United States
Department of
Agriculture

Soil
Conservation
Service

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

Soil Survey of Union County, Florida

How To Use This Soil Survey

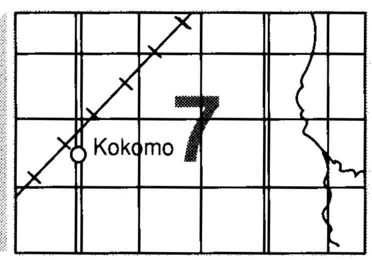
General Soil Map

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

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

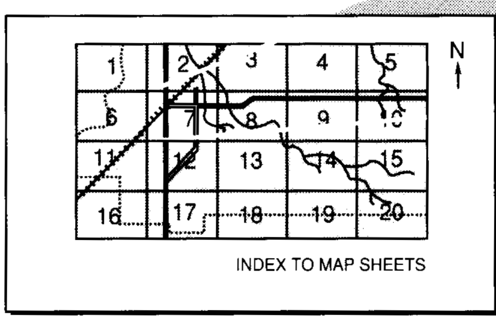
Detailed Soil Maps

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



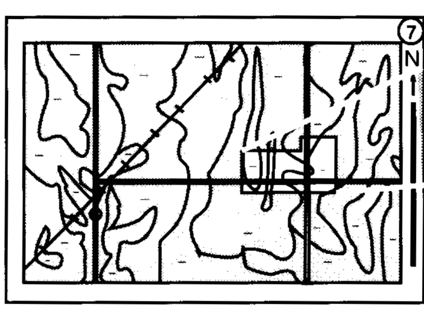
MAP SHEET

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



INDEX TO MAP SHEETS

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



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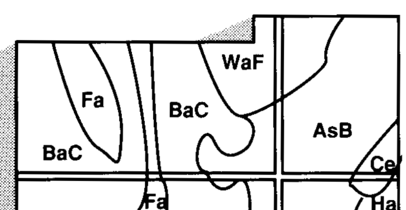

AREA OF INTEREST

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

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

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

Major fieldwork for this soil survey was completed in 1987. Soil names and descriptions were approved in 1989. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1987. This survey was made cooperatively by the Soil Conservation Service; the University of Florida, Institute of Food and Agricultural Sciences, Agricultural Experiment Stations, and Soil Science Department; and the Florida Department of Agriculture and Consumer Services. The Union County Board of Commissioners contributed funds for the publication of the interim soil survey report. The survey is part of the technical assistance furnished by the Union County Soil and Water Conservation District. 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.

This survey supersedes the soil survey of Bradford County published in 1914, which included Union County within its legal boundaries *(18)*.

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: An area of the very poorly drained Surrency and Pantego soils, depressional, in the foreground. Albany and Wampee soils are in the background.

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Issued October 1991

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Summary of Tables

Foreword

This soil survey contains information that can be used in land-planning programs in Union 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, ranchers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

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

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

Niles Glasgow

T. Niles Glasgow
State Conservationist
Soil Conservation Service

Soil Survey of Union County, Florida

By David A. Dearstyne, Darrell E. Leach, and Kevin S. Sullivan, Soil Conservation Service

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

UNION COUNTY is in north-central Florida (fig. 1). It is bordered on the north by Baker County, on the east by Bradford County, on the south by Alachua County, and on the west by Columbia County. The New River forms the eastern boundary of the county, the Santa Fe River forms the southern boundary, and Olustee Creek forms the western boundary, except for the extreme northern part.

The total area of Union County is 159,847 acres, or about 250 square miles. Lake Butler, the county seat, is the largest town in the county.

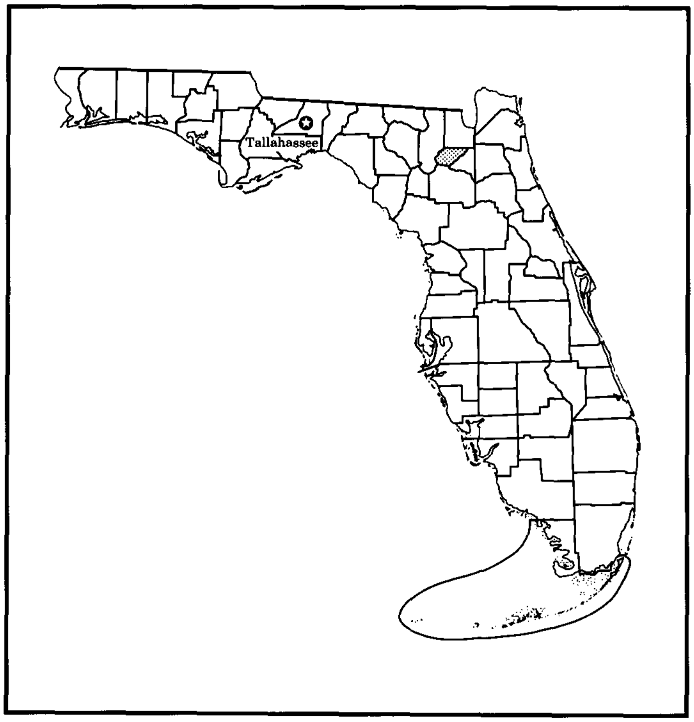

Figure 1.—Location of Union County in Florida.

General Nature of the County

This section gives general information about the county. It describes history and development, climate, geomorphology, stratigraphy, ground water, mineral resources, natural resources, recreation, and transportation facilities.

History and Development

This section is based on a history of the county published in 1971 *(17)*.

The early history of Union County centered around Providence Village, a settlement that was a stopover for stages in pioneer days. During the Second Seminole War, from 1835 to 1842, Fort Call, in the western part of the county, a fort on the north side of Lake Butler, and one near Providence were built to protect the settlers from the Indians. Wandering tribes of the Seminoles regularly raided settlements in southern Georgia and northern Florida, then scattered into the wilds before a sufficient force could organize. A lake and the settlement on its shore were both named Lake Butler in honor of Captain Robert Butler, an officer killed during one such encounter with the Seminoles. A town on the south side of the lake grew faster and had an inn that accommodated travelers from Providence Village to St. Augustine and other points along the coast.

In 1858, New River County, which included the present Bradford, Baker, and Union Counties, was established. Lake Butler was chosen as the county seat. In 1861, an act of the Florida Legislature formed Baker and Bradford Counties from New River County. Bradford County was made up of what is now Bradford and Union Counties. It was named for Captain Richard Bradford, the first Confederate officer from the state of Florida killed in the Civil War. In 1921, Union County was formed from that part of Bradford County west of the New River. This county, the 63rd and smallest county in the State of Florida, was formed after a dispute over whether Lake Butler or Starke would be the county seat of Bradford County. The name Union is derived from the common term expressing unity.

In the early 1900's, this area of the state was known as the "Florida Cotton Empire." Sea island cotton was king. Several cotton gins in the area did a tremendous business. Infestation by the boll weevil brought an end to the cotton industry. Orange trees also grew prolifically, some as high as rooftops, but severe freezes in the 1890's and 1930's destroyed them. The county currently has few orange trees.

In the early years the railroad was important in developing the county. In 1880, the Georgia Southern and Florida Railroad was extended across the county from Palatka to Valdosta, Georgia, and a short time later the Atlantic Coast Line Railroad was extended from Jacksonville to St. Petersburg. These two railroads crossed in Lake Butler. They generated development along their paths, and many small stations evolved into small communities. The Atlantic Coast Line Railroad no longer operates in the county, and the Georgia Southern and Florida Railroad is used only for freight.

Most of the acreage in the county is planted to pine. About 75,000 acres is owned by a packaging company. A large sawmill adds to the economy of the county. Forestry and timber play an important role in the economy, as well as farming and cattle and swine production *(26)*. Other commercial enterprises include several trucking companies, a clothing factory, egg and poultry contractors, a fertilizer plant, and nurseries. The largest employer is the Department of Corrections, which includes the North Florida Reception Center and the Union Correction Institution, in the Raiford area.

The small communities of Worthington Springs and Raiford are incorporated as municipal governments. Raiford is known for the prison system that has been a part of this community for over a century. Worthington Springs was noted in earlier years for its medicinal sulphur water and cooling springs, where people came in the summer for swimming and recreation. The springs have not been flowing for many years.

Climate

The climate of Union County is characterized by long, warm summers and relatively mild winters *(24)*. The Atlantic Ocean, the Gulf of Mexico, and large inland lakes moderate the temperatures.

In summer the temperature is fairly uniform with little day-to-day variation. In the afternoon the temperature generally is in the upper 80's and low 90's. Temperatures of 100 degrees or more are rare. Late at night and early in the morning, temperatures are generally in the upper 60's to upper 70's. In winter the temperature varies considerably. When cold fronts that have large masses of following cold air pass, the temperature late at night and early in the morning often drops to 32 degrees or less. Warm air from the south can raise the temperature to 80 degrees or more for several days. Table 1 gives data on temperature and precipitation for the survey area.

Frost and freezing temperatures generally occur several times a year. The temperature can stay below freezing from less than one day to several days. The duration of temperatures below 32 degrees can be from 1 to 12 consecutive hours but is rarely 15 hours or more. During an average winter the temperature is 32 degrees or less about 40 to 50 times and is 28 degrees or less about 30 to 40 times. Temperatures of less than 20 degrees are rare *(25)*.

The first killing frost generally occurs early in December. It is rarely as early as November. The last killing frost generally is near the beginning of March. It is rarely as late as early in April *(25)*. Table 2 shows freeze data for the survey area.

The total annual precipitation is 54.2 inches. A large part of this rainfall occurs in summer as locally heavy afternoon or early evening thundershowers. As much as 2 or 3 inches of rain can fall in an hour. Daylong rains in the summer are rare and generally accompany tropical depressions. These rains can be heavy and of long duration. As much as several inches of rain can fall in a 24-hour period. The annual frequency of tropical depressions ranges from none to several. Rainfall during the winter generally is more moderate. This precipitation usually occurs as cold fronts pass and can last from a few hours to a few days.

Some tropical depressions intensify into tropical storms or hurricanes. Hurricane-force winds rarely develop because of the inland location of the county. These storms can occur at any time of the year but normally are between June and mid-November. The wind and rain associated with these storms can cause timber and crop damage along with local flooding.

Extended dry periods can occur at any time during the year but are most common in spring and fall. These periods can adversely affect plants and crops. Higher temperatures in summer can also affect plants during dry periods of several days because of increased evaporation.

Hail sometimes accompanies thunderstorms. Hailstorms generally are small and seldom cause extensive damage. Snow is very rare and generally melts as it hits the ground.

Heavy fog forms from 30 to 60 days per year, generally during the winter *(24)*. The fog usually forms from late at night to midmorning. The sun shines 60 to 65 percent of the time possible during the year. Relative humidity varies daily and seasonally. It is generally highest during the summer, when it is about 90 percent early in the morning. The relative humidity in winter generally is less than 50 percent during the day. The prevailing wind is from the south in spring and summer and from the north or west in fall and winter.

Tornados occasionally accompany heavy thunderstorms or tropical storms. They generally cause limited damage in local areas.

Geomorphology

Frank R. Rupert, geologist, Florida Department of Natural Resources, Florida Geological Survey, prepared this section and the sections on stratigraphy, ground water, and mineral resources.

Union County is situated in the Northern Highlands physiographic province *(27)*. This province extends from eastern Bradford County in northern Florida westward into Alabama. The topographically high clayey sandhills making up this province are thought to be dissected remnants of a more extensive highland plain, possibly an ancient delta that covered much of the Gulf Coastal Plain *(27)*. Elevations of the surface in Union County range from about 50 feet above mean sea level in stream valleys at the southern edge of the county to about 165 feet on the flat plains in the central and northern areas.

