	--------	--------	Loblolly pine	77	7	Loblolly pine, slash pine.
							Slash pine	77	10	
							Longleaf pine	65	5	
38. Scranton	6W	Slight	Moderate	Slight	Slight	Severe	Longleaf pine	70	6	Loblolly pine, slash pine.
							Slash pine	84	11	
							Loblolly pine	80	8	
							Sweetgum	---	---	
39. Surrency	10W	Slight	Severe	Severe	Slight	Severe	Loblolly pine	95	10	Loblolly pine, slash pine, sweetgum, American sycamore, water tupelo.
							Slash pine	90	11	
							Sweetgum	90	7	
							Blackgum	---	---	
							Water oak	---	---	
							Cypress	---	---	
							Water tupelo	---	---	
44:										
Tooles**	2W	Slight	Severe	Severe	Moderate	Severe	Pondcypress	75	2	
							Red maple	---	---	
							Baldcypress	---	---	
							Blackgum	---	---	
							Pond pine	---	---	
							Sweetbay	---	---	
Nutall**	2W	Slight	Severe	Severe	Moderate	Severe	Pondcypress	75	2	
							Red maple	---	---	
							Sweetgum	---	---	
							Water tupelo	---	---	
							Baldcypress	---	---	
							Water oak	---	---	
							Blackgum	---	---	

See footnotes at end of table.

TABLE 5.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	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
47:										
Otela	10S	Slight	Moderate	Severe	Slight	Moderate	Slash pine	80	10	Slash pine.
							Longleaf pine	80	7	
							Loblolly pine	70	6	
							Live oak	---	---	
							Black cherry	---	---	
							Southern redcedar	---	---	
Alpin	8S	Slight	Moderate	Moderate	Slight	Slight	Loblolly pine	85	8	Slash pine, loblolly pine.
							Slash pine	90	11	
							Longleaf pine	70	6	
							Turkey oak	---	---	
							Post oak	---	---	
							Blackjack oak	---	---	
							Bluejack oak	---	---	
48:										
Otela	10S	Slight	Moderate	Severe	Slight	Moderate	Slash pine	80	10	Slash pine.
							Longleaf pine	80	7	
							Loblolly pine	70	6	
							Live oak	---	---	
							Black cherry	---	---	
							Southern redcedar	---	---	
							Laurel oak	---	---	
							Southern red oak	---	---	
Ortega	10S	Slight	Moderate	Moderate	Slight	Moderate	Slash pine	80	10	Slash pine, loblolly pine, longleaf pine.
							Longleaf pine	70	6	
							Loblolly pine	80	8	
							Blackjack oak	---	---	
							Post oak	---	---	
							Turkey oak	---	---	
51: Goldhead	10W	Slight	Moderate	Severe	Slight	Moderate	Slash pine	80	10	Slash pine, loblolly pine, longleaf pine.
							Loblolly pine	90	9	
							Longleaf pine	65	5	
							Baldcypress	---	---	
							Blackgum	---	---	
							Cabbage palm	---	---	
							Laurel oak	---	---	
							Sweetgum	---	---	
							Water oak	---	---	
52:										
Meggett	13W	Slight	Severe	Severe	Severe	Severe	Slash pine	100	13	Slash pine, loblolly pine.
							Loblolly pine	100	11	
							Pond pine	75	---	

See footnotes at end of table.

TABLE 5.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	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
52:										
Croatan	2W	Slight	Severe	Severe	Severe	Severe	Pond pine	55	2	Loblolly pine, pond pine.
							Loblolly pine	70	6	
							Sweetgum	70	4	

* 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.

** This soil is generally not suited to the production of pine trees because of ponding or extended wetness. It may be suited to cypress and hardwood production through natural regeneration.

TABLE 6.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "moderate" and "severe." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
3: Lutterloh	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
4: Alpin	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty, too sandy.
6:					
Bayvi	Severe: flooding, wetness, too sandy.	Severe: wetness, too sandy, excess salt.	Severe: too sandy, wetness, flooding.	Severe: wetness, too sandy.	Severe: excess salt, wetness, droughty.
Isles	Severe: flooding, wetness.	Severe: wetness, too sandy, excess salt.	Severe: too sandy, wetness, flooding.	Severe: wetness, too sandy.	Severe: excess salt, wetness, flooding.
Estero	Severe: flooding, wetness, excess humus.	Severe: wetness, excess humus, excess salt.	Severe: excess humus, wetness, flooding.	Severe: wetness, excess humus.	Severe: excess salt, wetness, flooding.
7: Otela	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty.
8: Otela	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty, too sandy.
10: Chaires	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
11: Shadeville	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
12:					
Shadeville	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
Seaboard	Severe: too sandy, depth to rock.	Severe: too sandy, depth to rock.	Severe: too sandy, depth to rock.	Severe: too sandy.	Severe: depth to rock.
14: Ridgewood	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty.
16:					
Croatan	Severe: ponding, excess humus, flooding.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
Dorovan	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.

TABLE 6.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
17: Ortega	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
18: Hurricane	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
19: Kershaw	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
21: Lakeland	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty, too sandy.
23: Leon	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
25: Mandarin	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: wetness, droughty.
26:					
Tooles	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
Nutall	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
27:					
Moriah	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
Pilgrims	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: wetness, depth to rock.
28:					
Tooles	Severe: flooding, wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness, flooding.	Severe: wetness, too sandy.	Severe: wetness, flooding.
Nutall	Severe: flooding, wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness, flooding.	Severe: wetness, too sandy.	Severe: wetness, flooding.
29:					
Tooles	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
Nutall	Severe: ponding, too sandy.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding.
Chaires	Severe: ponding, too sandy.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding, droughty.

TABLE 6.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
30: Ocilla	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: wetness, droughty, too sandy.
32: Plummer	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
33: Pottsburg	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
35: Rutlege	Severe: too sandy, ponding.	Severe: too sandy, ponding.	Severe: too sandy, ponding.	Severe: too sandy, ponding.	Severe: ponding.
36: Rutlege	Severe: ponding, too sandy.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding, droughty.
37: Sapelo	Severe: too sandy, wetness.	Severe: too sandy, wetness.	Severe: too sandy, wetness.	Severe: too sandy, wetness.	Severe: droughty, wetness.
38: Scranton	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
39: Surrency	Severe: ponding, too sandy.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding.
44:					
Tooles	Severe: ponding, too sandy.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding.
Nutall	Severe: ponding, too sandy.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding.
47:					
Otela	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty.
Alpin	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
48:					
Otela	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty, too sandy.
Ortega	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
50:					
Udorthents.					
Quartzipsamments.					

TABLE 6.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
51-------------------- Goldhead	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
52:					
Meggett---------------	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
Croatan---------------	Severe: flooding, wetness, excess humus.	Severe: wetness, excess humus, too acid.	Severe: excess humus, wetness, flooding.	Severe: wetness, excess humus.	Severe: too acid, wetness, flooding.
53. Quartzipsamments					
54-------------------- Maurepas	Severe: flooding, ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding, flooding.	Severe: ponding, excess humus.	Severe: ponding, flooding, excess humus.

TABLE 7.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	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
3: Lutterloh	Fair	Fair	Fair	Fair	Fair	Fair	Poor	Fair	Fair	Poor.
4: Alpin	Poor	Fair	Fair	Poor	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
6:										
Bayvi	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Fair	Good	Very poor.	Very poor.	Fair.
Isles.										
Estero	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Fair	Good	Very poor.	Very poor.	Good.
7, 8: Otela	Poor	Fair	Good	Fair	Fair	Poor	Poor	Fair	Fair	Very poor.
10: Chaires	Poor	Fair	Fair	Poor	Fair	Fair	Fair	Fair	Fair	Fair.
11: Shadeville	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
12:										
Shadeville	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Seaboard	Poor	Poor	Fair	Fair	Poor	Very poor.	Very poor.	Fair	Fair	Very poor.
14: Ridgewood	Poor	Poor	Fair	Fair	Fair	Poor	Poor	Poor	Fair	Poor.
16:										
Croatan	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Dorovan	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
17: Ortega	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
18: Hurricane	Poor	Poor	Fair	Fair	Fair	Poor	Very poor.	Poor	Fair	Very poor.
19: Kershaw	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
21: Lakeland	Poor	Fair	Fair	Poor	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
23: Leon	Poor	Fair	Good	Poor	Fair	Fair	Poor	Fair	Fair	Poor.

TABLE 7.--WILDLIFE HABITAT--Continued

Map symbol and soil name	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
25:										
Mandarin	Very poor.	Poor	Poor	Poor	Fair	Very poor.	Very poor.	Poor	Poor	Very poor.
Tooles	Poor	Fair	Fair	Fair	Fair	Fair	Good	Poor	Fair	Fair.
26:										
Tooles	Poor	Fair	Fair	Fair	Fair	Fair	Good	Poor	Fair	Fair.
Nutall	Poor	Fair	Fair	Fair	Fair	Fair	Fair	Poor	Fair	Fair.
27:										
Moriah	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Pilgrims	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
28:										
Tooles	Poor	Fair	Fair	Fair	Fair	Fair	Good	Poor	Fair	Fair.
Nutall	Poor	Fair	Fair	Fair	Fair	Fair	Fair	Poor	Fair	Fair.
29:										
Tooles	Poor	Fair	Fair	Fair	Fair	Fair	Good	Poor	Fair	Fair.
Nutall	Poor	Fair	Fair	Fair	Fair	Good	Good	Poor	Fair	Good.
Chaires	Very poor.	Very poor.	Very poor.	Fair	Fair	Good	Good	Very poor.	Fair	Good.
30 Ocilla	Fair	Fair	Good	Fair	Good	Fair	Fair	Fair	Good	Fair.
32 Plummer	Poor	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair.
33 Pottsburg	Poor	Poor	Fair	Poor	Poor	Poor	Poor	Poor	Poor	Poor.
35, 36 Rutlege	Very poor.	Poor	Poor	Poor	Poor	Fair	Good	Poor	Poor	Fair.
37 Sapelo	Poor	Fair	Fair	Poor	Fair	Fair	Fair	Fair	Fair	Fair.
38 Scranton	Fair	Fair	Good	Fair	Fair	Poor	Poor	Fair	Fair	Poor.
39 Surrency	Poor	Poor	Poor	Poor	Poor	Fair	Good	Poor	Poor	Fair.
44:										
Tooles	Very poor.	Very poor.	Very poor.	Fair	Fair	Good	Good	Very poor.	Fair	Good.
Nutall	Poor	Fair	Fair	Fair	Fair	Good	Good	Poor	Fair	Good.

TABLE 7.--WILDLIFE HABITAT--Continued

Map symbol and soil name	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
47:										
Otela	Poor	Fair	Good	Fair	Fair	Poor	Poor	Fair	Fair	Very poor.
Alpin	Poor	Fair	Fair	Poor	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
48:										
Otela	Poor	Fair	Good	Fair	Fair	Poor	Poor	Fair	Fair	Very poor.
Ortega	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
50:										
Udorthents.										
Quartzipsamments.										
51 Goldhead	Poor	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Poor.
52:										
Meggett	Poor	Fair	Fair	Fair	Good	Good	Good	Fair	Good	Good.
Croatan	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
53. Quartzipsamments										
54 Maurepas	Very poor.	Very poor.	Very poor.	Very poor.	---	Fair	Very poor.	Very poor.	Very poor.	Fair.

TABLE 8.--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; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
3----------------- Lutterloh	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Severe: droughty.
4----------------- Alpin	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Severe: droughty, too sandy.
6:						
Bayvi------------	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: excess salt, wetness, droughty.
Isles------------	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: excess salt, wetness, flooding.
Estero-----------	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: excess salt, wetness, flooding.
7----------------- Otela	Severe: cutbanks cave.	Slight---------	Moderate: wetness.	Slight---------	Slight---------	Moderate: droughty.
8----------------- Otela	Severe: cutbanks cave.	Slight---------	Moderate: wetness.	Moderate: slope.	Slight---------	Moderate: droughty, too sandy.
10---------------- Chaires	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
11---------------- Shadeville	Severe: cutbanks cave.	Slight---------	Moderate: wetness.	Slight---------	Slight---------	Severe: droughty.
12:						
Shadeville-------	Severe: cutbanks cave.	Slight---------	Moderate: wetness.	Slight---------	Slight---------	Severe: droughty.
Seaboard---------	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.
14---------------- Ridgewood	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: droughty.
16:						
Croatan----------	Severe: excess humus, ponding.	Severe: low strength, ponding, flooding.	Severe: flooding, ponding.	Severe: low strength, ponding, flooding.	Severe: ponding.	Severe: ponding, excess humus.

TABLE 8.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
16:						
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.
17---------------- Ortega	Severe: cutbanks cave.	Slight---------	Moderate: wetness.	Slight---------	Slight---------	Severe: droughty.
18---------------- Hurricane	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Severe: droughty.
19---------------- Kershaw	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Severe: droughty.
21---------------- Lakeland	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Moderate: droughty, too sandy.
23---------------- Leon	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
25---------------- Mandarin	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, droughty.
26:						
Tooles-----------	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Nutall-----------	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
27:						
Moriah-----------	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Severe: droughty.
Pilgrims---------	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: low strength.	Moderate: wetness, depth to rock.
28:						
Tooles-----------	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.
Nutall-----------	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.
29:						
Tooles-----------	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Nutall-----------	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.

TABLE 8.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
29:						
Chaires	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, droughty.
30 Ocilla	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, droughty, too sandy.
32 Plummer	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
33 Pottsburg	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
35 Rutlege	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
36 Rutlege	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, droughty.
37 Sapelo	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: droughty, wetness.
38 Scranton	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
39 Surrency	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
44:						
Tooles	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
Nutall	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
47:						
Otela	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Slight	Moderate: droughty.
Alpin	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Severe: droughty.
48:						
Otela	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Slight	Moderate: droughty, too sandy.
Ortega	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Slight	Severe: droughty.

TABLE 8.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
50:						
Udorthents.						
Quartzipsamments.						
51----------------- Goldhead	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
52:						
Meggett-----------	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: shrink-swell, wetness, flooding.	Severe: wetness, flooding.
Croatan-----------	Severe: excess humus, wetness.	Severe: flooding, wetness, low strength.	Severe: flooding, wetness.	Severe: flooding, wetness, low strength.	Severe: wetness, flooding.	Severe: too acid, wetness, flooding.
53. Quartzipsamments						
54----------------- Maurepas	Severe: excess humus, ponding.	Severe: flooding, ponding, low strength.	Severe: flooding, ponding, low strength.	Severe: flooding, ponding, low strength.	Severe: ponding, flooding.	Severe: ponding, flooding, excess humus.

TABLE 9.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "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]

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
3 Lutterloh	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
4 Alpin	Slight	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy, seepage.
6:					
Bayvi	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, wetness.
Isles	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding.	Severe: flooding, depth to rock, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, wetness.
Estero	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, wetness.
7, 8 Otela	Moderate: wetness, percs slowly.	Severe: seepage.	Severe: too sandy.	Severe: seepage.	Severe: seepage, too sandy.
10 Chaires	Severe: wetness, percs slowly.	Severe: seepage.	Severe: wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
11 Shadeville	Severe: wetness, percs slowly.	Severe: seepage.	Severe: depth to rock, wetness, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
12:					
Shadeville	Severe: wetness, percs slowly.	Severe: seepage.	Severe: depth to rock, wetness, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
Seaboard	Severe: depth to rock, wetness.	Severe: seepage, depth to rock.	Severe: depth to rock, seepage, wetness.	Severe: depth to rock.	Poor: depth to rock, seepage, too sandy.
14 Ridgewood	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: too sandy, seepage.

TABLE 9.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
16:					
Croatan	Severe: ponding, percs slowly.	Severe: excess humus, ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
Dorovan	Severe: subsides, ponding.	Severe: excess humus, ponding.	Severe: seepage, ponding.	Severe: seepage, ponding.	Poor: ponding, excess humus.
17 Ortega	Moderate: wetness.	Severe: seepage.	Severe: seepage, wetness, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
18 Hurricane	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: wetness, seepage, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
19 Kershaw	Severe: poor filter.	Severe: seepage.	Severe: too sandy, seepage.	Severe: seepage.	Poor: seepage, too sandy.
21 Lakeland	Slight	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
23 Leon	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
25 Mandarin	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: wetness, too sandy.	Severe: wetness, seepage.	Poor: seepage, too sandy.
26:					
Tooles	Severe: wetness, percs slowly, poor filter.	Severe: seepage, wetness.	Severe: depth to rock, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
Nutall	Severe: depth to rock, wetness.	Severe: seepage, depth to rock.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Poor: depth to rock, wetness.
27:					
Moriah	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: depth to rock, wetness.	Severe: seepage, wetness.	Poor: thin layer.
Pilgrims	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Poor: depth to rock, hard to pack.
28:					
Tooles	Severe: flooding, wetness, percs slowly.	Severe: seepage, flooding, wetness.	Severe: flooding, depth to rock, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, wetness.

TABLE 9.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
28:					
Nutall	Severe: flooding, depth to rock, wetness.	Severe: seepage, depth to rock, flooding.	Severe: flooding, depth to rock, wetness.	Severe: flooding, depth to rock, wetness.	Poor: depth to rock, wetness.
29:					
Tooles	Severe: wetness, percs slowly, poor filter.	Severe: seepage, wetness.	Severe: depth to rock, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
Nutall	Severe: depth to rock, ponding, percs slowly.	Severe: seepage, depth to rock, ponding.	Severe: depth to rock, ponding.	Severe: depth to rock, seepage, ponding.	Poor: depth to rock, ponding.
Chaires	Severe: ponding, percs slowly, poor filter.	Severe: seepage, ponding.	Severe: ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
30 Ocilla	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness.	Severe: seepage, wetness.	Fair: wetness.
32 Plummer	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: wetness, too sandy.	Severe: seepage, wetness.	Poor: too sandy, wetness.
33 Pottsburg	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: wetness, seepage.	Poor: too sandy, wetness, seepage.
35 Rutlege	Severe: ponding, poor filter.	Severe: seepage, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: too sandy, ponding.
36 Rutlege	Severe: ponding, poor filter.	Severe: seepage, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
37 Sapelo	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
38 Scranton	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
39 Surrency	Severe: ponding.	Severe: seepage, ponding.	Severe: ponding, too sandy.	Severe: seepage, ponding.	Poor: too sandy, ponding.

TABLE 9.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
44:					
Tooles	Severe: ponding, percs slowly, poor filter.	Severe: seepage, ponding.	Severe: depth to rock, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
Nutall	Severe: depth to rock, ponding, percs slowly.	Severe: seepage, depth to rock, ponding.	Severe: depth to rock, ponding.	Severe: depth to rock, seepage, ponding.	Poor: depth to rock, ponding.
47:					
Otela	Moderate: wetness, percs slowly.	Severe: seepage.	Severe: too sandy.	Severe: seepage.	Severe: seepage, too sandy.
Alpin	Slight	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy, seepage.
48:					
Otela	Moderate: wetness, percs slowly.	Severe: seepage.	Severe: too sandy.	Severe: seepage.	Severe: seepage, too sandy.
Ortega	Moderate: wetness.	Severe: seepage.	Severe: seepage, wetness, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
50:					
Udorthents.					
Quartzipsamments.					
51 Goldhead	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
52:					
Meggett	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
Croatan	Severe: flooding, wetness, percs slowly.	Severe: seepage, flooding, excess humus.	Severe: flooding, wetness, too acid.	Severe: flooding, seepage, wetness.	Poor: wetness, thin layer.
53. Quartzipsamments					
54 Maurepas	Severe: flooding, ponding, poor filter.	Severe: seepage, flooding, excess humus.	Severe: flooding, seepage, ponding.	Severe: flooding, seepage, ponding.	Severe: flooding, seepage, ponding.

TABLE 10.--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]

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
3: Lutterloh	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
4: Alpin	Good	Probable	Improbable: too sandy.	Poor: too sandy.
6:				
Bayvi	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, excess salt, wetness.
Isles	Poor: wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, wetness.
Estero	Poor: wetness.	Probable	Improbable: too sandy.	Poor: excess humus, excess salt, wetness.
7, 8: Otela	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.
10: Chaires	Poor: wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, wetness.
11: Shadeville	Fair: depth to rock.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy.
12:				
Shadeville	Fair: depth to rock.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy.
Seaboard	Poor: depth to rock.	Improbable: thin layer.	Improbable: too sandy.	Poor: depth to rock, too sandy.
14: Ridgewood	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
16:				
Croatan	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.
Dorovan	Poor: wetness.	Probable	Improbable: too sandy.	Poor: excess humus, wetness.
17: Ortega	Good	Probable	Improbable: too sandy.	Poor: too sandy.
18: Hurricane	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.

TABLE 10.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
19: Kershaw	Good	Probable	Improbable: too sandy.	Poor: too sandy.
21: Lakeland	Good	Probable	Improbable: too sandy.	Poor: too sandy.
23: Leon	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
25: Mandarin	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
26:				
Tooles	Poor: wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, wetness.
Nutall	Poor: depth to rock, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, wetness.
27:				
Moriah	Fair: depth to rock, thin layer, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.
Pilgrims	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
28:				
Tooles	Poor: wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, wetness.
Nutall	Poor: depth to rock, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, wetness.
29:				
Tooles	Poor: wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, wetness.
Nutall	Poor: depth to rock, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, wetness.
Chaires	Poor: wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, wetness.
30: Ocilla	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.
32: Plummer	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.

TABLE 10.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
33: Pottsburg	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
35: Rutlege	Poor: wetness.	Improbable: excess fines.	Improbable: too sandy.	Poor: too sandy, wetness.
36: Rutlege	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
37: Sapelo	Poor: wetness.	Improbable: excess fines.	Improbable: too sandy.	Poor: too sandy, wetness.
38: Scranton	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
39: Surrency	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, wetness.
44:				
Tooles	Poor: wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, wetness.
Nutall	Poor: depth to rock, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, wetness.
47:				
Otela	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.
Alpin	Good	Probable	Improbable: too sandy.	Poor: too sandy.
48:				
Otela	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.
Ortega	Good	Probable	Improbable: too sandy.	Poor: too sandy.
50:				
Udorthents.				
Quartzipsamments.				
51: Goldhead	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
52:				
Meggett	Poor: wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.

TABLE 10.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
52:				
Croatan--------------	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness, too acid.
53. Quartzipsamments				
54-------------------- Maurepas	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.

TABLE 11.--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]

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
3 Lutterloh	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: slow refill, cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Droughty.
4 Alpin	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, soil blowing.	Too sandy, soil blowing.	Droughty.
6:							
Bayvi	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: salty water, cutbanks cave.	Flooding, cutbanks cave, excess salt.	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, excess salt, droughty.
Isles	Severe: seepage.	Severe: seepage, wetness, excess salt.	Severe: cutbanks cave.	Flooding, cutbanks cave, excess salt.	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, excess salt, droughty.
Estero	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: salty water, cutbanks cave.	Flooding, cutbanks cave, excess salt.	Wetness, soil blowing, flooding.	Wetness, too sandy, soil blowing.	Wetness, excess salt.
7, 8 Otela	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.	Droughty.
10 Chaires	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: slow refill, cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty.
11 Shadeville	Severe: seepage.	Severe: seepage, piping.	Severe: slow refill, cutbanks cave.	Deep to water	Droughty, fast intake.	Too sandy, soil blowing.	Droughty, percs slowly.
12:							
Shadeville	Severe: seepage.	Severe: seepage, piping.	Severe: slow refill, cutbanks cave.	Deep to water	Droughty, fast intake.	Too sandy, soil blowing.	Droughty, percs slowly.

TABLE 11.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
12: Seaboard	Severe: depth to rock.	Severe: seepage, piping.	Severe: depth to rock, cutbanks cave.	Deep to water	Droughty, fast intake, soil blowing.	Depth to rock, too sandy, soil blowing.	Droughty, depth to rock.
14 Ridgewood	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Droughty.
16: Croatan	Moderate: seepage.	Severe: piping, ponding.	Slight	Ponding, percs slowly, subsides.	Ponding, percs slowly.	Ponding	Wetness, percs slowly.
Dorovan	Moderate: seepage.	Severe: excess humus, ponding.	Severe: cutbanks cave.	Ponding, flooding, subsides.	Ponding, flooding.	Ponding	Wetness.
17 Ortega	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Deep to water	Droughty, fast intake.	Too sandy, soil blowing.	Droughty.
18 Hurricane	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Droughty.
19 Kershaw	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake.	Too sandy, soil blowing.	Droughty.
21 Lakeland	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.	Droughty.
23 Leon	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty.
25 Mandarin	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Too sandy, soil blowing, wetness.	Droughty.
26: Tooles	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: slow refill, cutbanks cave.	Percs slowly, cutbanks cave.	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty, percs slowly.

TABLE 11.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
26:							
Nutall-----------	Moderate: depth to rock.	Severe: thin layer, wetness.	Severe: slow refill, depth to rock, cutbanks cave.	Percs slowly, depth to rock.	Wetness, fast intake.	Depth to rock, wetness, soil blowing.	Wetness, depth to rock.
27:							
Moriah-----------	Severe: seepage.	Severe: piping, wetness.	Severe: cutbanks cave.	Favorable------	Wetness, droughty, fast intake.	Wetness, soil blowing.	Droughty.
Pilgrims---------	Moderate: depth to rock.	Severe: thin layer, wetness.	Severe: slow refill, depth to rock.	Percs slowly, depth to rock.	Wetness, fast intake, soil blowing.	Depth to rock, wetness, soil blowing.	Depth to rock, percs slowly.
28:							
Tooles-----------	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: slow refill, cutbanks cave.	Percs slowly, flooding, cutbanks cave.	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty, percs slowly.
Nutall-----------	Moderate: depth to rock.	Severe: thin layer, wetness.	Severe: slow refill, depth to rock, cutbanks cave.	Percs slowly, depth to rock, flooding.	Wetness, fast intake.	Depth to rock, wetness, soil blowing.	Wetness, depth to rock.
29:							
Tooles-----------	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: slow refill, cutbanks cave.	Percs slowly, cutbanks cave.	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty, percs slowly.
Nutall-----------	Moderate: depth to rock.	Severe: thin layer, ponding.	Severe: slow refill, depth to rock, cutbanks cave.	Ponding, percs slowly, depth to rock.	Ponding, droughty, fast intake.	Depth to rock, ponding, soil blowing.	Wetness, droughty, depth to rock.
Chaires----------	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: slow refill, cutbanks cave.	Ponding, cutbanks cave.	Ponding, droughty, fast intake.	Ponding, too sandy, soil blowing.	Wetness, droughty.
30---------------- Ocilla	Severe: seepage.	Severe: piping, wetness.	Severe: cutbanks cave.	Favorable------	Wetness, droughty, fast intake.	Wetness--------	Droughty.
32---------------- Plummer	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy.	Wetness, droughty.