Large sandy swamps, bays, and shallow swampy lakes cover much of north-central Union County. The numerous drainage streams in this area are generally sluggish and flow in poorly defined channels. In areas adjacent to the larger streams, such as Olustee Creek, Swift Creek, and the Santa Fe River, along the western and southern edges of the county, the small dendritic drainage creeks are more deeply incised in channels in the surrounding terrain, resulting in a series of steeply sloped ravines cut in the otherwise flat topography. Bluffs about 50 feet high border the wide flood plain along the Santa Fe River near Worthington Springs and along Olustee Creek between Union and Columbia Counties.

The major lakes in Union County are Lake Butler, Palestine Lake, and Swift Creek Pond. These lakes are generally shallow and have low, swampy shorelines and sand or mud bottoms. They have outflow channels that are tributaries to Olustee Creek or the Santa Fe River *(5)*.

Stratigraphy

Union County is underlain by hundreds of feet of alluvial and marine sands, clays, limestones, and dolomites *(5)*. The oldest rock penetrated by water wells is Middle Eocene Epoch limestone (42 to 49 million years before the present) in the Avon Park Formation. The youngest sediments are undifferentiated surficial sands and clays of Pliocene to Holocene age (5 million years old and younger). The Avon Park Formation and the younger limestone units overlying it are important freshwater aquifers. The discussion of the geology of Union County will be confined to sediments of Eocene age and younger. Figure 2 shows geologic cross sections in Union County, and figures 3 and 4 illustrate the underlying statigraphy of these cross sections.

Avon Park Formation

The Avon Park Formation *(11)* in Union County is typically a dense, tan to dark brown, porous dolomite that in many areas is interbedded with tan, gray, or cream limestones and dolomitic limestones of varying hardness *(5)*. Foraminifera are the dominant fossils. Dolomitization has destroyed or altered many of the fossils. The Avon Park Formation is a component of the Floridan aquifer system. It underlies Union County at a depth of 400 to 600 feet *(5)*.

Ocala Group

Marine limestones of the Ocala Group *(12)* unconformably overlie the Avon Park Formation under all of Union County *(5)*. The Ocala Group is made up of, in ascending order, the Inglis Formation, the Williston Formation, and the Crystal River Formation. These formations are differentiated on the basis of lithology and fossil content. Typically, the lithology of the Ocala Group grades from the alternating soft and hard, white to tan, fossiliferous and dolomitic limestone of the Inglis Formation and the lower part of the Williston Formation to the white to pale orange, abundantly fossiliferous, chalky limestones of the upper part of the Williston Formation and the Crystal River Formation. Foraminifera, mollusks, bryozoans, and echinoids are the most abundant fossil types in sediments in the Ocala Group.

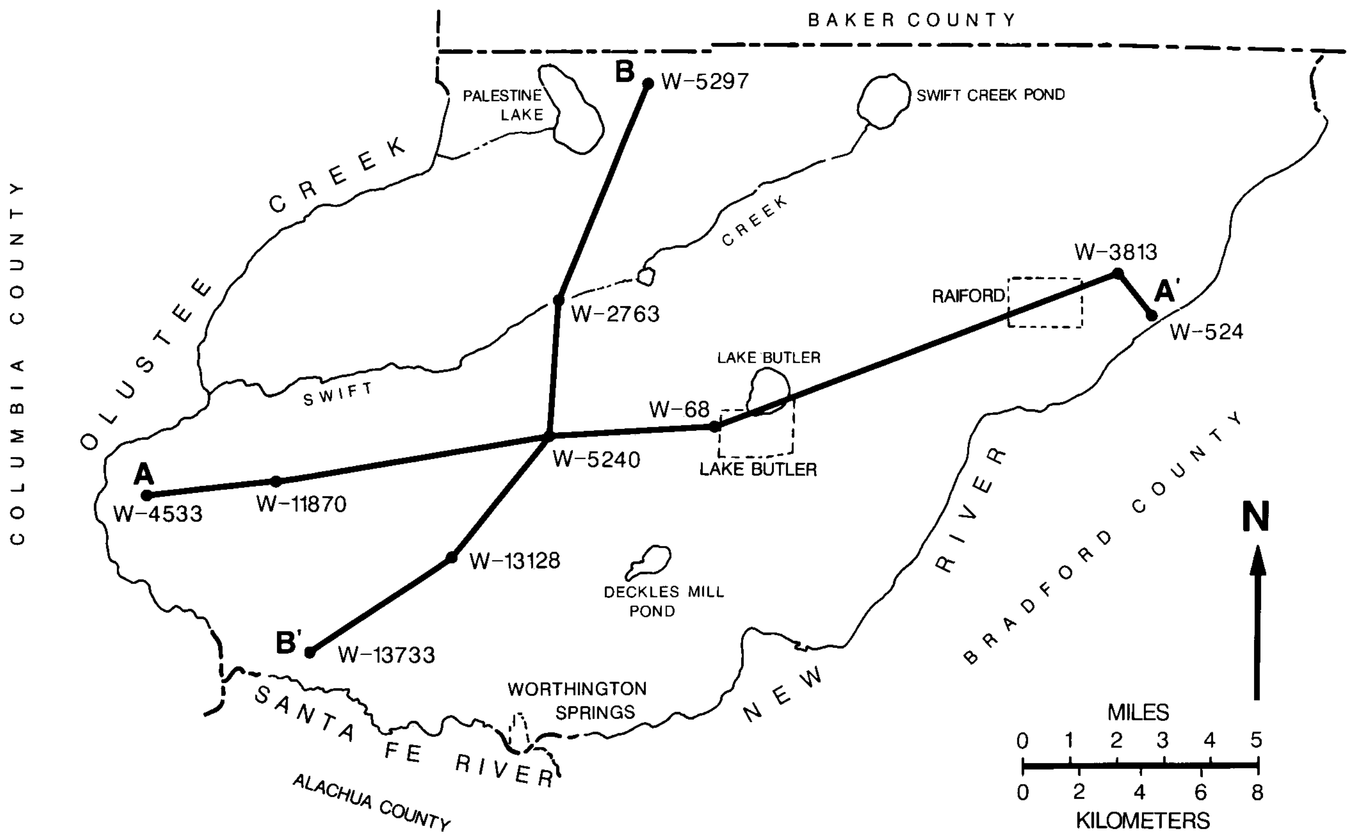

Figure 2.—Geologic cross sections in Union County, Florida.

The thickness of the Ocala Group sediments under Union County averages about 250 feet. The depth to the top of the Ocala Group ranges from about 40 feet directly west of Worthington Springs to nearly 300 feet near Raiford.

The porous and cavernous nature of the Ocala Group limestones make them important freshwater-bearing units of the Floridan aquifer system. Many wells in Union County draw drinking water from the Crystal River Formation.

Suwannee Limestone

The Oligocene age (24 to 37 million years before the present) Suwannee Limestone *(6)* is underlain by the Ocala Group sediments in most of Union County west of Lake Butler *(5)*. Generally, the Suwannee Limestone consists of tan, white, or cream marine limestone, which in many areas is dolomitic and coquinoid in parts and which varies considerably in hardness. In some wells this limestone is lithologically similar to the Ocala Group limestone and is identified mainly by the last occurrence of the foraminifera *Dictyoconus cookei*. The thickness of the limestones ranges from 20 to 40 feet, and the beds can be discontinuous in the subsurface. This unit does not occur in wells east of Lake Butler *(5)*. In northern Florida, the Suwannee Limestone is a freshwater-bearing unit of the Floridan aquifer system.

Hawthorn Group

Phosphatic sands, clays, limestones, and dolomites of the Miocene-age (5 to 24 million years before the present) Hawthorn Group *(14)* unconformably overlie the Suwannee Limestone in western Union County. East of Lake Butler, the Hawthorn Group sediments directly overlie limestones of the Ocala Group. The Hawthorn Group is dominantly a series of marine deposits consisting of varying and interbedded lithologies and characterized by phosphatic sands, granules, and pebbles.

Although not differentiated to date in Union County, formations of the Hawthorn Group are distinguishable in surrounding counties. In order of decreasing age, these formations are the Penney Farms Formation of interbedded phosphatic quartz sand, clay, and carbonate; the Marks Head Formation of thin, complex, interbedded phosphatic clay, sand, and carbonate; and

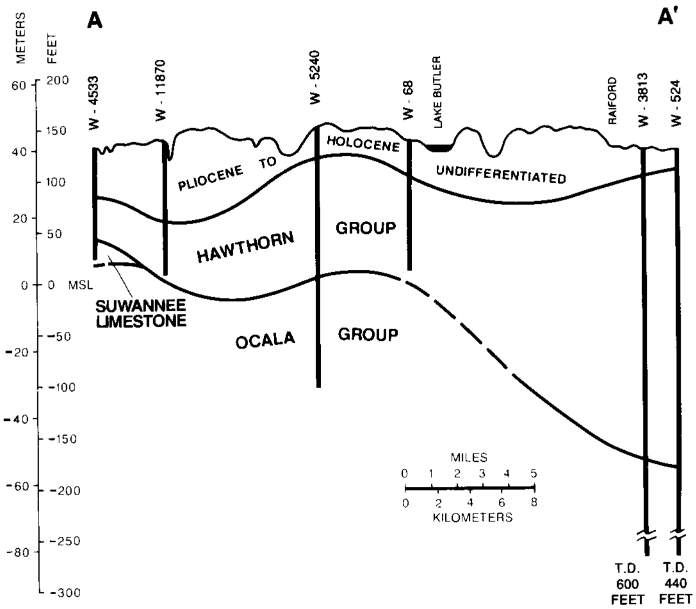

Figure 3.—Geologic cross section A-A′ in Union County. The numbers preceded by "W" are well numbers.

the Coosawhatchie Formation, a green to tan, phosphatic quartz sand with varying amounts of clay and dolomite.

The Hawthorn Group sediments have a generally northeastward dip and range in thickness from about 50 feet in parts of western Union County to at least 260 feet in the northeastern part, near Raiford. The thick, relatively impermeable clays in the Hawthorn Group are the main confining beds for the underlying Floridan aquifer system. Undifferentiated sands of Pliocene to Holocene age form a thin veneer over the Hawthorn Group sediments in most of Union County, although the larger river valleys in the southern and western parts of the county can cut down into the Hawthorn Group.

Pliocene to Holocene Undifferentiated

Undifferentiated quartz sands and clays make up the surficial sediments in most of Union County. Determining the age of these unfossiliferous deposits is virtually impossible. The deposits include unnamed reddish coarse clastics, relict Pleistocene (2.8 million to 10 thousand years before the present) marine terrace sands, and Holocene (10 thousand years to the present) eolian, lacustrine, and alluvial material.

Ground Water

Ground water fills the pore spaces in subsurface rocks and sediments. In Union County and nearby counties, it is derived mainly from precipitation. Most of the water consumed in Union County is drawn from ground water aquifers. In order of increasing depth, the main aquifer systems under the county are the surficial aquifer system, the intermediate aquifer system, and the Floridan aquifer system *(16)*.