TABLE 11.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
33----------------- Pottsburg	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty.
35----------------- Rutlege	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, cutbanks cave.	Ponding, droughty.	Too sandy, ponding.	Wetness, droughty.
36----------------- Rutlege	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, cutbanks cave.	Ponding, droughty, fast intake.	Ponding, too sandy.	Wetness, droughty.
37----------------- Sapelo	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy.	Droughty, wetness.
38----------------- Scranton	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty.
39----------------- Surrency	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, cutbanks cave.	Ponding, droughty, fast intake.	Ponding, too sandy.	Wetness, droughty, rooting depth.
44: Tooles------------	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: slow refill, cutbanks cave.	Ponding, percs slowly, cutbanks cave.	Ponding, droughty, fast intake.	Ponding, too sandy, soil blowing.	Wetness, droughty, percs slowly.
Nutall------------	Moderate: depth to rock.	Severe: thin layer, ponding.	Severe: slow refill, depth to rock, cutbanks cave.	Ponding, percs slowly, depth to rock.	Ponding, droughty, fast intake.	Depth to rock, ponding, soil blowing.	Wetness, droughty, depth to rock.
47: Otela-------------	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.	Droughty.
Alpin-------------	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, soil blowing.	Too sandy, soil blowing.	Droughty.

TABLE 11.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
48:							
Otela	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.	Droughty.
Ortega	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Deep to water	Droughty, fast intake.	Too sandy, soil blowing.	Droughty.
50:							
Udorthents.							
Quartzipsamments.							
51 Goldhead	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty.
52:							
Meggett	Moderate: seepage.	Severe: hard to pack, wetness.	Severe: slow refill.	Percs slowly, flooding.	Wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
Croatan	Severe: seepage.	Severe: piping, wetness.	Severe: slow refill.	Percs slowly, flooding, subsides.	Wetness, percs slowly, flooding.	Wetness	Wetness, percs slowly.
53. Quartzipsamments							
54 Maurepas	Severe: seepage.	Severe: excess humus, ponding.	Slight	Ponding, flooding, subsides.	Ponding, flooding.	Ponding	Wetness.

TABLE 12.--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]

Map symbol and soil name	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	
3---------------- Lutterloh	0-58	Sand-------------	SP, SP-SM	A-3	0	100	100	85-100	2-5	---	NP
	58-70	Fine sandy loam, very fine sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4, A-2-6, A-4, A-6	0	100	100	85-100	25-40	<35	NP-20
	70-80	Sandy clay loam, sandy clay, fine sandy loam.	SC, CL, CH	A-6, A-7	0	100	100	90-100	40-60	35-70	20-42
4---------------- Alpin	0-3	Sand-------------	SP-SM, SM	A-3, A-2-4	0	95-100	90-100	60-100	5-20	---	NP
	3-42	Fine sand, sand	SP-SM	A-3, A-2-4	0	95-100	90-100	60-100	5-20	---	NP
	42-80	Fine sand, sand	SP-SM, SM	A-2-4, A-3	0	95-100	90-100	60-100	9-20	---	NP
6:											
Bayvi-----------	0-26	Mucky sand-------	SM, SP-SM	A-3, A-2	0	100	100	80-100	5-20	---	NP
	26-80	Loamy sand, fine sand, sand.	SM, SP-SM	A-3, A-2-4	0	100	100	80-100	5-20	---	NP
Isles-----------	0-9	Sand-------------	SP-SM	A-3, A-2-4	0	100	100	88-95	5-12	---	NP
	9-35	Sand, fine sand, mucky fine sand.	SP-SM	A-3, A-2-4	0	100	100	88-95	5-12	---	NP
	35-51	Fine sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4, A-2-6	0	100	100	75-85	15-35	<30	NP-15
	51	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Estero----------	0-4	Muck-------------	PT	---	---	---	---	---	---	---	---
	4-14	Fine sand, sand	SP, SP-SM	A-3, A-2-4	0	100	100	85-95	2-12	---	NP
	14-34	Fine sand, sand	SP, SP-SM	A-3	0	100	100	85-95	2-5	---	NP
	34-54	Fine sand, sand	SP, SP-SM	A-3, A-2-4	0	100	100	85-95	2-12	---	NP
	54-80	Fine sand, sand	SP, SP-SM	A-3	0	100	100	80-95	2-5	---	NP
7---------------- Otela	0-58	Fine sand--------	SP-SM, SM	A-3, A-2-4	0	97-100	95-100	75-100	5-15	---	NP
	58-80	Sandy clay loam, sandy loam, loamy fine sand.	SC, SM-SC, SM	A-2-6, A-2-4	0	97-100	95-100	75-95	20-50	<40	NP-15
8---------------- Otela	0-48	Sand-------------	SP-SM, SM	A-3, A-2-4	0	97-100	95-100	75-100	5-15	---	NP
	48-80	Sandy clay loam, sandy clay, clay.	SC, CL, CH	A-6, A-7	0-5	97-100	95-100	75-100	45-95	35-65	20-39
10--------------- Chaires	0-18	Fine sand--------	SP, SP-SM	A-3	0	100	100	80-100	2-12	---	NP
	18-32	Sand, fine sand, loamy fine sand.	SP-SM, SM	A-3, A-2-4	0	100	100	85-100	5-20	---	NP
	32-80	Sandy loam, fine sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4, A-2-6	0	100	100	85-100	20-35	<40	NP-20

TABLE 12.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	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	
11--------------- Shadeville	0-7	Fine sand--------	SP-SM, SP	A-2-4, A-3	0	100	100	85-95	5-15	---	NP
	7-28	Sand, fine sand	SP-SM, SP	A-2-4, A-3	0	100	100	85-95	5-15	---	NP
	28-45	Sandy loam, fine sandy loam, sandy clay loam.	SM-SC, SC	A-6	0-3	100	100	90-100	40-50	<30	NP-15
	45	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
12:											
Shadeville------	0-5	Fine sand--------	SP, SP-SM	A-3, A-2-4	0	100	100	85-95	5-15	---	NP
	5-34	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	85-95	5-15	---	NP
	34-42	Sandy loam, fine sandy loam, sandy clay loam.	SM-SC, SC	A-6	0-3	100	100	90-100	40-50	<30	NP-15
	42	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Seaboard--------	0-6	Fine sand--------	SP-SM, SM	A-3, A-2-4	0	100	95-100	85-95	5-12	---	NP
	6-14	Sand, fine sand	SP-SM, SM	A-3, A-2-4	0	100	95-100	85-95	5-12	---	NP
	14	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
14--------------- Ridgewood	0-4	Fine sand--------	SP-SM	A-3, A-2-4	0	100	100	90-100	5-12	---	NP
	4-80	Fine sand, sand	SP-SM, SP	A-3, A-2-4	0	100	100	85-100	2-12	---	NP
16:											
Croatan---------	0-27	Muck-------------	PT	---	---	---	---	---	---	---	---
	27-35	Sandy loam, fine sandy loam, mucky sandy loam.	SM, SC, SM-SC	A-2, A-4	0	100	100	60-85	30-49	<30	NP-10
	35-53	Loam, clay loam, sandy clay loam.	CL, CL-ML, SC, SM-SC	A-4, A-6	0	100	100	75-100	36-95	18-36	4-15
	53-80	Variable---------	---	---	---	---	---	---	---	---	---
Dorovan---------	0-3	Muck-------------	PT	---	0	---	---	---	---	---	---
	3-74	Muck-------------	PT	---	0	---	---	---	---	---	---
	74-99	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
17--------------- Ortega	0-3	Sand-------------	SP, SP-SM	A-3	0	100	100	90-100	3-8	---	NP
	3-80	Fine sand, sand	SP, SP-SM	A-3	0	100	100	80-100	2-7	---	NP
18--------------- Hurricane	0-5	Sand-------------	SP, SP-SM	A-3	0	100	100	78-100	4-8	---	NP
	5-21	Sand, fine sand	SP, SP-SM	A-3	0	100	100	67-100	4-8	---	NP
	21-55	Sand, fine sand, loamy sand.	SP-SM, SM	A-3, A-2-4	0	100	100	80-100	5-15	---	NP
	55-80	Sand, fine sand	SP, SP-SM, SM	A-3, A-2-4	0	100	100	90-100	4-15	---	NP

TABLE 12.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
19--------------- Kershaw	0-80	Sand-------------	SP, SP-SM, SW	A-2, A-3	0	98-100	98-100	50-80	1-10	---	NP
21--------------- Lakeland	0-7	Sand-------------	SP-SM	A-3, A-2-4	0	90-100	90-100	60-100	5-12	---	NP
	7-80	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	90-100	90-100	50-100	1-12	---	NP
23--------------- Leon	0-18	Sand-------------	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	2-12	---	NP
	18-38	Sand, fine sand, loamy sand.	SM, SP-SM, SP	A-3, A-2-4	0	100	100	80-100	3-20	---	NP
	38-80	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	2-12	---	NP
25--------------- Mandarin	0-24	Fine sand--------	SP, SP-SM	A-3	0	100	100	90-100	2-10	---	NP
	24-32	Fine sand, sand, loamy fine sand.	SP-SM, SM	A-3, A-2-4	0	100	100	90-100	5-15	---	NP
	32-60	Fine sand, sand	SP, SP-SM	A-3	0	100	100	90-100	2-7	---	NP
	60-80	Fine sand, sand, loamy fine sand.	SP, SP-SM	A-3, A-2-4	0	100	100	90-100	3-12	---	NP
26: Tooles----------	0-26	Fine sand--------	SP-SM, SM	A-3, A-2-4	0	100	100	85-95	5-15	---	NP
	26-50	Sandy clay loam, clay loam.	SC, CL	A-6	0	100	100	85-100	27-55	25-30	11-15
	50	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Nutall----------	0-10	Fine sand--------	SP-SM, SM	A-3, A-2-4	0	100	100	85-95	5-15	---	NP
	10-37	Sandy clay loam, clay loam.	SC	A-2-6, A-6	0	100	80-85	85-95	30-45	25-30	11-15
	37	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
27: Moriah----------	0-8	Fine sand--------	SP-SM, SM	A-3, A-2-4	0	100	100	85-95	5-15	---	NP
	8-25	Sand, fine sand	SP-SM, SM	A-3, A-2-4	0	100	100	85-95	5-15	---	NP
	25-50	Sandy loam, sandy clay loam, sandy clay.	SM, SM-SC, SC	A-2-4, A-2-6, A-4, A-6	0	100	100	90-100	20-35	25-40	NP-15
	50	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Pilgrims--------	0-6	Fine sand--------	SP-SM, SM	A-3, A-2-4	0	100	95-100	85-95	5-15	---	NP
	6-9	Sand, fine sand	SP-SM, SM	A-3, A-2-4	0	100	95-100	85-95	5-15	---	NP
	9-24	Sandy clay-------	SC, CL, CH	A-6, A-7	0	100	100	95-100	36-60	40-60	25-35
	24	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

TABLE 12.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	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	
28:											
Tooles----------	0-39	Fine sand--------	SP-SM, SM	A-3, A-2-4	0	100	100	85-95	5-15	---	NP
	39-59	Sandy clay loam, clay loam.	SC, CL	A-6	0	100	100	85-95	36-55	25-30	11-15
	59	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Nutall----------	0-17	Fine sand--------	SP-SM, SM	A-3, A-2-4	0	100	100	85-95	5-15	---	NP
	17-26	Sandy clay loam, clay loam.	SC	A-2-6, A-6	0	100	80-85	85-95	30-45	25-30	11-15
	26	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
29:											
Tooles----------	0-31	Fine sand--------	SP-SM, SM	A-3, A-2-4	0	100	100	85-95	5-15	---	NP
	31-57	Sandy clay loam, clay loam.	SC, CL	A-6	0	100	100	85-95	36-55	25-30	11-15
	57	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Nutall----------	0-16	Fine sand--------	SP-SM, SM	A-3, A-2-4	0	100	100	85-95	5-15	---	NP
	16-39	Sandy clay loam, sandy clay.	SC	A-2-6, A-6	0	100	100	85-95	30-45	25-30	11-15
	39	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Chaires---------	0-17	Fine sand--------	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	2-12	---	NP
	17-33	Sand, fine sand, loamy fine sand.	SP-SM, SM	A-3, A-2-4	0	100	100	85-100	5-20	---	NP
	33-56	Sandy loam, fine sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4, A-2-6	0	100	100	85-100	20-35	<40	NP-20
	56-80	Sandy clay loam, sandy clay.	SC	A-2-6, A-2-7, A-6, A-7	0	100	100	85-100	25-50	25-50	11-30
30--------------- Ocilla	0-32	Sand-------------	SM, SP-SM	A-2, A-3	0	100	95-100	70-100	8-35	---	NP
	32-80	Sandy loam, sandy clay loam, fine sandy loam.	SM, CL, SC, ML	A-2, A-4, A-6	0	100	95-100	80-100	20-55	20-40	NP-18
32--------------- Plummer	0-43	Fine sand--------	SM, SP-SM	A-2-4, A-3	0	100	100	75-90	5-20	---	NP
	43-80	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
33--------------- Pottsburg	0-52	Sand-------------	SP-SM, SM	A-3, A-2-4	0	100	100	90-100	5-18	---	NP
	52-80	Sand, fine sand	SP-SM, SP, SM	A-3, A-2-4	0	100	100	90-100	4-18	---	NP
35--------------- Rutlege	0-24	Sand-------------	SP-SM, SM	A-2, A-3	0	95-100	95-100	70-100	5-10	---	NP
	24-72	Sand, loamy sand, loamy fine sand.	SP-SM, SP-SM	A-2, A-3	0	95-100	95-100	50-80	2-25	<20	NP

TABLE 12.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	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	
36----------------- Rutlege	0-14	Sand---------------	SP-SM	A-3	0	95-100	95-100	70-100	5-10	---	NP
	14-72	Sand, loamy sand, loamy fine sand.	SP-SM, SP, SM	A-2, A-3	0	95-100	95-100	50-80	2-25	<20	NP
37----------------- Sapelo	0-12	Sand---------------	SM, SP, SP-SM	A-2, A-3	0	100	100	85-100	4-20	---	NP
	12-15	Fine sand, sand, loamy fine sand.	SM, SP-SM	A-2, A-3	0	100	100	80-100	8-20	---	NP
	15-45	Fine sand, sand	SM, SP, SP-SM	A-2, A-3	0	100	100	75-100	4-20	---	NP
	45-80	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----------------- Scranton	0-7	Sand---------------	SP-SM, SM	A-2, A-3, A-1	0	100	95-100	40-90	5-20	---	NP
	7-61	Loamy sand, sand, fine sand.	SP-SM, SM	A-2, A-3, A-1	0	100	95-100	40-90	5-25	---	NP
	61-80	Sand, fine sand	SP-SM, SM, SP	A-2, A-3, A-1	0	100	95-100	40-90	1-15	---	NP
39----------------- Surrency	0-3	Mucky fine sand	SP-SM, SM, SM-SC	A-3, A-2-4	0	100	95-100	50-100	5-20	<20	NP-5
	3-39	Loamy sand, sand, fine sand.	SP-SM, SM	A-2-4	0	100	95-100	50-100	10-26	---	NP
	39-80	Sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2	0	100	95-100	75-100	22-35	<30	NP-10
44:											
Tooles------------	0-38	Fine sand----------	SP-SM, SM	A-3, A-2-4	0	100	100	85-95	5-15	---	NP
	38-56	Sandy clay loam, clay loam.	SC, CL	A-6	0	100	100	85-95	36-55	25-30	11-15
	56	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Nutall------------	0-18	Fine sand----------	SP-SM, SM	A-3, A-2-4	0	100	100	85-95	5-15	---	NP
	18-33	Sandy clay loam, sandy clay.	SC	A-2-6, A-6	0	100	100	85-95	30-45	25-30	11-15
	33	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
47:											
Otela-------------	0-67	Fine sand----------	SP-SM, SM	A-3, A-2-4	0	97-100	95-100	75-100	5-15	---	NP
	67-80	Sandy clay loam, sandy loam, loamy fine sand.	SC, SM-SC, SM	A-2-6, A-2-4	0	97-100	95-100	75-100	20-50	<40	NP-15
Alpin-------------	0-7	Fine sand----------	SP-SM, SM	A-3, A-2-4	0	95-100	90-100	60-100	5-20	---	NP
	7-52	Fine sand, sand	SP-SM	A-3, A-2-4	0	95-100	90-100	60-100	5-20	---	NP
	52-80	Fine sand, sand	SP-SM, SM	A-2-4	0	95-100	90-100	60-100	11-20	---	NP

TABLE 12.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	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	
48:											
Otela-----------	0-50	Sand-------------	SP-SM, SM	A-3, A-2-4	0	97-100	95-100	75-100	5-15	---	NP
	50-63	Sandy clay loam, sandy loam, loamy fine sand.	SC, SM-SC, SM	A-2-6, A-2-4	0	97-100	95-100	75-100	20-50	<40	NP-15
	63	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Ortega----------	0-8	Sand-------------	SP, SP-SM	A-3	0	100	100	90-100	3-8	---	NP
	8-80	Fine sand, sand	SP, SP-SM	A-3	0	100	100	90-100	2-7	---	NP
50:											
Udorthents.											
Quartzipsamments											
51--------------- Goldhead	0-8	Fine sand--------	SP, SP-SM	A-3	0	100	100	90-99	2-6	---	NP
	8-27	Sand, fine sand	SP, SP-SM	A-3	0	95-100	90-100	90-99	2-10	---	NP
	27-38	Sandy loam, gravelly sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4, A-2-6	0-3	75-100	65-100	60-95	15-35	20-40	NP-25
	38-80	Variable---------	---	---	---	---	---	80-99	2-12	---	---
52:											
Meggett---------	0-18	Fine sandy loam	SM	A-2, A-4	0	100	95-100	50-85	15-55	---	NP
	18-72	Clay, sandy clay, clay loam.	CH, MH, CL	A-6, A-7	0	100	90-100	75-100	51-90	30-60	11-30
Croatan---------	0-21	Muck-------------	PT	---	---	---	---	---	---	---	---
	21-40	Sandy loam, fine sandy loam, mucky sandy loam.	SM, SC, SM-SC	A-2, A-4	0	100	100	60-85	25-49	<30	NP-10
	40-72	Loam, clay loam, sandy clay loam.	CL, SM, ML, SC	A-4, A-6	0	100	100	75-100	36-95	<36	NP-15
53.											
Quartzipsamments											
54--------------- Maurepas	0-72	Muck-------------	PT	A-8	0	---	---	---	---	---	---

TABLE 13.--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]

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm					Pct
3---------------- Lutterloh	0-58	0-5	1.45-1.55	6.0-20	0.02-0.05	4.5-6.5	<2	Low--------	0.10	5	2	<3
	58-70	15-30	1.60-1.70	0.6-2.0	0.10-0.15	4.5-6.0	<2	Low--------	0.24			
	70-80	30-55	1.60-1.70	<0.2	0.10-0.15	4.5-6.0	<2	High-------	0.32			
4---------------- Alpin	0-3	1-12	1.35-1.55	2.0-6.0	0.05-0.10	4.5-6.5	<2	Low--------	0.10	5	2	0-2
	3-42	1-7	1.40-1.55	6.0-20	0.03-0.09	4.5-6.5	<2	Low--------	0.10			
	42-80	5-8	1.45-1.65	2.0-6.0	0.06-0.09	4.5-6.5	<2	Low--------	0.10			
6:												
Bayvi------------	0-26	3-9	1.20-1.55	2.0-6.0	0.01-0.03	6.1-8.4	>4	Low--------	0.10	5	2	8-20
	26-80	3-9	1.50-1.60	6.0-20	0.01-0.03	6.1-8.4	4-16	Low--------	0.10			
Isles------------	0-9	1-2	1.35-1.45	6.0-20	0.05-0.14	5.1-7.8	8-16	Low--------	0.17	2	2	10-15
	9-35	1-2	1.35-1.45	6.0-20	0.05-0.14	5.1-7.8	8-16	Low--------	0.17			
	35-51	15-22	1.60-1.75	0.6-2.0	0.12-0.18	5.6-8.4	2-4	Low--------	0.24			
	51	---	---	---	---	---	---	-----------	----			
Estero-----------	0-4	---	0.25-0.35	6.0-20	0.20-0.35	6.6-8.4	>16	Low--------	----	2	2	---
	4-14	1-6	1.55-1.70	6.0-20	0.10-0.15	6.6-8.4	>16	Low--------	0.10			
	14-34	2-7	1.60-1.70	6.0-20	0.07-0.13	6.6-8.4	>16	Low--------	0.10			
	34-54	2-7	1.55-1.65	2.0-6.0	0.10-0.15	4.5-8.4	>16	Low--------	0.10			
	54-80	1-4	1.60-1.70	6.0-20	0.05-0.10	4.5-8.4	>16	Low--------	0.10			
7---------------- Otela	0-58	<5	1.45-1.65	6.0-20	0.05-0.10	4.5-7.3	<2	Low--------	0.10	5	1	<2
	58-80	8-32	1.55-1.75	0.6-2.0	0.06-0.15	4.5-6.5	<2	Low--------	0.23			
8---------------- Otela	0-48	<5	1.45-1.65	6.0-20	0.05-0.10	4.5-7.3	<2	Low--------	0.10	5	1	<2
	48-80	30-65	1.55-1.75	0.20-0.60	0.08-0.18	4.5-8.4	<2	Moderate	0.30			
10--------------- Chaires	0-18	<3	1.35-1.45	6.0-20	0.02-0.05	3.6-5.5	<2	Low--------	0.10	5	2	1-3
	18-32	2-13	1.45-1.60	0.6-2.0	0.05-0.10	3.6-5.5	<2	Low--------	0.20			
	32-80	15-35	1.60-1.70	0.2-0.6	0.10-0.15	4.5-7.3	<2	Low--------	0.24			
11--------------- Shadeville	0-7	2-10	1.40-1.60	2.0-6.0	0.02-0.05	5.1-6.5	<2	Low--------	0.10	3	2	.5-2
	7-28	2-10	1.45-1.65	2.0-6.0	0.02-0.05	5.1-6.5	<2	Low--------	0.10			
	28-45	15-35	1.45-1.60	0.06-0.2	0.10-0.15	6.1-8.4	<2	Low--------	0.20			
	45	---	---	---	---	---	---	-----------	----			
12:												
Shadeville-------	0-5	2-10	1.40-1.60	2.0-6.0	0.02-0.05	5.1-6.5	<2	Low--------	0.10	3	2	.5-2
	5-34	2-10	1.45-1.65	2.0-6.0	0.02-0.05	5.1-6.5	<2	Low--------	0.10			
	34-42	15-35	1.45-1.60	0.06-0.2	0.10-0.15	6.1-8.4	<2	Low--------	0.20			
	42	---	---	---	---	---	---	-----------	----			
Seaboard---------	0-6	2-3	1.20-1.40	6.0-20	0.05-0.09	5.1-8-4	<2	Low--------	0.10	1	2	.5-2
	6-14	3-5	1.50-1.60	6.0-20	0.05-0-08	5.1-8.4	<2	Low--------	0.10			
	14	---	---	---	---	---	---	-----------	----			
14--------------- Ridgewood	0-4	1-3	1.35-1.55	6.0-20	0.05-0.10	3.6-7.3	<2	Low--------	0.10	5	2	<1
	4-80	0-5	1.35-1.65	6.0-20	0.03-0.08	4.5-7.3	<2	Low--------	0.10			
16:												
Croatan----------	0-27	---	0.40-0.65	0.06-6.0	0.35-0.45	<4.5	<2	Low--------	----	---	---	25-60
	27-35	8-20	1.40-1.60	0.2-6.0	0.10-0.15	3.6-6.5	<2	Low--------	0.17			
	35-53	10-35	1.40-1.60	0.2-2.0	0.12-0.20	3.6-6.5	<2	Low--------	0.24			
	53-80	---	---	---	---	---	---	-----------	----			