Surficial Aquifer System

The surficial aquifer system is the highest freshwater aquifer in Union County. The sediments making up this aquifer are mainly the sands and thin limestone layers in the highest part of the Hawthorn Group and the overlying Pliocene to Holocene sands. The surficial aquifer system averages about 40 feet thick throughout most of the county *(5)*. It is unconfined, and its upper

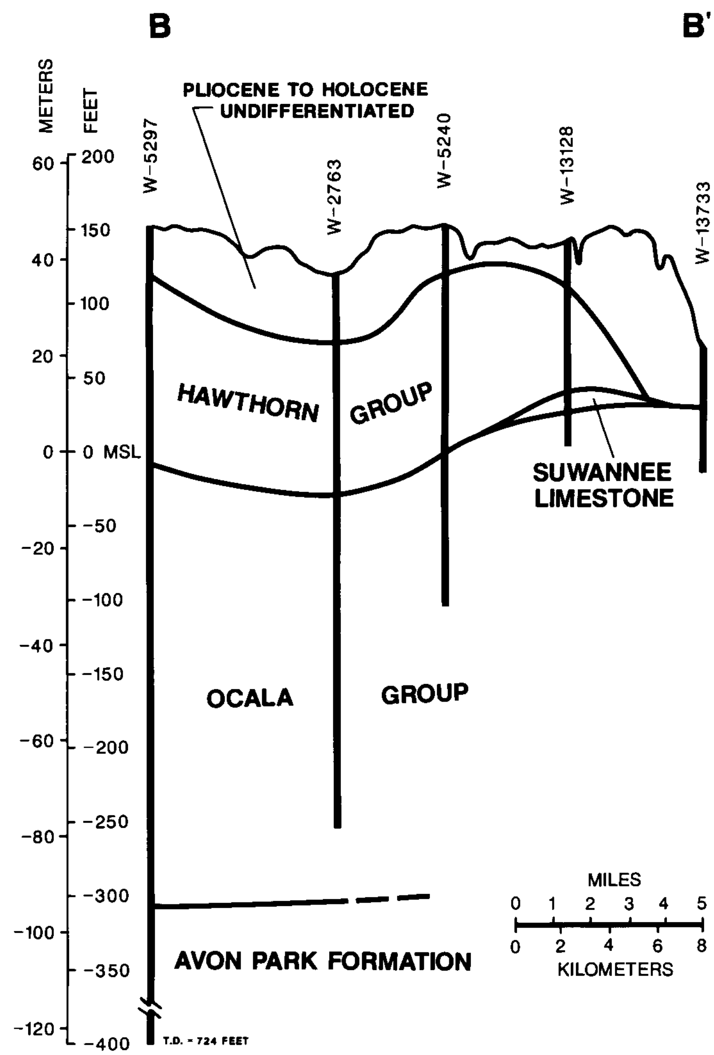

Figure 4.—Geologic cross section B-B′ in Union County. The numbers preceded by "W" are well numbers.

surface is the water table. Generally, the elevation of the water table fluctuates with the precipitation rate and conforms to the topography of the land surface. In Union County, the water table is normally 10 feet or less below the surface of the soil.

The surficial aquifer system is recharged mainly by rainfall percolating downward through the surficial sediments and to a lesser extent by upward leakage from the deeper aquifers. Water naturally discharges from the aquifer through evaporation, transpiration, spring flow, and downward seepage into the lower aquifers. The surficial aquifer system yields water of suitable quality for consumption and is normally tapped by shallow dug or sand point wells. Because of the relatively thin units making up this aquifer, however, only limited amounts of water are available before the local water table is lowered.

Intermediate Aquifer System

The intermediate aquifer system is made up of water-bearing sand and limestone layers in the Hawthorn Group. Slowly permeable clays above the sand and carbonate layers generally confine the intermediate aquifer system under artesian conditions. Water yields from this aquifer vary locally, depending on the quantity of sand and the porosity of the carbonate. In some areas the Hawthorn Group carbonates are very dense, yielding little water.

Recharge to the intermediate aquifer system occurs chiefly through downward leakage from the surficial aquifer system and through upward seepage from the Floridan aquifer system in areas where the potentiometric surface of the Floridan aquifer system is higher than that of the intermediate aquifer system. Numerous rural and domestic wells draw water from the intermediate aquifer system. As in the surficial aquifer system, the available volume of water depends mainly on the local thickness of the aquifer units.

Floridan Aquifer System

The Floridan aquifer system is made up of several hundred feet of Eocene- to Oligocene-age porous marine limestones, including the Avon Park Formation, the Ocala Group, and Suwannee Limestone. It is by far the most productive aquifer system in Union County. In the extreme southwestern part of the county, the upper part of the Floridan aquifer system is unconfined and under water table conditions. In the rest of the county, the aquifer is confined by slowly permeable clays of the overlying Hawthorn Group and is under artesian conditions. West of Lake Butler, Suwannee Limestone makes up the upper unit of the Floridan aquifer system. East of Lake Butler, the Crystal River Formation of the Ocala Group is the upper unit. Depth to the Floridan aquifer system ranges from 75 to 325 feet throughout the county. This system is an important freshwater source throughout Florida. Many deep domestic wells and most municipal and industrial wells draw from this aquifer.

In Union County the Floridan aquifer system is recharged mainly by downward leakage through the confining beds of the shallower aquifers *(5)*. In the southwestern part of the county, where the Hawthorn Group is thin or does not occur, direct recharge through downward percolation occurs. Water leaves the Floridan aquifer system by natural downgradient movement, which is westward, and by subsequent discharge through springs, lakes, and the Santa Fe River.

Mineral Resources

No mineral commodities are commercially mined in Union County. The potential for commercial mineral production generally is low. The following discussion of the major mineral commodities provides an overview of the mining potential for each mineral.

Sand

A number of private shallow pits in Union County are mined for fill sand. The sand deposits are concentrated in the unconsolidated Pliocene- to Holocene-age surficial sediments covering most of the county. Clayey coarse clastics believed to be equivalent to the Miccosukee and Citronelle Formations to the west characteristically contain fine to coarse grained quartz sand and local gravel beds. These clayey sands are used as roadbase material in counties to the south where the content of clay is higher. Commercial sand production would require extensive washing to remove the clay matrix. The economics of this procedure would probably preclude mining of the sand in Union County.

Phosphate

Phosphatic sediments of the Hawthorn Group underlie most of Union County. The phosphate occurs as tan to black sand and granule- and pebble-sized grains. It generally makes up as much as 25 percent, by volume, of the Hawthorn Group sediments. Most well lithologic logs indicate that the phosphate grain content generally ranges from 1 to 10 percent. The higher phosphate percentages are at a depth of more than 60 feet in wells near Raiford. Because of the variable nature of these deposits and an excessive depth to the higher concentrations, the potential for mining phosphate is low in Union County.

Limestone and Dolomite

Union County is underlain by extensive deposits of Eocene- to Miocene-age marine limestones. Because of the thickness of the overlying Hawthorn Group siliciclastics and the Pliocene- to Holocene-age undifferentiated surficial sediments, however, most of the limestone is at too great a depth for commercial mining. In the southwest corner of the county, Ocala Group limestones are within 40 feet of the surface. This depth may still be beyond the range for economic mining, however, and the compositional quality of this rock for industrial use is untested.

Peat

Peat is an organic deposit formed through the rapid accumulation of decaying vegetation. To date, it is not commercially mined in Union County. The potential for mining peat is highest in areas of Dorovan, Pamlico, and Croatan soils in the shallow, swampy regions in the northern and central parts of the county.

Clay

In most of Union County, clay and clayey sand are deposited in the upper Hawthorn Group sediments and in the undifferentiated Pliocene- to Holocene-age surficial sediments. These deposits have been commercially exploited only in private dirt fill pits. The suitability of the deposits for industrial and commercial use is untested as yet. In Putnam County and in counties to the south, the red, clayey sands and sandy clays formerly referred to as unnamed coarse clastics are used extensively as road material.

Natural Resources

Soil is the most important resource in Union County. The soil and the underlying parent material are the source and basis of the natural resources and the agricultural commodities produced in the county.

Water for most domestic and urban uses is supplied by underground wells. These wells tap into underground aquifers. The depth of the wells varies. It generally is 50 to 80 feet. Water for agricultural uses is supplied by wells, streams, or water-retention areas.

The Santa Fe River, the New River, and Olustee Creek are the largest permanent streams. The New River and Olustee Creek flow generally to the south and empty into the Santa Fe River, which flows west. All three streams flow permanently, except for the upper stretches of the New River and Olustee Creek during extended dry periods. The county has very few other streams. Most of these are intermittent, drying up to pools and potholes during extended dry periods.

Union County has three large bodies of water. Lake Butler, which is directly north of the city of Lake Butler, is several hundred acres in size. Palestine Lake, the largest body of water in the county, is about 1,000 acres in size. It is in the extreme northwestern part of the county. Swift Creek Pond, which is in the north-central part of the county, is 400 to 500 acres in size. These lakes are all accessible to the public.

Woodland is a major natural resource in Union County *(26)*. Forestry and forest products are an important part of the county's economy. Timber is used for lumber and pulpwood and provides habitat for wildlife.

Recreation

The lakes in Union County provide opportunities for recreational activities, such as swimming, boating, water-skiing, and fishing. Hunting also is an important recreational activity in the county. About 25 percent of the county is in the Lake Butler Wildlife Management Area, which is north of Lake Butler. Other lands are available for hunting, mainly as leases to hunt clubs.

Transportation Facilities

County and state highways facilitate the transportation of goods and people in Union County. State Highway 100, running from Starke to Lake City, and State Highway 121, running from Macclenny to Gainesville, intersect at Lake Butler. Rail service for freight and bus service also are available in the county.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; 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 in 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

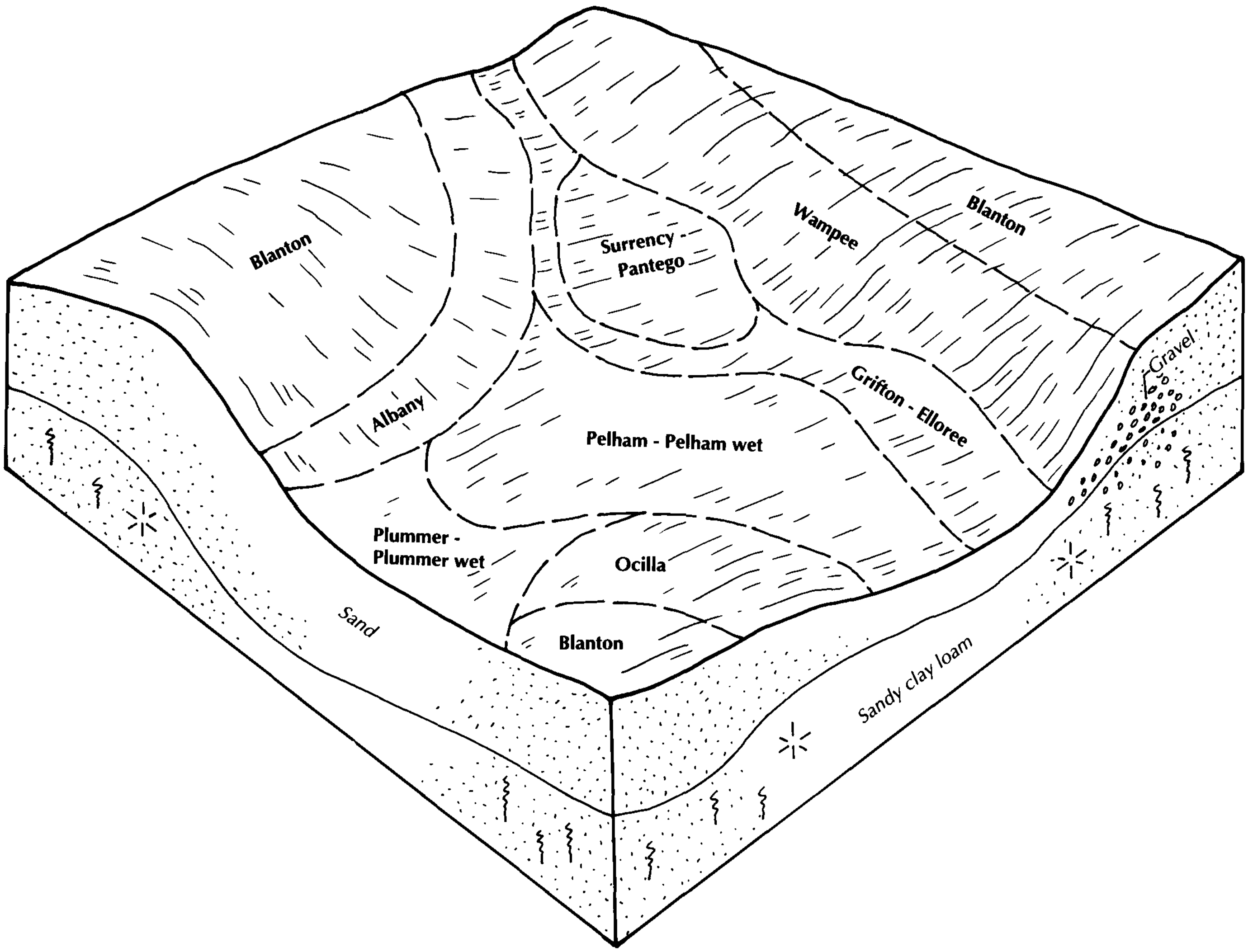

Figure 5.—Pattern of soils on a gently rolling landscape near major drainageways.

landscape or with a segment of the landscape (figs. 5 and 6). 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 *(20)* used in the United States is based mainly on the kind and character of soil properties and the

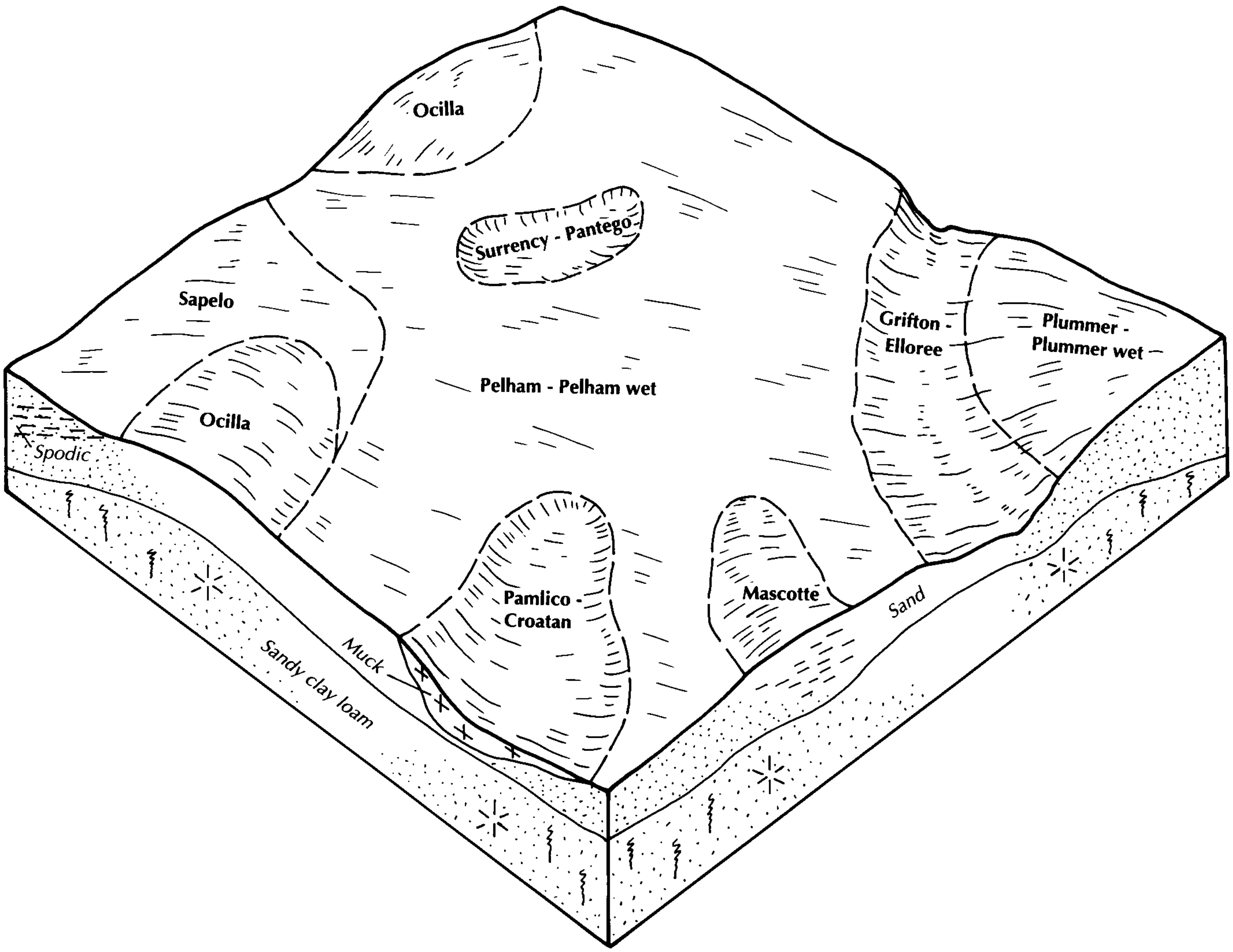

Figure 6.—Pattern of soils on a flatwoods landscape that includes slightly elevated areas, depressions, and flood plains.

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 generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. 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 given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

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

Union County was mapped concurrently with adjacent Bradford County. Near the end of the survey, the counties were correlated separately. For some of the soils in Union County, the locations of the series profiles are in Bradford County.

A ground-penetrating radar (GPR) system was used to document the type and variability of soils that occur in the detailed soil map units *(7, 8, 10, 15)*. Random transects were made with the GPR system and by hand. The GPR system was successfully used on all soils to detect the presence of and measure the depth to major soil horizons or other soil features and to determine the variability of those features. In Bradford and Union Counties, 160 random transects were made with the GPR system and by hand. Information from notes and ground-truth observations made in the field was used, along with radar data from this study, to classify the soils and to determine the composition of the map units. The map units described in the section "Detailed Soil Map Units" are based on this data.

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. These latter soils are called inclusions or included soils.

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 soil 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.

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 investigations. 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 Union County were determined by random transects made with the GPR system and by hand across mapped areas. The data are statistically summarized in the description of each map unit in the section "Detailed Soil Map Units." Soil scientists made enough transects and took enough samples to characterize each map unit at a specific confidence level. For example, Sapelo sand was characterized at a 95 percent confidence level based on the transect data. On 95 percent of the acreage mapped as Sapelo sand, Sapelo and similar soils make up 79 to 99 percent of the mapped areas. On 5 percent of the acreage, included soils make up more than 21 percent.

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 another but in a different pattern.

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

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or 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.

1. Lakeland-Blanton-Foxworth

Nearly level to strongly sloping, excessively drained and moderately well drained soils that are sandy throughout or are sandy in the upper part and loamy at a depth of 40 to 80 inches

This map unit consists of soils on broad uplands in the southern part of the county. Rolling hills and long, undulating slopes are interspersed with a few intermittent streams. The natural vegetation consists mainly of oaks and pines.

This map unit makes up about 2 percent of the county. It is about 37 percent Lakeland soils, 28 percent Blanton soils and the similar Ocilla soils, 10 percent Foxworth soils, and 25 percent minor soils.

The Lakeland soils are excessively drained. Typically, the surface layer is very dark grayish brown sand. It is underlain by dark yellowish brown and strong brown sand.

The Blanton soils are moderately well drained. Typically, the surface layer is very dark gray fine sand. The subsurface layer is yellowish brown and very pale brown fine sand. The upper part of the subsoil is light yellowish brown loamy fine sand grading to light yellowish brown sandy clay loam. The lower part is gray sandy clay loam.

The Foxworth soils are moderately well drained. Typically, the surface layer is very dark gray fine sand. It is underlain by yellowish brown, brownish yellow, and very pale brown sand.

Of minor extent in this unit are Albany, Chipley, Ousley, Plummer, Troup, and Wampee soils and Fluvaquents.

Most areas are used for crops, pasture, or hay. The major soils are severely limited as cropland and are only moderately suited to pasture and hay because of low fertility and seasonal droughtiness. Deep-rooted grasses should be selected for planting. The droughtiness can be overcome by irrigation. The soils are moderately suited to pine trees. They have slight limitations if used as sites for most urban uses.

2. Albany-Blanton-Ocilla

Nearly level to strongly sloping, somewhat poorly drained and moderately well drained soils that are sandy to a depth of 20 inches or more and have loamy material within a depth of 80 inches

This map unit consists mostly of soils on low uplands along the western, southern, and southeastern boundaries of the county. The natural vegetation consists of live oak and laurel oak mixed with pine and other hardwoods.

This map unit makes up about 9 percent of the county. It is about 37 percent Albany soils, 25 percent Blanton soils, 13 percent Ocilla soils, and 25 percent minor soils.

The Albany soils are somewhat poorly drained. Typically, the surface layer is dark gray fine sand. The subsurface layer is brown sand and light brownish gray and light gray fine sand. The subsoil is yellowish brown fine sandy loam in the upper part and light gray sandy clay loam in the lower part.

The Blanton soils are moderately well drained. Typically, the surface layer is very dark gray fine sand. The subsurface layer is yellowish brown and very pale brown fine sand. The upper part of the subsoil is light

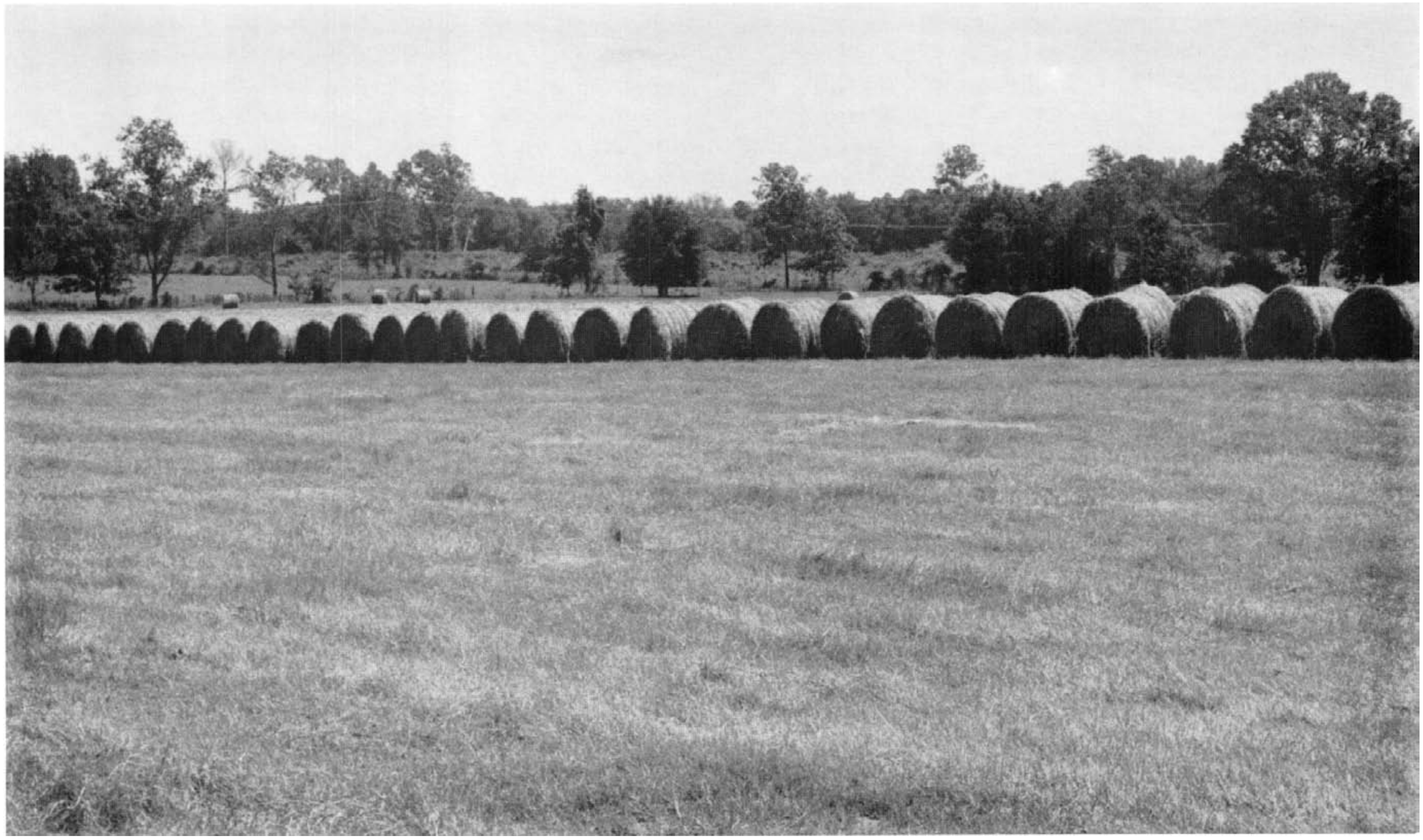

Figure 7.—Improved bermudagrass hay in an area of the Albany-Blanton-Ocilla general soil map unit.

yellowish brown loamy fine sand grading to light yellowish brown sandy clay loam. The lower part is gray and white sandy clay.