TABLE 13.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Soil reaction	Salinity	Shrink- swell potential	Erosion factors K	Erosion factors T	Wind erodi- bility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm					Pct
16:												
Dorovan----------	0-3	---	0.25-0.40	0.6-2.0	0.25-0.50	3.6-4.4	<2	----------	----	---	---	>60
	3-74	---	0.35-0.55	0.6-2.0	0.25-0.50	3.6-4.4	<2	----------	----			
	74-99	5-20	1.40-1.65	6.0-20	0.05-0.08	4.5-5.5	<2	Low--------	----			
17--------------- Ortega	0-3	1-3	1.20-1.45	6.0-20	0.05-0.08	3.6-6.5	<2	Low--------	0.10	5	2	1-2
	3-80	1-3	1.35-1.60	6.0-20	0.03-0.06	3.6-6.5	<2	Low--------	0.10			
18--------------- Hurricane	0-5	1-4	1.40-1.60	>6.0	0.03-0.07	3.6-6.0	<2	Low--------	0.10	5	2	<2
	5-21	1-4	1.40-1.60	>6.0	0.03-0.07	3.6-6.0	<2	Low--------	0.10			
	21-55	2-8	1.55-1.65	2.0-6.0	0.10-0.15	3.6-6.0	<2	Low--------	0.15			
	55-80	1-4	1.40-1.60	2.0-20	0.03-0.10	3.6-6.0	<2	Low--------	0.10			
19--------------- Kershaw	0-80	<5	1.35-1.60	>20	0.02-0.05	4.5-6.0	<2	Very low	0.10	5	1	<1
21--------------- Lakeland	0-7	2-8	1.35-1.65	6.0-20	0.05-0.09	4.5-6.0	<2	Low--------	0.10	5	2	<1
	7-80	1-6	1.50-1.60	6.0-20	0.02-0.08	4.5-6.0	<2	Low--------	0.10			
23--------------- Leon	0-18	1-6	1.40-1.65	6.0-20	0.02-0.05	3.6-6.5	<2	Low--------	0.10	5	2	.5-4
	18-38	2-8	1.50-1.70	0.6-6.0	0.05-0.10	3.6-6.5	<2	Low--------	0.15			
	38-80	1-6	1.40-1.65	0.6-6.0	0.02-0.05	3.6-6.5	<2	Low--------	0.10			
25--------------- Mandarin	0-24	0-3	1.35-1.45	6.0-20	0.03-0.07	3.6-6.0	<2	Low--------	0.10	5	2	<3
	24-32	2-9	1.45-1.60	0.6-2.0	0.10-0.15	3.6-6.0	<2	Low--------	0.15			
	32-60	0-3	1.35-1.45	6.0-20	0.03-0.07	3.6-7.3	<2	Low--------	0.10			
	60-80	2-9	1.45-1.60	0.6-2.0	0.10-0.15	3.6-7.3	<2	Low--------	0.15			
26:												
Tooles-----------	0-26	2-5	1.20-1.40	6.0-20	0.05-0.10	4.5-7.3	<2	Low--------	0.10	3	2	1-4
	26-50	20-35	1.40-1.70	0.06-0.2	0.15-0.20	6.6-8.4	<2	Moderate	0.28			
	50	---	---	---	---	---	---	----------	----			
Nutall-----------	0-10	2-5	1.20-1.40	6.0-20	0.05-0.10	4.5-7.3	<2	Low--------	0.10	2	2	1-4
	10-37	20-35	1.40-1.70	0.06-0.2	0.15-0.20	6.6-8.4	<2	Moderate	0.28			
	37	---	---	---	---	---	---	----------	----			
27:												
Moriah-----------	0-8	1-5	1.35-1.50	6.0-20	0.02-0.05	3.6-5.0	<2	Low--------	0.10	3	2	.5-2
	8-25	1-3	1.45-1.55	6.0-20	0.02-0.05	3.6-5.0	<2	Low--------	0.10			
	25-50	15-35	1.60-1.70	0.6-2.0	0.07-0.12	5.6-8.4	<2	Low--------	0.20			
	50	---	---	---	---	---	---	----------	----			
Pilgrims---------	0-6	2-4	1.35-1.50	6.0-20	0.02-0.05	3.6-5.0	<2	Low--------	0.10	3	2	.5-2
	6-9	1-3	1.45-1.55	6.0-20	0.02-0.05	3.6-5.0	<2	Low--------	0.10			
	9-24	35-45	1.40-1.70	0.06-0.2	0.15-0.20	5.6-8.4	<2	Moderate	0.28			
	24	---	---	---	---	---	---	----------	----			
28:												
Tooles-----------	0-39	2-5	1.20-1.40	6.0-20	0.05-0.10	4.5-7.3	<2	Low--------	0.10	3	2	1-4
	39-59	20-35	1.40-1.70	0.06-0.2	0.15-0.20	6.1-8.4	<2	Moderate	0.28			
	59	---	---	---	---	---	---	----------	----			
Nutall-----------	0-17	2-5	1.20-1.40	6.0-20	0.05-0.10	4.5-7.3	<2	Low--------	0.10	2	2	1-4
	17-26	20-35	1.40-1.70	0.06-0.2	0.15-0.20	6.6-8.4	<2	Moderate	0.28			
	26	---	---	---	---	---	---	----------	----			
29:												
Tooles-----------	0-31	2-5	1.20-1.40	6.0-20	0.05-0.10	4.5-7.3	<2	Low--------	0.10	3	2	1-4
	31-57	20-35	1.40-1.70	0.06-0.2	0.15-0.20	6.6-8.4	<2	Moderate	0.28			
	57	---	---	---	---	---	---	----------	----			

TABLE 13.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Soil reaction	Salinity	Shrink- swell potential	Erosion factors K	Erosion factors T	Wind erodi- bility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm					Pct
29:												
Nutall----------	0-16	2-5	1.20-1.40	6.0-20	0.05-0.10	4.5-7.3	<2	Low-------	0.10	2	1	.5-1
	16-39	20-35	1.40-1.70	0.06-0.2	0.15-0.20	6.6-8.4	<2	Moderate	0.24			
	39	---	---	---	---	---	---	----------	----			
Chaires---------	0-17	0-3	1.35-1.45	6.0-20	0.02-0.05	3.6-5.5	<2	Low-------	0.10	5	1	1-3
	17-33	2-13	1.45-1.60	0.6-2.0	0.05-0.10	3.6-5.5	<2	Low-------	0.20			
	33-56	15-35	1.60-1.70	0.2-0.6	0.10-0.15	4.5-7.3	<2	Low-------	0.37			
	56-80	20-40	1.60-1.70	0.06-0.2	0.12-0.17	4.5-7.3	<2	Moderate	0.32			
30--------------- Ocilla	0-32	3-10	1.45-1.65	2.0-20	0.05-0.07	4.5-5.5	<2	Low-------	0.10	5	2	1-2
	32-80	15-35	1.55-1.70	0.6-2.0	0.09-0.12	4.5-5.5	<2	Low-------	0.24			
32--------------- Plummer	0-43	1-7	1.35-1.65	2.0-20	0.03-0.08	3.6-5.5	<2	Low-------	0.10	5	---	1-3
	43-80	15-30	1.50-1.70	0.6-2.0	0.07-0.15	3.6-5.5	<2	Low-------	0.15			
33--------------- Pottsburg	0-52	0-5	1.20-1.70	6.0-20	0.03-0.10	3.6-6.5	<2	Low-------	0.10	5	2	<3
	52-80	1-6	1.30-1.70	0.6-2.0	0.10-0.25	3.6-6.0	<2	Low-------	0.15			
35--------------- Rutlege	0-24	2-10	1.30-1.50	6.0-20	0.04-0.06	3.6-5.5	<2	Low-------	0.10	5	---	3-9
	24-72	2-10	1.40-1.60	6.0-20	0.04-0.08	3.6-5.5	<2	Low-------	0.17			
36--------------- Rutlege	0-14	2-10	1.30-1.50	6.0-20	0.05-0.10	3.6-5.5	<2	Low-------	0.10	5	8	3-9
	14-72	2-10	1.50-1.70	6.0-20	0.04-0.08	3.6-5.5	<2	Low-------	0.17			
37--------------- Sapelo	0-12	2-5	1.40-1.65	6.0-20	0.03-0.07	3.6-5.5	<2	Low-------	0.10	5	---	1-3
	12-15	3-7	1.35-1.60	0.6-2.0	0.10-0.15	3.6-5.5	<2	Low-------	0.15			
	15-45	3-6	1.50-1.70	6.0-20	0.03-0.07	3.6-5.5	<2	Low-------	0.17			
	45-80	10-30	1.55-1.75	0.6-2.0	0.12-0.17	3.6-5.5	<2	Low-------	0.24			
38--------------- Scranton	0-7	2-8	1.30-1.60	6.0-20	0.05-0.10	4.5-6.5	<2	Low-------	0.10	5	1	1-4
	7-61	3-12	1.40-1.60	6.0-20	0.05-0.11	4.5-6.0	<2	Low-------	0.10			
	61-80	2-10	1.40-1.60	6.0-20	0.04-0.08	4.5-6.0	<2	Low-------	0.10			
39--------------- Surrency	0-3	2-8	0.80-1.25	6.0-20	0.15-0.30	3.6-5.5	<2	Low-------	0.10	5	---	10-20
	3-39	<10	1.50-1.65	2.0-20	0.05-0.10	3.6-5.5	<2	Low-------	0.10			
	39-80	10-23	1.60-1.85	0.6-6.0	0.06-0.10	3.6-5.5	<2	Low-------	0.15			
44:												
Tooles----------	0-38	2-5	1.20-1.40	6.0-20	0.05-0.10	4.5-7.3	<2	Low-------	0.10	3	2	1-4
	38-56	20-35	1.40-1.70	0.06-0.2	0.15-0.20	6.6-8.4	<2	Moderate	0.28			
	56	---	---	---	---	---	---	----------	----			
Nutall----------	0-18	2-5	1.20-1.40	6.0-20	0.05-0.10	4.5-7.3	<2	Low-------	0.10	2	1	.5-1
	18-33	20-35	1.40-1.70	0.06-0.2	0.15-0.20	6.6-8.4	<2	Moderate	0.24			
	33	---	---	---	---	---	---	----------	----			
47:												
Otela-----------	0-67	<5	1.45-1.65	6.0-20	0.05-0.10	4.5-7.3	<2	Low-------	0.10	5	1	<2
	67-80	8-32	1.55-1.75	0.2-0.6	0.06-0.15	4.5-6.5	<2	Low-------	0.23			
Alpin-----------	0-7	1-12	1.35-1.55	2.0-6.0	0.05-0.10	4.5-6.5	<2	Low-------	0.10	5	2	0-2
	7-52	1-7	1.40-1.55	6.0-20	0.03-0.09	4.5-6.5	<2	Low-------	0.10			
	52-80	5-8	1.45-1.65	2.0-6.0	0.06-0.09	4.5-6.5	<2	Low-------	0.10			
48:												
Otela-----------	0-50	<5	1.45-1.65	6.0-20	0.05-0.10	4.5-7.3	<2	Low-------	0.10	5	1	<2
	50-63	8-32	1.55-1.75	0.6-2.0	0.06-0.15	4.5-6.5	<2	Low-------	0.23			
	63	---	---	---	---	---	---	----------				

TABLE 13.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Soil reaction	Salinity	Shrink- swell potential	Erosion factors K	Erosion factors T	Wind erodi- bility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm					Pct
48:												
Ortega----------	0-8	1-3	1.20-1.45	6.0-20	0.05-0.08	3.6-6.5	<2	Low--------	0.10	5	2	1-2
	8-80	1-3	1.35-1.60	6.0-20	0.03-0.06	3.6-6.5	<2	Low--------	0.10			
50:												
Udorthents.												
Quartzipsamments												
51----------------	0-8	1-5	1.30-1.50	6.0-20	0.05-0.15	4.5-7.8	<2	Low--------	0.10	5	2	1-4
Goldhead	8-27	1-5	1.35-1.50	6.0-20	0.02-0.05	4.5-7.8	<2	Low--------	0.10			
	27-38	13-34	1.45-1.65	0.6-2.0	0.10-0.20	4.5-8.4	<2	Low--------	0.24			
	38-80	---	---	---	---	---	---	-----------	----			
52:												
Meggett---------	0-18	5-20	1.20-1.40	2.0-6.0	0.10-0.15	4.5-6.5	<2	Low--------	0.24	5	---	2-8
	18-72	30-60	1.45-1.60	0.06-0.2	0.13-0.18	5.1-8.4	<2	High-------	0.32			
Croatan---------	0-21	---	0.40-0.65	0.06-6.0	0.35-0.45	<4.5	<2	Low--------	----	---	---	25-60
	21-40	8-20	1.40-1.60	0.2-6.0	0.10-0.15	3.6-6.5	<2	Low--------	----			
	40-72	10-35	1.40-1.60	0.2-2.0	0.12-0.20	3.6-6.5	<2	Low--------	----			
53.												
Quartzipsamments												
54----------------	0-72	---	0.05-0.25	>2.0	0.20-0.50	5.6-8.4	<4	Low--------	----	---	---	---
Maurepas												

TABLE 14.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "rare," "frequent," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated]

Map symbol and soil name	Hydrologic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hardness	Subsidence: Initial	Subsidence: Total	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In		In	In		
3. Lutterloh	C	None	---	---	1.5-3.5	Apparent	Dec-Mar	>60	---	---	---	High	Moderate.
4. Alpin	A	None	---	---	>6.0	---	---	>60	---	---	---	Low	High.
6:													
Bayvi	D	Frequent	Very long	Jan-Dec	0-1.0	Apparent	Jan-Dec	>60	---	---	---	High	High.
Isles	D	Frequent	Very long	Jan-Dec	0-1.0	Apparent	Jan-Dec	42-72	Soft	---	---	High	High.
Estero	D	Frequent	Very long	Jan-Dec	0-1.0	Apparent	Jan-Dec	>60	---	---	---	High	High.
7, 8. Otela	A	None	---	---	3.5-6.0	Perched	Jul-Oct	>60	---	---	---	Low	Low.
10. Chaires	B/D	None	---	---	0-1.0	Apparent	Nov-Apr	>60	---	---	---	High	High.
11. Shadeville	B	None	---	---	3.5-5.0	---	---	40-60	Soft	---	---	Low	Moderate.
12:													
Shadeville	B	None	---	---	3.5-5.0	Apparent	Feb-Jun	40-60	Soft	---	---	Low	Moderate.
Seaboard	B	None	---	---	3.5-5.0	Apparent	Feb-Jun	6-20	Soft	---	---	High	High.
14. Ridgewood	C	None	---	---	2.0-3.5	Apparent	Jun-Nov	>60	---	---	---	Low	High.
16:													
Croatan	D	None	---	---	+1-1.0	Apparent	Nov-Jul	>60	---	4-10	18-24	High	High.
Dorovan	D	None	---	---	+1-0.5	Apparent	Jan-Dec	>60	---	4-12	51-80	High	High.
17. Ortega	A	None	---	---	3.5-5.0	Apparent	Jun-Jan	>60	---	---	---	Low	High.
18. Hurricane	C	None	---	---	2.0-3.5	Apparent	Nov-Apr	>60	---	---	---	Low	Moderate.
19. Kershaw	A	None	---	---	>6.0	---	---	>60	---	---	---	Low	High.