The Ocilla soils are somewhat poorly drained. Typically, the surface layer is dark grayish brown fine sand. The subsurface layer is light yellowish brown fine sand. The upper part of the subsoil is a few inches of yellow loamy fine sand. The lower part is pale brown sandy clay loam grading to gray sandy clay loam.

Of minor extent in this unit are Chipley, Elloree, Foxworth, Grifton, Mascotte, Osier, Sapelo, Surrency, and Wampee soils and Fluvaquents.

Most areas are used for crops, pasture, or hay (fig. 7). Generally, the somewhat poorly drained soils are moderately limited by low fertility and seasonal wetness and the moderately well drained soils by low fertility and seasonal droughtiness. The soils are moderately well suited to pine trees. The somewhat poorly drained soils are severely limited as sites for some urban uses, such as septic tank absorption fields, landfills, and dwellings with basements, because of seasonal wetness. The moderately well drained soils have slight limitations if used as sites for most urban uses.

3. Sapelo-Mascotte-Pelham

Nearly level, poorly drained soils that are sandy to a depth of 20 inches or more and have loamy material within a depth of 80 inches

This map unit consists dominantly of soils in the flatwoods in the northern and central parts of the county. The flatwoods are interspersed with swamps, depressions, intermittent drainageways, and slightly better drained, elevated areas. The natural vegetation consists mainly of slash pine and an understory of saw palmetto, gallberry, waxmyrtle, and white titi. The dominant vegetation in the wetter areas consists of cypress, sweetgum, bay, maple, and pond pine.

This map unit makes up about 20 percent of the county. It is about 42 percent Sapelo soils, 21 percent Mascotte soils, 15 percent Pelham soils, and 22 percent minor soils.

Typically, the Sapelo soils have a surface layer of very dark gray sand. The subsurface layer is grayish brown sand. The upper part of the subsoil is very dark brown and dark brown sand. The next part is light gray sand. The lower part is light gray fine sandy loam grading to sandy clay loam.

Typically, the Mascotte soils have a surface layer of black sand. The subsurface layer is grayish brown sand. The upper part of the subsoil is black loamy sand and dark reddish brown sand. The next part is light yellowish brown sand. The lower part is light gray fine sandy loam and sandy clay loam.

Typically, the Pelham soils have a surface layer of very dark gray fine sand. The subsurface layer is dark gray fine sand grading to gray fine sand. The subsoil is gray fine sandy loam in the upper part and gray sandy clay loam and light gray sandy clay in the lower part.

Of minor extent in this unit are Albany, Chipley, Croatan, Elloree, Grifton, Ocilla, Osier, Pamlico, Pantego, Plummer, Starke, Surrency, and Wampee soils.

Many areas are used for planted or naturally seeded pine. A few small areas are used for pasture or crops. The major soils are moderately suited to pine trees, are moderately well suited to pasture, and generally are severely limited as cropland and as sites for urban uses. Wetness is the main limitation. An extensive drainage system can lower the water table.

4. Plummer-Sapelo

Nearly level, poorly drained soils that are sandy to a depth of 40 inches or more and have loamy material within a depth of 80 inches

This map unit consists of soils dominantly in the flatwoods in the southern, central, and south-central parts of the county and in a small area along the central part of the eastern boundary. The flatwoods are interspersed with swamps, depressions, intermittent drainageways, and slightly better drained, slightly elevated areas. The vegetation consists mainly of slash pine and an understory of saw palmetto, waxmyrtle, white titi, and gallberry. The dominant vegetation in the wetter areas consists of cypress, red maple, and pond pine.

This map unit makes up about 22 percent of the county. It is about 43 percent Plummer soils, 33 percent Sapelo soils, and 24 percent minor soils.

Typically, the Plummer soils have a surface layer of very dark gray sand. The subsurface layer is grayish brown, light gray, and white sand. A thin layer between the subsurface layer and the subsoil is light brownish gray loamy sand. The subsoil is light brownish gray and light gray sandy clay loam.

Typically, the Sapelo soils have a surface layer of very dark gray sand. The subsurface layer is grayish brown sand. The upper part of the subsoil is very dark brown and dark brown sand. The next part is light gray sand. The lower part is light gray fine sandy loam underlain by light gray sandy clay loam.

Of minor extent in this unit are Albany, Chipley, Croatan, Grifton, Mascotte, Ocilla, Pamlico, Pelham, Starke, and Surrency soils and Fluvaquents.

Many areas are used for planted or naturally seeded pine, and a few areas of cleared land are used mainly for pasture or crops. The major soils are moderately well suited to pine trees, are well suited to pasture, and are severely limited as cropland and as sites for urban uses. Wetness is the main limitation. It can be reduced by a good drainage system.

5. Pelham

Nearly level, poorly drained soils that are sandy in the upper part and loamy at a depth of 20 to 40 inches

This map unit consists of soils in the broad flatwoods throughout the county. The flatwoods are interspersed with swamps, depressions, and intermittent drainageways. The natural vegetation consists mainly of slash pine and an understory of gallberry, waxmyrtle, and saw palmetto. The dominant vegetation in the swamps, depressions, and intermittent drainageways is maple, sweetgum, bay, ash, pondcypress, pond pine, and slash pine.

This map unit makes up about 32 percent of the county. It is about 77 percent Pelham soils and 23 percent minor soils.

Typically, the Pelham soils have a surface layer of very dark gray fine sand. The subsurface layer is dark gray fine sand grading to gray fine sand. The subsoil is gray fine sandy loam in the upper part and gray sandy clay loam and light gray sandy clay in the lower part.

Of minor extent in this unit are Albany, Croatan, Grifton, Mascotte, Ocilla, Pantego, Plummer, Sapelo, Starke, and Surrency soils.

Most areas are used for planted or naturally seeded pine. A few small areas have been cleared and are used for pasture or crops. Most areas are moderately well suited to pine trees and pasture and generally are severely limited as cropland and as sites for urban uses. Wetness is the main limitation. An extensive drainage system can lower the water table.

6. Grifton-Elloree-Fluvaquents

Nearly level, poorly drained soils that are sandy in the upper part and loamy within a depth of 40 inches or are stratified throughout with various textures; in flood-prone areas

This map unit consists of soils in narrow areas along the major drainageways of the New and Santa Fe Rivers and their tributaries. The landscape consists of flood plains interspersed with numerous backwater channels, cutbanks, flats, low ridges, and depressions.

The natural vegetation consists of spruce pine and various hardwoods, such as live oak, laurel oak, water oak, overcup oak, hickory, maple, sweetgum, and ironwood. Cypress occasionally grows in very poorly drained areas. Also, a few loblolly pine and slash pine grow in some areas.

This map unit makes up about 4 percent of the county. It is about 30 percent Grifton soils, 18 percent Elloree soils, 28 percent Fluvaquents, and 24 percent minor soils.

Typically, the Grifton soils have a surface layer of very dark gray loamy fine sand. The subsurface layer is dark gray loamy fine sand. The upper part of the subsoil is dark gray sandy clay loam. The next part is gray and dark gray sandy clay loam that has pockets and broken bands of soft carbonate. The lower part is gray sandy loam.

Typically, the Elloree soils have a surface layer of black fine sand. The subsurface layer is grayish brown fine sand grading to gray fine sand. The upper part of the subsoil is light gray sandy loam grading to grayish brown sandy loam. The lower part is grayish brown sandy clay loam.

Typically, the Fluvaquents have a surface layer of grayish brown loamy sand. Below this to a depth of 80 inches or more are alternating bands of loam, sand, sandy clay loam, and sand.

Of minor extent in this unit are Croatan, Mascotte, Ousley, Pamlico, Pantego, Pelham, Plummer, Sapelo, Starke, and Surrency soils. Ousley soils, the most significant of the minor soils, make up about 15 percent of the unit. They are somewhat poorly drained and are in the higher landscape positions.

Most areas support natural hardwood stands. Very few small areas are cleared or are used for planted pine. Unless intensive flood-control and drainage measures are applied, the major soils are generally unsuited to crops, pasture, and urban development.

7. Dorovan-Pamlico-Croatan

Nearly level, very poorly drained, organic soils that are muck to a depth of more than 51 inches or are muck 16 to 51 inches deep over sandy or loamy material

This map unit consists of soils in broad swamps, mainly in the northern part of the county, and in smaller swamps in the central part. The natural vegetation consists of bay, blackgum, red maple, Carolina ash, pondcypress, and pond pine and a dense understory commonly of greenbrier, fetterbush lyonia, willow, and other water-tolerant species.

This map unit makes up about 11 percent of the county. It is about 29 percent Dorovan soils, 27 percent Pamlico soils, 22 percent Croatan soils, and 22 percent minor soils.

Typically, the Dorovan soils have a surface layer of dark brown muck. Below this is very dark brown muck.

Typically, the Pamlico soils have a surface layer of dark brown muck. The next layer is black muck. Below this is very dark grayish brown sand over grayish brown sand.

Typically, the Croatan soils have a surface layer of black muck. Below this is very dark grayish brown mucky sandy loam grading to dark gray and gray sandy clay loam.

Of minor extent in this unit are Grifton, Pantego, Starke, and Surrency soils.

Most areas support natural vegetation. Unless an extensive drainage system or a water-control system is installed, the major soils are not suited to crops, pasture, or urban uses. They are best suited to wetland wildlife habitat.

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

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

A *soil complex* consists of two or more soils, or one or more soils and a miscellaneous area, 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. Pelham-Pelham, wet, fine sands is an example.

A *soil association* is made up of two or more geographically associated soils that are shown as one unit on the maps. Because of present or anticipated soil uses in the survey area, it was not considered practical or necessary to map the soils separately. The pattern and relative proportion of the soils are somewhat similar. Fluvaquents-Ousley association, occasionally flooded, 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 the mapped areas 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. Surrency and Pantego soils, depressional, is an undifferentiated group in this survey area.

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

Table 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.

2—Albany fine sand, 0 to 5 percent slopes. This nearly level to gently sloping, somewhat poorly drained soil is in slightly elevated areas in the flatwoods and on low uplands. Individual areas are irregular in shape and range from about 2 to more than 500 acres in size. Slopes are smooth to convex.

Typically, the surface layer is dark gray fine sand about 8 inches thick. The subsurface layer extends to a depth of about 50 inches. The upper 14 inches is brown sand, the next 20 inches is light brownish gray fine sand, and the lower 8 inches is light gray fine sand. The subsoil extends to a depth of 80 inches or more. The upper 10 inches is yellowish brown fine sandy loam, and the lower 20 inches is light gray sandy clay loam.

On 95 percent of the acreage mapped as Albany fine sand, 0 to 5 percent slopes, Albany and similar soils make up 81 to 99 percent of the mapped areas. On 5 percent of the acreage, included soils make up more than 19 percent of the mapped areas.

Small areas of soils that are similar to the Albany soil are included in mapping. These are Chipley and Ocilla soils and soils that have 15 to 35 percent, by volume, ironstone nodules or weathered phosphatic limestone fragments in one or more of the subsurface horizons.

Small areas of soils that are dissimilar to the Albany soil are included in this map unit. These are Blanton, Foxworth, and Pelham soils, which make up about 1 to 19 percent of most mapped areas.

Under natural conditions, the Albany soil has a seasonal high water table at a depth of 12 to 30 inches for 1 to 4 months in most years. The water table is at a depth of 30 to 50 inches for 3 to 7 months in most years. It recedes below a depth of 50 inches during extended dry periods. The available water capacity is low. Permeability is moderate.

Most areas of this soil support natural vegetation. Some areas are used for the production of pine trees. A few areas have been cleared and are used as cropland or tame pasture. The natural vegetation consists of slash pine, scattered longleaf pine, water oak, and laurel oak. The understory includes waxmyrtle, gallberry, creeping bluestem, low panicum, indiangrass, pineland threeawn, and various other grasses.

If used for cultivated crops, this soil has severe limitations because of the wetness, low natural fertility, and the hazard of erosion. The high water table retards root development during wet periods. A well designed, simple drainage system can overcome this limitation. If good management that includes water-control measures is applied, the soil is suited to most locally grown crops. Good management includes growing the crops in rotation with close-growing, soil-improving crops; returning crop residue to the soil; and applying fertilizer and lime. Soil blowing is a hazard where the surface is unprotected, especially during dry periods. Leaving crop residue on the surface can help to prevent excessive soil loss and conserves moisture.

This soil is moderately suited to tame pasture and hay. Deep-rooted plants, such as improved bermudagrass and bahiagrass, are suitable, but yields are reduced by periodic droughtiness. If properly managed, good pastures of grass or of grass-legume mixtures can be established. Regular applications of fertilizer and lime are needed. Controlled grazing helps to maintain plant vigor.

The potential productivity of this soil is high for pines. Slash pine, loblolly pine, and longleaf pine are suitable for planting. The equipment limitation, seedling mortality, and plant competition are management concerns. The use of equipment that has large tires or tracks helps to overcome the equipment limitation and minimizes compaction and root damage during thinning activities. Good site preparation, such as harrowing and bedding, helps to establish seedlings, removes debris, helps to control competing vegetation, and facilitates planting. Retarding the growth of the hardwood understory by chemical or mechanical means helps to control plant competition. The trees respond well to applications of fertilizer.

This soil is moderately suited to grazeable woodland. The desirable forage is creeping bluestem, indiangrass, and low panicum. The forage composition and annual productivity are influenced by the forest canopy. Little grazing value can be expected after the canopy cover exceeds 60 percent.

This soil is severely limited as a site for dwellings without basements, for small commercial buildings, and for septic tank absorption fields because of the depth to the water table during wet periods. Adding suitable fill material increases the depth to the water table and thus helps to overcome the wetness. If outlets are available, a surface drainage system can be installed.

The limitations affecting recreational uses are severe. The sandy surface layer limits trafficability, and soil blowing is a hazard. These limitations can be overcome by establishing and maintaining a good vegetative cover or windbreaks or by adding suitable topsoil or some other material that can stabilize the surface.

The capability subclass is IIIw. The woodland ordination symbol is 11W.

3—Ocilla fine sand, 0 to 5 percent slopes. This nearly level to gently sloping, somewhat poorly drained soil is in slightly elevated areas in the flatwoods and on low uplands. Individual areas are irregular in shape and range from 2 to more than 300 acres in size. Slopes are smooth or slightly convex.

Typically, the surface layer is dark grayish brown fine sand about 8 inches thick. The subsurface layer extends to a depth of about 20 inches. It is light yellowish brown fine sand. The next 5 inches is yellow loamy fine sand. The subsoil to a depth of 80 inches or more is sandy clay loam. It is pale brown in the upper 14 inches and gray in the lower 41 inches.

On 95 percent of the acreage mapped as Ocilla fine sand, 0 to 5 percent slopes, Ocilla and similar soils make up 83 to 99 percent of the mapped areas. On 5 percent of the acreage, included soils make up more than 17 percent of the mapped areas.

Small areas of the soils that are similar to the Ocilla soils are included in mapping. These are Albany soils and soils that have 2 to 10 percent, by volume, ironstone nodules or weathered phosphatic, gravel-sized limestone fragments in one or more horizons.

Small areas of soils that are dissimilar to the Ocilla soil are included in this map unit. These are Blanton, Mascotte, and Pelham soils and, in a few small areas, soils that are so eroded that the subsoil is within a depth of 20 inches. The dissimilar soils make up about 1 to 17 percent of most mapped areas.

Under natural conditions, the Ocilla soil has a seasonal high water table at a depth of 12 to 30 inches for 2 to 6 months. It recedes below a depth of 36 inches during extended dry periods. The available water capacity is low. Permeability is moderate.

Most areas of this soil are used for tame pasture or planted pine. The natural vegetation consists of slash pine and scattered live oak and laurel oak. The understory includes scattered saw palmetto, gallberry, greenbrier, pineland threeawn, broomsedge bluestem, chalky bluestem, and low panicum.

If used for cultivated crops, the soil has severe limitations because of the wetness, low natural fertility, and the hazard of erosion. The high water table retards root development during wet periods. A well designed, simple drainage system can overcome this limitation. If good management that includes water-control measures is applied, the soil is suited to most locally grown crops. Good management includes growing the crops in rotation with close-growing, soil-improving crops; returning crop residue to the soil; and applying fertilizer and lime. Soil blowing is a hazard where the surface is unprotected, especially during dry periods. Leaving crop residue on the surface can help to prevent excessive soil loss and conserves moisture.

This soil is moderately suited to tame pasture and hay. Deep-rooted plants, such as improved bermudagrass and bahiagrass, are suitable, but yields are reduced by periodic droughtiness. If properly managed, good pastures of grass or of grass-legume mixtures can be established. Regular applications of fertilizer and lime are needed. Controlled grazing helps to maintain plant vigor.

The potential productivity of this soil is high for pines. Slash pine, loblolly pine, and longleaf pine are suitable for planting. The equipment limitation, seedling mortality, and plant competition are management concerns. The use of equipment that has large tires or tracks helps to overcome the equipment limitation and minimizes compaction and root damage during thinning activities. Good site preparation, such as harrowing and bedding, helps to establish seedlings, removes debris, helps to control competing vegetation, and facilitates planting. Retarding the growth of the hardwood understory by chemical or mechanical means helps to control plant competition. The trees respond well to applications of fertilizer.

This soil is moderately suited to grazeable woodland. The desirable forage is creeping bluestem, indiangrass, and panicum. The forage composition and annual productivity are influenced by the forest canopy. Little grazing value can be expected after the canopy cover exceeds 60 percent.

This soil is moderately limited as a site for dwellings without basements and severely limited as a site for small commercial buildings and for septic tank absorption fields because of the depth to the water table during wet periods. Adding suitable fill material increases the depth to the water table and thus helps to overcome the wetness. If outlets are available, a surface drainage system can be installed.

The limitations affecting recreational uses are severe. The sandy surface layer limits trafficability, and soil blowing is a hazard. These limitations can be overcome by establishing and maintaining a good vegetative cover or windbreaks or by adding suitable topsoil or some other material that can stabilize the surface.

The capability subclass is IIIw. The woodland ordination symbol is 11W.

4—Mascotte sand. This nearly level, poorly drained soil is in broad flatwoods. Individual areas are irregular in shape and range from 2 to more than 1,000 acres in size. Slopes are smooth and range from 0 to 2 percent.

Typically, the surface layer is black sand about 6 inches thick. The subsurface layer extends to a depth of about 19 inches. It is grayish brown sand. The upper part of the subsoil is about 4 inches of black loamy sand and 4 inches of dark reddish brown sand. The next 8 inches is light yellowish brown sand. The lower part of the subsoil is about 3 inches of light gray fine sandy loam and 42 or more inches of light gray sandy clay loam.

On 95 percent of the acreage mapped as Mascotte sand, Mascotte and similar soils make up 78 to 99 percent of the mapped areas. On 10 percent of the acreage, included soils make up more than 22 percent of the mapped areas.

Small areas of soils that are similar to the Mascotte soil are included in mapping. These are Leon, Pelham, and Sapelo soils and soils that do not have a subsurface layer or have an 8-inch layer between the sandy and loamy parts of the subsoil.

Small areas of soils that are dissimilar to the Mascotte soil are included in this map unit. These are Ocilla, Pantego, and Surrency soils, which make up about 1 to 22 percent of most mapped areas.

Under natural conditions, the Mascotte soil has a seasonal high water table within a depth of about 6 to 18 inches for 1 to 4 months during most years. The water table is at a depth of 18 to 40 inches for as long as 6 months. It recedes below a depth of 40 inches during extended dry periods. The available water capacity is low. Permeability is moderate.

Most areas support native vegetation or planted pine. The natural vegetation consists mainly of slash pine. The understory includes waxmyrtle, scattered saw palmetto, gallberry, fetterbush lyonia, blackberry, brackenfern, chalky bluestem, broomsedge bluestem, lopsided indiangrass, low panicum, pineland threeawn, and sedges.

If used for cultivated crops, this soil has very severe limitations because of the wetness and low fertility. The number of crops that can be grown is limited unless good water-control measures are used. If these measures are applied, the soil is suitable for most locally grown crops. It is better suited to specialty crops than to most general farm crops. A good water-control system removes excess water during wet periods and provides for subsurface irrigation during dry periods. Good management includes growing row crops in rotation with close-growing, soil-improving cover crops; returning crop residue, including that of the soil-improving crops, to the soil; bedding rows to provide additional rooting depth; and applying fertilizer and lime according to the needs of the crop.

If water is properly controlled, this soil is well suited to improved bermudagrass, bahiagrass, and legumes. If properly managed, good pastures of grass or of grass-legume mixtures can be established. Water-control measures are needed to remove excess surface water during long rainy periods. Irrigation is needed for the best yields of white clover or other adapted shallow-rooted pasture plants during dry periods. Establishing an optimum plant population, applying fertilizer and lime, and controlling grazing help to maintain a good plant cover and increase forage production.

The potential productivity of this soil is high for pines. Slash pine, loblolly pine, and longleaf pine are suitable for planting (fig. 8). The equipment limitation, seedling mortality, and plant competition are management concerns. Seasonal wetness is the main limitation. The use of equipment that has large tires or tracks helps to overcome the equipment limitation and minimizes compaction and root damage during thinning activities. Preparing the site and planting and harvesting the trees during the drier periods also help to overcome the equipment limitation. Good site preparation, such as harrowing and bedding, helps to establish seedlings, removes debris, helps to control competing vegetation, and facilitates planting. Leaving all plant debris on the site helps to maintain the content of organic matter in the soil. The trees respond well to applications of fertilizer.

This soil is well suited to grazeable woodland. The desirable forage is creeping bluestem, chalky bluestem, and blue maidencane. The forage composition and annual productivity are influenced by the forest canopy. Little grazing value can be expected after the canopy cover exceeds 60 percent.

This soil is severely limited as a site for dwellings without basements, for small commercial buildings, and for septic tank absorption fields because of the depth to the high water table during wet periods. A good drainage system is needed to remove excess water during wet periods and to control the water table. Adding suitable fill material increases the depth to the water table and thus helps to overcome the wetness.

The limitations affecting recreational uses are severe. The high water table is the major limitation. A good water-control system is needed. Trafficability also is a limitation. Because of the loose, sandy surface layer, soil blowing is a hazard during dry periods. Establishing or maintaining a good vegetative cover or windbreaks or adding suitable topsoil or some other material that can stabilize the surface improves trafficability and helps to control soil blowing.