TABLE 14.--SOIL AND WATER FEATURES--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table			Bedrock		Subsidence		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Initial	Total	Uncoated steel	Concrete
					Ft			In		In	In		
21----------------- Lakeland	A	None---------	---	---	>6.0	---	---	>60	---	---	---	Low-------	Moderate.
23----------------- Leon	B/D	None---------	---	---	0-1.0	Apparent	Jun-Feb	>60	---	---	---	High------	High.
25----------------- Mandarin	C	None---------	---	---	1.5-3.5	Apparent	Jun-Dec	>60	---	---	---	Moderate	High.
26:													
Tooles------------	D	None---------	---	---	0-1.0	Apparent	Feb-Sep	40-60	Soft	---	---	High------	Moderate.
Nutall------------	D	None---------	---	---	0-1.0	Apparent	Feb-Sep	20-40	Soft	---	---	High------	Moderate.
27:													
Moriah------------	B	None---------	---	---	1.5-3.0	Apparent	Feb-Jun	40-60	Soft	---	---	High------	High.
Pilgrims----------	B	None---------	---	---	1.5-3.0	Apparent	Feb-Jun	20-40	Soft	---	---	High------	High.
28:													
Tooles------------	D	Frequent-----	Long-------	Feb-May	0-1.0	Apparent	Nov-May	40-60	Soft	---	---	High------	Moderate.
Nutall------------	D	Frequent-----	Long-------	Feb-May	0-1.0	Apparent	Feb-Sep	20-40	Soft	---	---	High------	Moderate.
29:													
Tooles------------	D	None---------	---	---	0-1.0	Apparent	Feb-Sep	40-60	Soft	---	---	High------	Moderate.
Nutall------------	D	None---------	---	---	+4-1.0	Apparent	Nov-May	20-40	Soft	---	---	High------	Moderate.
Chaires-----------	D	None---------	---	---	+2-1.0	Apparent	Nov-Apr	>60	---	---	---	High------	High.
30----------------- Ocilla	C	None---------	---	---	1.0-2.5	Apparent	Dec-Apr	>60	---	---	---	High------	Moderate.
32----------------- Plummer	B/D	Rare---------	---	---	0-1.5	Apparent	Dec-Jul	>60	---	---	---	Moderate	High.
33----------------- Pottsburg	B/D	None---------	---	---	0-1.0	Apparent	Jul-Mar	>60	---	---	---	High------	High.
35----------------- Rutlege	B/D	None---------	---	---	+2-1.0	Apparent	Dec-May	>60	---	---	---	High------	High.
36----------------- Rutlege	B/D	Frequent-----	---	---	+1.-1.0	Apparent	Dec-May	>60	---	---	---	High------	High.

TABLE 14.--SOIL AND WATER FEATURES--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table			Bedrock		Subsidence		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Initial	Total	Uncoated steel	Concrete
					Ft			In		In	In		
37: Sapelo	D	None	---	---	0.5-1.5	Apparent	Nov-Apr	>60	---	---	---	High	High.
38: Scranton	A/D	None	---	---	0.5-1.5	Apparent	Nov-Apr	>60	---	---	---	Low	High.
39: Surrency	D	None	---	---	+1-0.5	Apparent	Jan-Dec	>60	---	---	---	High	High.
44:													
Tooles	D	None	---	---	+2-1.0	Apparent	Jun-Mar	40-60	Soft	---	---	High	Moderate.
Nutall	D	None	---	---	+4-1.0	Apparent	Nov-May	20-40	Soft	---	---	High	Moderate.
47:													
Otela	A	None	---	---	3.5-6.0	Perched	Jul-Oct	>60	---	---	---	Low	Low.
Alpin	A	None	---	---	>6.0	---	---	>60	---	---	---	Low	High.
48:													
Otela	A	None	---	---	3.5-6.0	Perched	Jul-Oct	>60	---	---	---	Low	Low.
Ortega	A	None	---	---	3.5-5.0	Apparent	Jun-Jan	>60	---	---	---	Low	High.
50:													
Udorthents.													
Quartzipsamments.													
51: Goldhead	B/D	None	---	---	0-1.0	Apparent	Jul-Mar	>60	---	---	---	High	Moderate.
52:													
Meggett	D	Frequent	Long	Dec-Apr	0-1.0	Apparent	Nov-Apr	>60	---	---	---	High	Moderate.
Croatan	D	Frequent	Very long	Jan-Dec	0-1.0	Apparent	Dec-May	>60	---	4-10	18-24	High	High.
53. Quartzipsamments													
54: Maurepas	D	Frequent	Brief to very long.	Jan-Dec	+1-0.5	Apparent	Jan-Dec	>60	---	15-30	>51	High	Moderate.

TABLE 15.--PHYSICAL ANALYSES OF SELECTED SOILS

Soil name and sample number	Depth	Horizon	Particle-size distribution: Very coarse (2-1 mm)	Coarse (1-0.5 mm)	Medium (0.5-0.25 mm)	Fine (0.25-0.1 mm)	Very fine (0.1-0.05 mm)	Total (2-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm)	Hydraulic conductivity	Bulk density (field moist)	Water content: 1/10 bar	1/3 bar	15 bar
	Cm		Pct								Cm/hr	g/cm	Pct (wt)		
Alpin sand:															
S65-12-1	0-8	Ap	1.3	17.0	34.7	28.0	14.1	95.1	3.1	1.8	25.0	1.48	8.2	5.2	1.3
-2	8-79	E1	2.0	15.1	30.8	30.4	16.1	94.4	3.8	1.8	22.4	1.62	5.3	3.1	0.7
-3	79-107	E2	2.8	14.6	30.7	31.0	15.2	94.3	3.8	1.9	19.1	1.62	5.9	3.4	0.9
-4	107-155	E/Bt1	2.6	17.0	30.2	29.8	16.2	95.8	3.1	1.1	19.7	1.70	5.0	2.5	0.4
-5	155-203	E/Bt2	2.5	15.5	29.9	31.3	16.5	95.7	3.2	1.1	30.9	1.60	4.2	2.2	0.4
Hurricane sand:															
S65-16-1	0-13	Ap	3.9	22.6	46.7	17.5	2.3	93.0	5.4	1.6	115.0	1.39	6.6	4.8	1.4
-2	13-53	E1	2.4	20.9	47.2	20.0	2.8	93.3	4.3	2.4	85.5	1.58	4.7	3.5	0.9
-3	55-81	E2	3.7	20.8	45.0	20.7	3.0	93.2	4.6	2.2	67.1	1.62	4.5	3.3	0.8
-4	81-140	E3	3.9	19.5	44.2	22.8	3.0	93.4	4.7	1.9	38.8	1.66	4.3	3.0	0.7
-5	140-203	Bh	3.2	17.4	49.9	24.5	1.7	96.7	2.1	1.2	51.9	1.64	2.9	2.3	0.3
Lutterloh fine sand:															
S65-13-1	0-18	Ap	0.0	1.1	7.8	60.7	26.1	95.7	3.3	1.0	17.4	1.37	9.6	5.1	1.6
-2	18-56	E1	0.0	1.0	7.4	60.4	26.2	95.0	4.1	0.9	17.7	1.57	8.2	3.4	0.4
-3	56-79	E2	0.0	1.1	7.4	61.1	26.2	95.8	3.2	1.0	19.7	1.55	7.4	2.7	0.4
-4	79-147	E3	0.0	1.1	7.0	61.7	26.9	96.7	2.5	0.8	14.5	1.58	6.7	2.6	0.2
-5	147-178	Btg1	0.0	0.9	6.0	53.4	23.1	83.4	3.1	13.5	1.1	1.69	16.9	9.4	4.0
-6	178-203	Btg2	0.0	0.8	5.5	42.6	26.2	75.1	5.0	19.9	0.1	1.67	22.8	19.8	9.4
Moriah sand:															
S65-4-1	0-20	Ap	0.1	1.6	7.2	59.1	26.9	94.9	4.1	1.0	10.5	1.42	11.9	5.6	0.9
-2	20-33	E1	0.1	1.6	6.6	55.3	30.2	93.8	4.0	2.2	17.4	1.48	10.2	4.8	0.8
-3	33-64	E2	0.1	1.8	7.1	56.6	29.5	95.1	3.9	1.0	19.7	1.47	7.9	3.4	0.4
-4	64-127	Bt	0.1	1.3	5.7	44.1	28.7	79.9	4.5	15.6	0.6	1.53	21.4	15.7	6.2
Nutall fine sand:															
S65-6-1	0-13	Ap	0.2	1.5	7.2	44.9	34.6	88.4	5.9	5.7	3.4	1.35	18.7	12.0	2.8
-2	13-25	E	0.2	1.6	7.9	50.4	31.7	91.8	6.0	2.2	4.0	1.58	9.7	4.5	0.8
-3	25-51	Bt	0.2	1.5	5.3	31.4	23.2	61.6	9.9	28.5	2.1	1.41	31.5	29.4	12.2
-4	51-94	Btg	0.8	2.3	5.6	29.2	24.1	62.0	12.0	26.0	0.0	1.48	29.6	27.6	11.8
Ortega fine sand:															
S65-7-1	0-18	Ap	0.0	1.1	10.4	59.2	25.5	96.2	2.5	1.3	14.6	1.41	11.0	5.2	0.9
-2	18-58	C1	0.0	0.9	9.9	70.0	14.5	95.3	3.4	1.3	16.4	1.53	7.1	3.0	0.4
-3	58-89	C2	0.0	1.0	10.0	68.9	16.2	96.1	2.6	1.3	23.7	1.46	6.2	2.8	0.4
-4	89-135	C3	0.0	1.0	10.1	73.9	11.1	96.1	3.0	0.9	21.7	1.51	5.4	2.3	0.2
-5	135-203	C4	0.0	1.0	9.3	73.5	13.1	96.9	2.3	0.8	19.7	1.51	5.1	1.9	0.1

TABLE 15.--PHYSICAL ANALYSES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Particle-size distribution: Very coarse (2-1 mm)	Coarse (1-0.5 mm)	Medium (0.5-0.25 mm)	Fine (0.25-0.1 mm)	Very fine (0.1-0.05 mm)	Total (2-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm)	Hydraulic conductivity	Bulk density (field moist)	Water content: 1/10 bar	1/3 bar	15 bar
	Cm		Pct								Cm/hr	g/cm	Pct (wt)		
Ortega sand:															
S65-17-1	0-8	A	0.6	11.9	36.4	46.6	3.9	99.4	0.3	0.3	45.4	1.46	6.3	4.4	1.1
-2	8-36	C1	0.9	11.0	32.5	47.4	4.2	96.0	2.6	1.5	57.2	1.53	3.5	2.2	0.6
-3	36-124	C2	1.2	9.9	28.9	51.4	5.4	96.8	1.8	1.4	57.2	1.62	3.3	2.0	0.5
-4	124-150	C3	1.4	9.8	27.8	52.9	4.6	96.4	2.5	1.1	55.9	1.61	2.8	1.6	0.3
-5	150-180	C4	1.6	10.7	28.6	52.4	4.9	98.2	1.0	0.8	53.2	1.58	2.7	1.5	0.3
-6	180-203	C5	2.3	13.8	33.9	45.9	2.7	98.6	0.9	0.5	55.2	1.60	2.2	1.3	0.3
Otela fine sand:															
S65-11-1	0-18	Ap	0.6	5.8	18.7	43.6	27.3	96.0	2.7	1.3	7.7	1.60	8.4	4.2	0.9
-2	18-76	E1	0.6	5.1	17.5	45.3	27.5	96.0	2.6	1.4	11.8	1.58	6.9	3.0	0.4
-3	76-112	E2	1.1	5.6	17.2	43.2	29.4	96.5	2.5	1.0	15.8	1.63	6.2	2.3	0.2
-4	112-147	E3	1.6	8.0	19.7	39.7	29.0	98.0	1.2	0.8	17.7	1.65	5.0	2.2	0.4
-5	147-157	EB	1.4	12.8	32.0	20.1	16.6	82.9	2.6	14.5	0.9	1.72	11.9	8.9	4.4
-6	157-203	2Btg	1.0	6.6	17.6	17.0	14.1	56.3	8.2	35.5	0.6	1.24	36.2	32.2	19.0
Otela fine sand:															
S65-14-1	0-18	Ap	0.0	1.7	9.7	56.4	27.4	95.2	3.6	1.2	21.7	1.38	9.5	5.4	2.1
-2	18-58	E1	0.1	1.9	10.0	55.3	27.1	94.4	4.3	1.3	18.1	1.51	6.7	3.0	0.6
-3	58-99	E2	0.1	2.1	10.0	56.3	27.2	95.7	3.3	1.0	19.7	1.42	5.8	2.2	0.2
-4	99-147	E3	0.2	2.1	10.3	58.6	25.3	96.5	2.9	0.6	18.1	1.47	5.4	1.7	0.1
-5	147-170	Bt	0.1	2.0	10.2	51.4	19.9	83.6	3.9	12.5	0.4	1.74	12.9	9.1	4.1
-6	170-203	Btg	0.1	1.8	8.8	51.7	16.4	78.8	6.3	14.9	0.3	1.75	13.7	8.4	3.8
Pilgrims fine sand:															
S65-5-1	0-15	Ap	0.1	1.8	12.4	52.9	25.3	92.5	5.6	1.9	4.1	1.53	11.2	6.2	0.8
-2	15-23	E	0.1	1.9	12.4	51.9	26.4	92.7	4.9	2.4	4.8	1.63	10.1	5.3	0.6
-3	23-61	Bt	0.0	0.6	3.8	24.0	22.4	50.8	10.2	39.0	1.3	1.12	50.8	47.8	21.2
Ridgewood fine sand:															
S65-18-1	0-10	Ap	1.1	8.2	21.2	59.0	6.9	96.4	2.0	1.6	40.8	1.43	6.1	3.8	1.3
-2	10-61	C1	1.6	9.1	22.0	57.6	5.6	95.9	2.5	1.6	43.4	1.54	4.3	2.6	0.7
-3	61-94	C2	2.0	9.2	21.6	57.9	5.6	96.3	2.4	1.3	35.5	1.58	3.2	1.7	0.4
-4	94-157	C3	1.8	8.0	19.0	61.7	6.5	97.0	2.1	0.9	19.7	1.74	9.3	1.8	0.3
-5	157-203	C4	2.6	12.6	22.1	55.8	5.2	98.3	1.2	0.5	33.5	1.75	10.9	1.3	0.2
Shadeville fine sand:															
S65-8-1	0-18	Ap	0.4	2.0	24.7	56.0	5.0	89.0	9.9	1.1	9.9	1.50	8.9	4.5	0.7
-2	18-71	E	0.4	2.0	7.2	74.4	10.1	94.1	5.0	0.9	12.8	1.57	6.4	3.2	0.2
-3	71-114	Bt	0.8	2.0	6.6	49.4	11.6	70.4	8.4	21.2	0.2	1.52	24.1	21.2	9.7

TABLE 15.--PHYSICAL ANALYSES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Particle-size distribution: Very coarse (2-1 mm)	Coarse (1-0.5 mm)	Medium (0.5-0.25 mm)	Fine (0.25-0.1 mm)	Very fine (0.1-0.05 mm)	Total (2-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm)	Hydraulic conductivity	Bulk density (field moist)	Water content: 1/10 bar	1/3 bar	15 bar
	Cm		Pct								Cm/hr	g/cm	Pct (wt)		
Tooles fine sand:															
S65-3-1	0-15	Ap	0.0	1.0	7.0	58.0	25.8	91.8	5.6	2.6	20.4	1.21	28.4	19.4	2.2
-2	15-36	E1	0.2	1.5	7.1	67.5	20.5	96.8	2.1	1.1	11.5	1.56	7.8	3.4	0.3
-3	36-66	E2	0.1	1.3	6.9	63.0	25.2	96.5	2.5	1.0	9.9	1.57	7.2	3.2	0.2
-4	66-127	Btg	0.0	1.1	6.4	51.0	20.0	78.5	4.4	17.1	0.3	1.50	27.0	23.8	8.1

TABLE 16.--CHEMICAL ANALYSES OF SELECTED SOILS

[Absence of an entry indicates that data were not available]

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)	Pyrophosphate extractable: C	Fe	Al	Citrate-dithionite extractable: Fe	Al
	Cm		Milliequivalents/100 grams of soil							Pct	Pct	Mmhos/cm				Pct	Pct	Pct	Pct	Pct
Alpin sand:																				
S65-12-1	0-8	Ap	0.60	0.15	0.10	0.03	0.88	3.25	4.13	21	1.25	0.01	5.6	4.6	4.2	---	---	---	---	---
-2	8-79	E1	0.06	0.04	0.06	0.00	0.16	0.90	1.06	15	0.27	0.01	5.4	4.7	4.6	---	---	---	---	---
-3	79-107	E2	0.06	0.05	0.07	0.01	0.19	1.08	1.27	15	0.15	0.01	5.3	4.6	4.7	---	---	---	---	---
-4	107-155	E/Bt1	0.09	0.07	0.07	0.00	0.23	0.14	0.37	62	0.15	0.01	5.5	4.9	4.8	---	---	---	---	---
-5	155-203	E/Bt2	0.05	0.06	0.05	0.00	0.16	0.25	0.41	39	0.07	0.01	5.5	4.5	4.9	---	---	---	---	---
Hurricane sand:																				
S65-16-1	0-13	Ap	0.08	0.05	0.09	0.02	0.24	2.49	2.73	9	0.98	0.01	4.9	4.7	4.3	---	---	---	---	---
-2	13-53	E1	0.08	0.05	0.07	0.01	0.21	1.68	1.89	11	0.33	0.01	5.1	4.8	4.7	---	---	---	---	---
-3	53-81	E2	0.07	0.05	0.07	0.00	0.19	1.14	1.33	14	0.14	0.01	5.1	4.7	4.7	---	---	---	---	---
-4	81-140	E3	0.04	0.03	0.06	0.00	0.13	0.27	0.40	33	0.17	0.01	5.0	4.7	4.7	---	---	---	---	---
-5	140-203	Bh	0.01	0.02	0.05	0.00	0.08	1.16	1.24	6	0.20	0.01	4.6	4.8	4.8	0.30	0.01	0.08	0.12	0.06
Lutterloh fine sand:																				
S65-13-1	0-18	Ap	0.18	0.07	0.08	0.02	0.35	4.00	4.35	8	0.84	0.01	5.0	4.4	4.2	---	---	---	---	---
-2	18-56	E1	0.04	0.01	0.07	0.00	0.12	1.00	1.12	11	0.37	0.01	5.2	4.9	4.7	---	---	---	---	---
-3	56-79	E2	0.04	0.01	0.08	0.00	0.13	1.03	1.16	11	0.32	0.01	5.3	5.1	4.8	---	---	---	---	---
-4	79-147	E3	0.06	0.04	0.06	0.00	0.16	0.43	0.59	27	0.06	0.01	5.4	5.2	5.0	---	---	---	---	---
-5	147-178	Btg1	1.95	0.26	0.10	0.08	2.39	3.51	5.90	41	0.17	0.01	5.2	4.4	4.2	---	---	---	0.92	0.12
-6	178-203	Btg2	7.90	0.58	0.15	0.17	8.80	5.00	13.80	64	0.04	0.01	5.2	4.4	4.1	---	---	---	0.20	0.06
Moriah fine sand:																				
S65-4-1	0-20	Ap	0.11	0.04	0.06	0.01	0.22	3.58	3.80	6	0.59	0.01	4.2	3.8	3.5	---	---	---	---	---
-2	20-33	E1	0.10	0.02	0.06	0.01	0.19	4.39	4.58	4	0.38	0.00	4.7	4.6	4.6	---	---	---	---	---
-3	33-64	E2	0.05	0.02	0.04	0.00	0.11	1.74	1.85	6	0.13	0.00	4.8	4.8	4.9	---	---	---	---	---
-4	64-127	Bt	9.00	0.62	0.15	0.11	9.88	4.58	14.46	68	0.17	0.00	6.0	5.9	5.7	---	---	---	0.41	0.12
Nutall fine sand:																				
S65-6-1	0-13	Ap	9.00	0.30	0.17	0.04	9.51	3.90	13.41	71	1.57	0.00	5.7	5.6	5.5	---	---	---	---	---
-2	13-25	E	4.77	0.06	0.04	0.01	4.88	0.35	5.23	93	0.29	0.00	6.3	6.1	6.1	---	---	---	---	---
-3	25-51	Bt	43.25	0.62	0.18	0.17	44.22	5.31	49.53	89	0.34	0.00	7.7	7.0	6.8	---	---	---	0.63	0.20
-4	51-94	Btg	47.50	0.74	0.17	0.13	48.54	5.04	53.58	91	0.26	0.07	7.6	7.3	7.1	---	---	---	0.41	0.16
Ortega fine sand:																				
S65-7-1	0-18	Ap	0.56	0.07	0.04	0.02	0.69	3.83	4.52	15	0.99	0.03	4.7	4.3	3.9	---	---	---	---	---
-2	18-58	C1	0.06	0.02	0.03	0.01	0.12	1.14	1.26	10	0.26	0.01	4.9	4.7	4.6	---	---	---	---	---
-3	58-89	C2	0.25	0.03	0.02	0.00	0.30	0.57	0.87	34	0.13	0.00	5.7	5.4	5.1	---	---	---	---	---
-4	89-135	C3	0.14	0.04	0.02	0.00	0.20	0.23	0.43	47	0.07	0.00	5.6	5.2	5.0	---	---	---	---	---
-5	135-203	C4	0.06	0.02	0.02	0.00	0.10	0.36	0.46	22	0.06	0.00	5.4	5.1	5.0	---	---	---	---	---

TABLE 16.--CHEMICAL ANALYSES OF SELECTED SOILS--Continued

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)	Pyrophosphate extractable: C	Fe	Al	Citrate-dithionite extractable: Fe	Al
	Cm		----Milliequivalents/100 grams of soil---							Pct	Pct	Mmhos/cm				Pct	Pct	Pct	Pct	Pct
Ortega sand:																				
S65-17-1	0-8	A	0.21	0.11	0.08	0.02	0.42	5.07	5.49	8	3.12	0.01	4.4	3.9	3.5	---	---	---	---	---
-2	8-36	C1	0.03	0.02	0.06	0.00	0.11	2.23	2.34	5	0.22	0.01	4.8	4.8	4.7	---	---	---	---	---
-3	36-124	C2	0.02	0.01	0.06	0.00	0.09	1.59	1.68	5	0.17	0.01	4.9	4.8	4.8	---	---	---	---	---
-4	124-150	C3	0.02	0.01	0.06	0.00	0.09	0.93	1.02	9	0.15	0.01	4.8	4.8	4.9	---	---	---	---	---
-5	150-180	C4	0.02	0.01	0.05	0.00	0.08	1.18	1.26	6	0.19	0.01	4.8	4.9	5.0	---	---	---	---	---
-6	180-203	C5	0.02	0.01	0.04	0.00	0.07	0.70	0.77	9	0.19	0.01	4.9	4.9	5.0	---	---	---	---	---
Otela fine sand:																				
S65-11-1	0-18	Ap	1.50	0.13	0.08	0.03	1.74	1.64	3.38	51	0.71	0.01	6.1	5.2	5.8	---	---	---	---	---
-2	18-76	E1	0.18	0.06	0.08	0.01	0.33	0.58	0.91	36	0.29	0.01	6.1	5.1	5.0	---	---	---	---	---
-3	76-112	E2	0.07	0.02	0.07	0.00	0.16	0.12	0.28	57	0.10	0.01	6.2	5.1	5.0	---	---	---	---	---
-4	112-147	E3	0.05	0.03	0.06	0.00	0.14	0.28	0.42	33	0.11	0.01	6.4	5.2	5.1	---	---	---	---	---
-5	147-157	EB	5.62	0.22	0.11	0.10	6.05	2.12	8.17	74	0.14	0.01	6.4	5.2	5.1	---	---	---	0.52	0.08
-6	157-203	2Btg	30.50	1.15	0.18	0.49	32.32	4.70	37.02	87	0.28	0.01	6.5	6.4	6.3	---	---	---	0.52	0.10
Otela fine sand:																				
S65-14-1	0-18	Ap	0.28	0.08	0.08	0.02	0.46	3.37	3.83	12	0.87	0.01	4.6	4.1	3.7	---	---	---	---	---
-2	18-58	E1	0.12	0.04	0.08	0.01	0.25	0.78	1.03	24	0.19	0.01	5.1	4.9	4.8	---	---	---	---	---
-3	58-99	E2	0.13	0.06	0.07	0.01	0.27	0.68	0.95	28	0.10	0.01	5.4	5.1	4.9	---	---	---	---	---
-4	99-147	E3	0.04	0.02	0.05	0.00	0.11	0.18	0.29	38	0.08	0.01	5.5	5.3	5.1	---	---	---	---	---
-5	147-170	Bt	1.45	1.07	0.10	0.08	2.70	2.89	5.59	48	0.14	0.01	5.3	4.7	4.5	---	---	---	0.52	0.12
-6	170-203	Btg	1.80	1.56	0.11	0.12	3.59	4.27	7.86	46	0.11	0.01	5.2	4.5	4.2	---	---	---	0.16	0.08
Pilgrims fine sand:																				
S65-5-1	0-15	Ap	0.34	0.03	0.11	0.02	0.50	4.98	5.48	9	0.80	0.00	4.1	3.8	3.7	---	---	---	---	---
-2	15-23	E	1.60	0.04	0.06	0.01	1.71	2.68	4.39	39	0.28	0.00	5.0	4.7	4.7	---	---	---	---	---
-3	23-61	Bt	35.75	0.99	0.33	0.57	37.64	12.29	49.93	75	0.67	0.00	6.6	6.1	5.8	---	---	---	0.77	0.34
Ridgewood fine sand:																				
S65-18-1	0-10	Ap	0.32	0.13	0.10	0.03	0.58	5.73	6.31	9	1.61	0.01	4.7	4.1	3.7	---	---	---	---	---
-2	10-61	C1	0.02	0.02	0.05	0.00	0.09	1.89	1.98	5	0.23	0.01	4.8	4.7	4.8	---	---	---	---	---
-3	61-94	C2	0.02	0.01	0.05	0.00	0.08	0.87	0.95	8	0.20	0.01	4.7	4.7	4.8	---	---	---	---	---
-4	94-157	C3	0.02	0.01	0.05	0.00	0.08	0.67	0.75	11	0.18	0.01	4.8	4.8	4.8	---	---	---	---	---
-5	157-203	C4	0.02	0.01	0.05	0.00	0.08	0.45	0.53	15	0.05	0.01	4.9	4.8	5.0	---	---	---	---	---
Shadeville fine sand:																				
S65-8-1	0-18	Ap	2.77	0.10	0.03	0.01	2.91	1.08	3.99	73	0.41	0.00	6.0	5.6	5.7	---	---	---	---	---
-2	18-71	E	0.62	0.05	0.03	0.01	0.71	0.42	1.13	63	0.13	0.00	6.3	6.0	6.0	---	---	---	---	---
-3	71-114	Bt	16.00	1.07	0.15	0.31	17.53	4.07	21.60	81	0.35	0.00	6.5	6.1	5.9	---	---	---	0.87	0.22