The capability subclass is IVw. The woodland ordination symbol is 11W.

6—Plummer-Plummer, wet, sands. These nearly level, poorly drained soils generally are on broad flats, but the wet Plummer soil is in the slightly lower areas or drainageways. The soils occur in a regular repeating pattern on the landscape. Excess water ponds in the low areas during the rainy season and for short periods after heavy, unseasonal rainfall. Individual areas are irregularly shaped or elongated and range from 2 to more than 500 acres in size. Slopes are smooth to concave and range from 0 to 2 percent.

Typically, the surface layer of the Plummer soil on flats is very dark gray sand about 9 inches thick. The subsurface layer extends to a depth of about 56 inches. It is sand. The upper 18 inches is grayish brown, the next 8 inches is light gray, and the lower 21 inches is white. Below this is light brownish gray loamy sand about 5 inches thick. The subsoil to a depth of about 80 inches is light brownish gray and light gray sandy clay loam.

Typically, the surface layer of the wet Plummer soil is very dark gray sand about 7 inches thick. The subsurface layer extends to a depth of about 48 inches. It is sand. The upper 13 inches is grayish brown, and the lower 28 inches is light brownish gray. Below this is

Figure 8.—Slash pine in an area of Mascotte sand.

light gray loamy sand about 2 inches thick. The subsoil to a depth of about 80 inches is light gray sandy clay loam.

On 95 percent of the acreage mapped as Plummer-Plummer, wet, sands, Plummer and similar soils make up 89 to 99 percent of the mapped areas. On 5 percent of the acreage, included soils make up more than 11 percent of the mapped areas. Generally, the mapped areas are about 58 percent the Plummer soil on flats and similar soils and 36 percent the wet Plummer soil and similar soils. The components of this map unit occur as areas so intricately intermingled that it is not practical to map them separately at the scale used in mapping. The proportions and patterns of both of the Plummer soils and of the similar soils are relatively consistent in most mapped areas.

Small areas of soils that are similar to the Plummer soils are included in mapping. These are Osier, Pelham, and Sapelo soils; soils that have about 5 to 15 percent, by volume, ironstone nodules or weathered phosphatic, gravel-sized limestone fragments in one or more horizons; and, in a few areas adjacent to drainageways, soils that have slopes of as much as 5 percent.

Small areas of soils that are dissimilar to the Plummer soils are included in this map unit. These are Albany, Starke, and Surrency soils, which make up 1 to 11 percent of most mapped areas.

Under natural conditions, the Plummer soil on flats has a seasonal high water table within about 6 to 18 inches of the surface for 2 to 4 months and the wet Plummer soil has one at or above the surface for 1 to 4 months during the rainy season and for short periods after heavy rainfall. The water table recedes to a depth of 30 inches or more in both soils during droughty periods. The available water capacity is low. Permeability is moderate.

Most areas support second-growth pine or planted pine. A few areas are used for tame pasture, hay, or urban development. The natural vegetation consists of slash pine, longleaf pine, laurel oak, scattered sweetgum, blackgum, water oak, and scattered pondcypress. The understory includes waxmyrtle, blackberry, gallberry, grape, greenbrier, lopsided indiangrass, chalky bluestem, scattered saw palmetto, panicum, pineland threeawn, broomsedge bluestem, chalky bluestem, maidencane, and St Johnswort.

If used for cultivated crops under natural conditions, these soils have very severe limitations because of the wetness and low natural fertility. They are suited to most vegetable crops, however, if intensive management that includes a water-control system to remove excess water rapidly and provide for subsurface irrigation is applied. Soil-improving crops and crop residue can protect the soils from erosion and maintain the content of organic matter. Seedbed preparation should include bedding of rows. Fertilizer should be applied according to the needs of the crop.

If water is properly controlled, these soils are well suited to improved bermudagrasses, bahiagrass, and legumes. If properly managed, good pastures of grass or of grass-legume mixtures can be established. Water-control measures are needed to remove excess surface water during long rainy periods. Irrigation is needed for the best yields of white clover or other adapted shallow-rooted pasture plants during dry periods. Establishing an optimum plant population, applying fertilizer and lime, and controlling grazing help to maintain a good plant cover and increase forage production.

In most areas the potential productivity of these soils is high for pines. Slash pine and loblolly pine are suitable for planting. The equipment limitation, seedling mortality, and plant competition are management concerns. Seasonal wetness is the main limitation. The use of equipment that has large tires or tracks helps to overcome the equipment limitation and minimizes compaction and root damage during thinning activities. Preparing the site and planting and harvesting the trees during the drier periods also help to overcome the equipment limitation. Good site preparation, such as harrowing and bedding, helps to establish seedlings, helps to control competing vegetation, and facilitates planting. Leaving all plant debris on the site helps to maintain the content of organic matter in the soils. The trees respond well to applications of fertilizer.

These soils are well suited to grazeable woodland. The desirable forage is creeping bluestem, chalky bluestem, and blue maidencane. The forage composition and annual productivity are influenced by the forest canopy. Little grazing value can be expected after the canopy cover exceeds 60 percent.

These soils are severely limited as sites for dwellings without basements, for small commercial buildings, and for septic tank absorption fields because of the depth to the high water table during wet periods. A good drainage system is needed to remove excess water during wet periods and to control the water table. Adding suitable fill material increases the depth to the water table and thus helps to overcome the wetness.

The limitations affecting recreational uses are severe. The high water table is the major limitation. A good water-control system is needed. The sandy surface layer limits trafficability, and soil blowing is a hazard. These limitations can be overcome by establishing and maintaining a good vegetative cover or windbreaks or by adding suitable topsoil or some other material that can stabilize the surface.

The Plummer soil on flats is assigned to capability subclass IIIw and woodland ordination symbol 11W. The wet Plummer soil is assigned to capability subclass Vw and woodland ordination symbol 2W.

7—Surrency and Pantego soils, depressional. These nearly level, very poorly drained soils are in depressions. They do not occur in a regular repeating pattern on the landscape. Individual areas are circular, irregularly shaped, or elongated and range from 2 to more than 500 acres in size. Slopes are smooth or slightly concave. They are dominantly less than 1 percent but range from 0 to 2 percent.

Typically, the upper part of the surface layer in the Surrency soil is black mucky fine sand about 9 inches thick. The lower part is very dark grayish brown sand about 9 inches thick. The subsurface layer extends to a depth of about 30 inches. It is light brownish gray sand. The subsoil extends to a depth of 80 inches or more. The upper 15 inches is grayish brown sandy loam, the next 10 inches is light gray sandy clay loam, and the lower 25 inches or more is light gray sandy clay loam.

Typically, the surface layer of the Pantego soil is black mucky loamy sand about 15 inches thick. The subsoil extends to a depth of 64 inches or more. The upper 3 inches is grayish brown sandy loam, the next 14 inches is dark grayish brown sandy clay loam, and the lower 32 inches is dark brown sandy clay.

On 95 percent of the acreage mapped as Surrency and Pantego soils, depressional, Surrency, Pantego, and similar soils make up 83 to 99 percent of the mapped areas. On 5 percent of the acreage, included soils make up more than 17 percent of the mapped areas. Generally, the mapped areas are about 62 percent Surrency and similar soils and about 30 percent Pantego and similar soils. Some areas are Surrency and similar soils, some are Pantego and similar soils, and some are both Surrency and Pantego soils. Each of the soils does not necessarily occur in every mapped area. The relative proportion of the soils varies from area to area. Areas of the individual soils are large enough to be mapped separately. Because of the present and predicted land uses, however, they were mapped as one unit.

Small areas of soils that are similar to the Surrency and Pantego soils are included in mapping. These are Pelham and Starke soils, soils that have a surface layer of muck 3 to 16 inches thick, and soils that have a substratum of sand, loamy sand, or sandy loam at a depth of more than 60 inches.

Small areas of soils that are dissimilar to the Surrency and Pantego soils are included in this map unit. These are Croatan, Pamlico, and Plummer soils, which make up about 1 to 17 percent of most mapped areas.

Undrained areas of the Surrency and Pantego soils are ponded for 4 months or more during the year, and a seasonal high water table is within 12 inches of the surface for 4 to 8 months during most years. The available water capacity is moderate or high. Permeability is moderate.

Most areas support natural vegetation, which consists of pondcypress (fig. 9), scattered pond pine, sweetbay, water tupelo, blackgum, and red maple. The understory includes gallberry, fetterbush lyonia, devils walkingstick, sedges, ferns, and other water-tolerant grasses. Areas of these soils provide cover for deer and are excellent habitat for wading birds and other wetland wildlife.

Under natural conditions, these soils are not suited to cultivated crops, tame pasture, planted pine trees, or grazeable woodland. The excessive wetness is the main limitation. Installing adequate water-control systems is difficult. Many areas are in isolated ponds or wet depressions that do not have suitable drainage outlets. In properly managed areas where a good drainage system can be installed, good-quality grass or grass-clover pastures can be established.

The limitations affecting urban uses are severe. Excess water on or near the surface during much of the year and the thick sandy layers are the dominant limitations. Drainage systems that would adequately remove the water and effectively regulate the water table are expensive and cannot be easily installed or maintained. Most areas do not have good drainage outlets. Even where adequate drainage systems are installed, maintaining the systems is a continuing problem. Suitable fill material is needed on sites for dwellings, small commercial buildings, and septic tank absorption fields.

The limitations affecting recreational uses are severe. The ponding and the sandy texture are the major limitations. A good water-control system is necessary. Also, suitable fill material is needed to improve trafficability and to increase the depth to the water table.

The capability subclass is VIIw. The woodland ordination symbol is 2W.

8—Surrency and Pantego soils, frequently flooded. These nearly level, very poorly drained soils are on flood plains along various creeks and rivers throughout the county. They do not occur in a regular repeating pattern on the landscape. Some areas are isolated by meandering stream channels. Individual areas are irregularly shaped or elongated and range from 5 to more than 100 acres in size. Slopes are smooth or slightly concave. They are dominantly less than 1 percent but range from 0 to 2 percent.

Typically, the upper part of the surface layer in the Surrency soil is black mucky fine sand about 12 inches thick. The lower part is very dark gray loamy fine sand about 4 inches thick. The subsurface layer extends to a depth of about 32 inches. It is grayish brown and light gray fine sand. The subsoil extends to a depth of 80 inches or more. The upper 10 inches is gray sandy loam, the next 25 inches is mixed gray and light gray sandy clay loam, and the lower 13 inches is gray sandy clay loam.

Typically, the upper part of the surface layer in the Pantego soil is black mucky loamy sand about 10 inches thick. The lower part is very dark gray loamy fine sand about 6 inches thick. The upper part of the subsoil is sandy clay loam. The upper 12 inches is dark gray, the next 14 inches is grayish brown, and the next 17 inches is gray. Below this to a depth of 80 inches is mixed gray and light gray sandy loam.