TABLE 16.--CHEMICAL ANALYSES 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)	Pyrophosphate extractable: C	Pyrophosphate extractable: Fe	Pyrophosphate extractable: Al	Citrate-dithionite extractable: Fe	Citrate-dithionite extractable: Al
	Cm		----Milliequivalents/100 grams of soil---							Pct	Pct	Mmhos/cm				Pct	Pct	Pct	Pct	Pct
Tooles fine sand:																				
S65-3-1	0-15	Ap	0.72	0.21	0.24	0.04	1.21	16.31	17.52	7	3.06	0.00	3.7	3.6	3.4	---	---	---	---	---
-2	15-36	E1	0.11	0.03	0.04	0.00	0.18	0.99	1.17	15	0.10	0.01	4.8	4.7	4.6	---	---	---	---	---
-3	36-66	E2	0.20	0.01	0.04	0.00	0.25	0.80	1.05	24	0.10	0.00	5.5	5.0	4.9	---	---	---	---	---
-4	66-127	Btg	11.00	0.66	0.19	0.08	11.93	3.41	15.34	78	0.04	0.03	6.6	6.1	6.0	---	---	---	0.31	0.06

TABLE 17.--CLAY MINERALOGY OF SELECTED SOILS

Soil name and sample number	Depth	Horizon	Clay minerals			
			Montmorillonite	14-angstrom intergrade	Kaolinite	Quartz
	Cm		Pct	Pct	Pct	Pct
Alpin sand:						
S65-12-1	0-8	Ap	17	34	23	26
-4	107-155	E/Bt1	16	42	24	18
Hurricane sand:						
S65-16-1	0-13	Ap	21	44	18	17
-3	53-81	E2	19	47	19	15
-5	140-203	Bh	20	20	13	47
Lutterloh fine sand:						
S65-13-1	0-18	Ap	8	46	13	33
-3	56-79	E2	8	44	12	36
-4	79-147	E3	11	38	23	28
Moriah fine sand:						
S65-4-1	0-20	Ap	25	34	12	29
-4	64-127	Bt	52	38	4	6
Nutall fine sand:						
S65-6-1	0-13	Ap	62	28	5	5
-4	51-94	Btg	69	23	2	6
Ortega fine sand:						
S65-7-1	0-18	Ap	0	40	8	52
-3	58-89	C2	0	57	10	33
-5	135-203	C4	0	33	6	61
Ortega sand:						
S65-17-1	0-8	A	19	41	18	22
-4	124-150	C3	19	43	21	17
-6	180-203	C5	17	35	24	24
Otela fine sand:						
S65-11-1	0-18	Ap	13	42	24	21
-5	147-157	EB	12	36	33	19
-6	157-203	2Btg	32	24	16	28
Otela fine sand:						
S65-14-1	0-18	Ap	12	44	19	25
-3	58-99	E2	10	46	17	27
-6	170-203	Btg	21	33	23	23
Pilgrims fine sand:						
S65-5-1	0-15	Ap	51	28	3	18
-3	23-61	Bt	92	5	0	3
Ridgewood fine sand:						
S65-18-1	0-10	Ap	17	38	22	23
-3	61-94	C2	17	37	27	19
-5	157-203	C4	14	30	39	17
Shadeville fine sand:						
S65-8-1	0-18	Ap	18	40	5	37
-3	71-114	Bt	0	48	22	30
Tooles fine sand:						
S65-3-1	0-15	Ap	0	48	16	36
-4	66-127	Btg	58	31	4	7

TABLE 18.--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. LL means liquid limit; PI, plasticity index; MD, maximum dry density; OM, optimum moisture; and NP, nonplastic]

Soil name, report number, horizon, and depth in inches	FDOT report number	Classification: AASHTO**	Classification: Unified	Mechanical analysis*: Percentage passing sieve***--: No. 10	No. 40	No. 200	Percentage smaller than--: .05 mm	.02 mm	.005 mm	.002 mm	LL	PI	Moisture density**: MD	OM
											Pct		Lb/ft^3	
Alpin sand:														
(S86FL-129-012)														
E1----- 3 to 31	12	A-3	SP-SM	100	68	8	7	4	2	2	NP	NP	114	7
E/Bt1-- 42 to 61	13	A-3	SP-SM	100	76	9	6	5	3	2	NP	NP	114	7
Chaires fine sand:														
(S85FL-129-002)														
Btg---- 34 to 44	2	A-2-4	SP-SM	100	99	11	10	8	7	6	NP	NP	107	12
Goldhead fine sand:														
(S85FL-129-001)														
Eg2---- 17 to 28	1	A-3	SP-SM	100	99	10	9	8	7	6	NP	NP	108	13
Hurricane sand:														
(S86FL-129-016)														
E2----- 5 to 21	19	A-3	SP-SM	100	67	7	7	5	4	2	NP	NP	109	10
Kershaw sand:														
(S85FL-129-010)														
C1----- 8 to 47	10	A-3	SP-SM	100	77	10	7	4	0	0	NP	NP	112	10
Lakeland sand:														
(S86FL-129-015)														
C1----- 7 to 44	18	A-3	SP-SM	100	66	5	5	4	3	3	NP	NP	109	10
Lutterloh fine sand:														
(S86FL-129-013)														
E1---- 7 to 22	14	A-3	SP-SM	100	98	5	4	3	1	0	NP	NP	106	11
Btg1-- 58 to 70	15	A-2-4	SM	100	98	27	22	17	17	16	NP	NP	115	14
Moriah fine sand:														
(S85FL-129-004)														
Bt----- 25 to 50	4	A-2-4	SM	100	98	26	22	19	18	16	NP	NP	111	15
Nutall fine sand:														
(S85FL-129-006)														
Bt----- 10 to 20	6	A-2-6	SC	85	82	37	32	28	25	24	42	23	102	20
Ortega fine sand:														
(S86FL-129-017)														
C1----- 30 to 34	20	A-3	SP	100	80	4	4	3	1	1	NP	NP	109	11
Ortega sand:														
(S85FL-129-007)														
C3----- 35 to 53	7	A-3	SP-SM	100	98	9	5	3	2	1	NP	NP	103	12

See footnotes at end of table.

TABLE 18.--ENGINEERING INDEX TEST DATA--Continued

Soil name, report number, horizon, and depth in inches	FDOT report number	Classification: AASHTO**	Classification: Unified	Mechanical analysis*: Percentage passing sieve***--: No. 10	No. 40	No. 200	Percentage smaller than--: .05 mm	.02 mm	.005 mm	.002 mm	LL	PI	Moisture density**: MD	OM
											Pct		Lb/ft^3	
Otela fine sand:														
(S86FL-129-014)														
E2----- 23 to 39	16	A-2-4	SM	100	96	13	5	3	3	2	NP	NP	105	10
Btg---- 67 to 80	17	A-2-4	SM	100	97	27	20	17	16	16	NP	NP	113	14
Otela fine sand:														
(S86FL-129-011)														
E2----- 30 to 44	11	A-2-4	SM	100	89	13	5	3	1	1	NP	NP	108	11
Pilgrims fine sand:														
(S85FL-129-005)														
Bt----- 9 to 24	5	A-7	SC	100	98	49	43	37	35	34	57	34	92	24
Ridgewood fine sand:														
(S86FL-129-018)														
C1----- 4 to 24	21	A-3	SP-SM	100	87	5	4	4	2	1	NP	NP	109	11
Shadeville fine sand:														
(S85FL-129-008)														
Bt----- 28 to 45	8	A-6	SC	100	96	41	36	30	29	28	27	15	102	20
Tooles fine sand:														
(S85FL-129-003)														
Btg---- 26 to 50	3	A-6	SC	100	98	27	25	22	21	20	28	18	109	16

* Mechanical analysis according to AASHTO designation T88-78. 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-sized fractions are calculated on the basis of all the material, including that coarser than 2 millimeters in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method and the material coarser than 2 millimeters in diameter is excluded from the calculations of grain-sized fractions. The mechanical analyses used in this table are not suitable for use in naming textural classes of soil.

** Moisture density based on AASHTO designation T99-74, and AASHTO classification based on AASHTO designation H145-73.

*** Sieve information is slightly different in some horizons than is given in table 12. Most of the differences are within the range of normal laboratory error.

TABLE 19.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Alpin	Thermic, coated Typic Quartzipsamments
Bayvi	Sandy, siliceous, thermic Cumulic Haplaquolls
Chaires	Sandy, siliceous, thermic Alfic Haplaquods
*Croatan	Loamy, siliceous, dysic, thermic Terric Medisaprists
Dorovan	Dysic, thermic Typic Medisaprists
*Estero	Sandy, siliceous, hyperthermic Typic Haplaquods
Goldhead	Loamy, siliceous, thermic Arenic Ochraqualfs
Hurricane	Sandy, siliceous, thermic Grossarenic Entic Haplohumods
*Isles	Loamy, siliceous, hyperthermic Arenic Ochraqualfs
Kershaw	Thermic, uncoated Typic Quartzipsamments
Lakeland	Thermic, coated Typic Quartzipsamments
Leon	Sandy, siliceous, thermic Aeric Haplaquods
Lutterloh	Loamy, siliceous, thermic Grossarenic Paleudalfs
Mandarin	Sandy, siliceous, thermic Typic Haplohumods
Maurepas	Euic, thermic Typic Medisaprists
Meggett	Fine, mixed, thermic Typic Albaqualfs
Moriah	Loamy, siliceous, thermic Aquic Arenic Hapludalfs
Nutall	Fine-loamy, siliceous, thermic Mollic Albaqualfs
Ocilla	Loamy, siliceous, thermic Aquic Arenic Paleudults
Ortega	Thermic, uncoated Typic Quartzipsamments
*Otela	Loamy, siliceous, thermic Grossarenic Paleudalfs
Pilgrims	Fine, montmorillonitic, thermic Albaquic Hapludalfs
Plummer	Loamy, siliceous, thermic Grossarenic Paleaquults
Pottsburg	Sandy, siliceous, thermic Grossarenic Haplaquods
Quartzipsamments	Quartzipsamments
Ridgewood	Thermic, uncoated Aquic Quartzipsamments
Rutlege	Sandy, siliceous, thermic Typic Humaquepts
Sapelo	Sandy, siliceous, thermic Ultic Haplaquods
Scranton	Siliceous, thermic Humaqueptic Psammaquents
Seaboard	Thermic, coated Lithic Quartzipsamments
Shadeville	Loamy, siliceous, thermic Arenic Hapludalfs
Surrency	Loamy, siliceous, thermic Arenic Umbric Paleaquults
Tooles	Loamy, siliceous, thermic Arenic Albaqualfs
Udorthents	Udorthents

* 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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