On 95 percent of the acreage mapped as Surrency and Pantego soils, frequently flooded, Surrency, Pantego, and similar soils make up 86 to 99 percent of the mapped areas. On 5 percent of the acreage, included soils make up more than 14 percent of the mapped areas. Generally, the mapped areas are about 60 percent Surrency and similar soils and about 35 percent Pantego and similar soils. Some areas are Surrency and similar soils, some are Pantego and similar soils, and some are both Surrency and Pantego soils. Each of the soils does not necessarily occur in

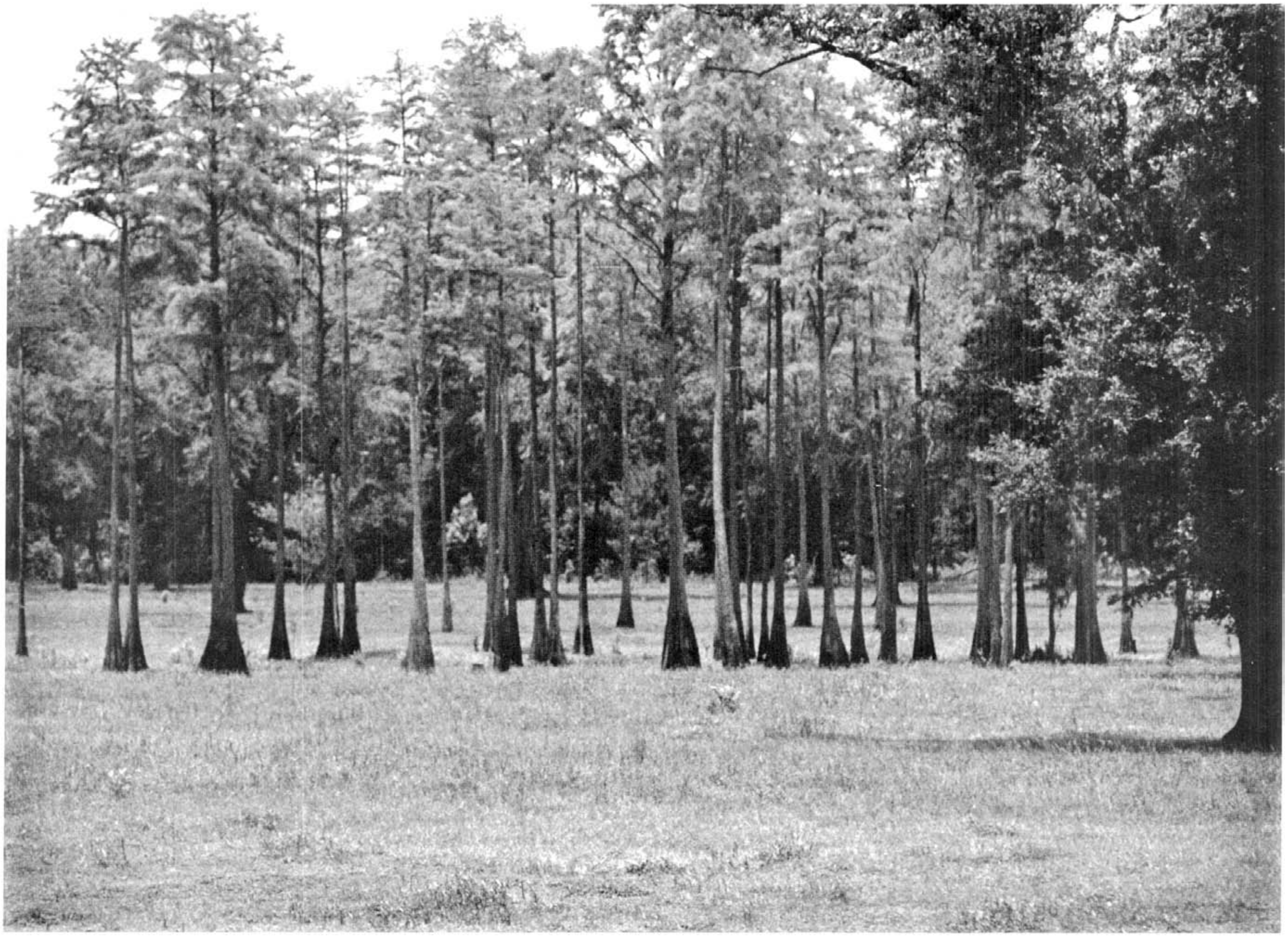

Figure 9.—Pondcypress and water-tolerant grasses in an area of Surrency and Pantego soils, depressional.

every mapped area. The relative proportion of the soils varies from area to area. Areas of the individual soils are large enough to be mapped separately. Because of the present and predicted land uses, however, they were mapped as one unit.

Small areas of soils that are similar to the Surrency and Pantego soils are included in mapping. These are Grifton soils and soils that have a thin surface layer of muck.

Small areas of soils that are dissimilar to the Surrency and Pantego soils are included in this map unit. These are Croatan soils, which make up about 1 to 14 percent of most mapped areas.

Under natural conditions, the Surrency and Pantego soils have a seasonal high water table within 12 inches of the surface for long periods. These soils are flooded for very long periods following heavy rainfall. Ponding occurs in the lower areas for long periods. The available water capacity is moderate or high. Permeability is moderate.

Most areas support natural vegetation, which consists of red maple, blackgum, sweetgum, sweetbay, swamp tupelo, baldcypress, and scattered pond pine. The understory includes waxmyrtle, dwarf palmetto, maidencane, ferns, sedges, and other water-tolerant grasses.

Unless major drainage systems are installed, these soils are not suited to cultivated crops, tame pasture grasses, planted pine trees, or grazeable woodland because of the prolonged wetness and the hazard of flooding. Establishing and maintaining a drainage system are difficult and expensive.

These soils are severely limited as sites for urban and recreational uses because of the hazard of flooding and the wetness. Intensive flood-control and drainage measures are necessary. Fill material is needed to elevate building sites, septic tank absorption fields, and local roads and streets.

These soils are well suited to habitat for wetland and woodland wildlife. Shallow water areas are easily developed, and the natural vegetation provides abundant food and shelter for wildlife.

The capability subclass is VIIw. The woodland ordination symbol is 7W.

10—Osier sand. This nearly level, poorly drained soil is in low areas in the flatwoods. Individual areas are circular or irregularly shaped and range from 10 to 120 acres in size. Slopes are smooth to concave and are less than 2 percent.

Typically, the surface layer is very dark gray sand about 5 inches thick. The underlying material to a depth of 80 inches or more is sand. The upper 20 inches is dark grayish brown, the next 30 inches is grayish brown, and the lower 25 inches is light brownish gray.

On 95 percent of the acreage mapped as Osier sand, Osier and similar soils make up 82 to 99 percent of the mapped areas. On 5 percent of the acreage, included soils make up more than 18 percent of the mapped areas.

Small areas of soils that are similar to the Osier soil are included in mapping. These are Chipley and Plummer soils and soils that have underlying material of dark brown to light yellowish brown sand or fine sand.

Small areas of soils that are dissimilar to the Osier soil are included in this map unit. These are Albany soils, which make up about 1 to 18 percent of most mapped areas.

Under natural conditions, the Osier soil has a seasonal high water table within a depth of 12 inches for 2 to 4 months and at a depth of 12 to 30 inches for about 3 to 6 months or more during most years. The available water capacity is very low. Permeability is rapid.

Most areas of this soil support natural vegetation. A few areas have been cleared and are used for tame pasture or planted pine. The natural vegetation consists of blackgum, water oak, slash pine, and scattered red maple. The understory includes pineland threeawn, gallberry, waxmyrtle, scattered saw palmetto, little bluestem, blue maidencane, toothachegrass, switchgrass, and various other grasses.

If used for cultivated crops, this soil has very severe limitations because of the wetness and low natural fertility. The number of crops that can be grown is limited unless good water-control measures are used. If these measures are applied, the soil is suitable for most locally grown crops. It is better suited to specialty crops than to most general farm crops. A good water-control system removes excess water during wet periods and provides for subsurface irrigation during dry periods. Good management includes growing row crops in rotation with close-growing, soil-improving cover crops; returning crop residue, including that of the soil-improving crops, to the soil; bedding rows to provide additional rooting depth; and applying fertilizer and lime according to the needs of the crop.

If water is properly controlled, the soil is well suited to improved bermudagrasses, bahiagrass, and legumes. If properly managed, good pastures of grass or of grass-legume mixtures can be established. Water-control measures are needed to remove excess surface water during long rainy periods. Irrigation is needed for the best yields of white clover or other adapted shallow-rooted pasture plants during dry periods. Establishing an optimum plant population, applying fertilizer and lime, and controlling grazing help to maintain a good plant cover and increase forage production.

The potential productivity of this soil is high for pines. Slash pine is suitable for planting. The equipment limitation, seedling mortality, and plant competition are management concerns. Seasonal wetness is the main limitation. The use of equipment that has large tires or tracks helps to overcome the equipment limitation and minimizes compaction and root damage during thinning activities. Preparing the site and planting and harvesting the trees during the drier periods also help to overcome the equipment limitation. Good site preparation, such as harrowing and bedding, helps to establish seedlings, helps to control competing vegetation, and facilitates planting. Leaving all plant debris on the site helps to maintain the content of organic matter in the soil.

This soil is well suited to grazeable woodland. The desirable forage is creeping bluestem, chalky bluestem, and blue maidencane. The forage composition and annual productivity are influenced by the forest canopy. Little grazing value can be expected after the canopy cover exceeds 60 percent.

This soil is severely limited as a site for dwellings without basements, for small commercial buildings, and for septic tank absorption fields because of the depth to the high water table during wet periods. A good drainage system is needed to remove excess water during wet periods and to control the water table. Adding suitable fill material increases the depth to the water table and thus helps to overcome the wetness.

The limitations affecting recreational uses are severe. The high water table is the major limitation. A good water-control system is needed. The sandy surface layer limits trafficability, and soil blowing is a hazard.

These limitations can be overcome by establishing and maintaining a good vegetative cover or windbreaks or by adding suitable topsoil or some other material that can stabilize the surface.

The capability subclass is IIIw. The woodland ordination symbol is 11W.

12—Sapelo sand. This nearly level, poorly drained soil is in the flatwoods. Individual areas are irregular in shape and range from 3 to more than 400 acres in size. Slopes are smooth and range from 0 to 2 percent.

Typically, the surface layer is very dark gray sand about 8 inches thick. The subsurface layer is grayish brown sand about 7 inches thick. The subsoil extends to a depth of 80 inches or more. In sequence downward, it is about 6 inches of very dark brown sand, 8 inches of dark brown sand, 21 inches of light gray sand, 10 inches of light gray fine sandy loam, and 20 inches of light gray sandy clay loam.

On 95 percent of the acreage mapped as Sapelo sand, Sapelo and similar soils make up 79 to 99 percent of the mapped areas. On 5 percent of the acreage, included soils make up more than 21 percent of the mapped areas.

Small areas of soils that are similar to the Sapelo soil are included in mapping. These are Mascotte and Plummer soils and soils that have less than 10 percent, by volume, ironstone nodules and weathered phosphatic limestone fragments in the lower part of the subsoil.

Small areas of soils that are dissimilar to the Sapelo soil are included in this map unit. These are Pelham, Starke, and Surrency soils, which make up about 1 to 21 percent of most mapped areas.

Under natural conditions, the Sapelo soil has a seasonal high water table within a depth of about 6 to 18 inches for 1 to 4 months during most years. The available water capacity is low. Permeability is moderate.

Most areas are used for the production of pine trees. A few areas are used for crops or pasture. The natural vegetation consists of slash pine, loblolly pine, gallberry, saw palmetto, fetterbush lyonia, and waxmyrtle. The understory includes chalky bluestem, pineland threeawn, lopsided indiangrass, and broomsedge bluestem.

If used for cultivated crops, this soil has very severe limitations because of the wetness and low fertility. The number of crops that can be grown is limited unless good water-control measures are used. If these measures are applied, the soil is suitable for most locally grown crops. It is better suited to specialty crops than to most general farm crops. A good water-control system removes excess water during wet periods and provides for subsurface irrigation during dry periods. Good management includes growing row crops in rotation with close-growing, soil-improving cover crops; returning crop residue, including that of the soil-improving crops, to the soil; bedding rows; and applying fertilizer and lime according to the needs of the crop.

If water is properly controlled, this soil is well suited to improved bermudagrass, bahiagrass, and legumes. If properly managed, good pastures of grass or of grass-legume mixtures can be established. Water-control measures are needed to remove excess surface water during long rainy periods. Irrigation is needed for the best yields of white clover or other adapted shallow-rooted pasture plants during dry periods. Establishing an optimum plant population, applying fertilizer and lime, and controlling grazing help to maintain a good plant cover and increase forage production.

The potential productivity of this soil is high for pines. Slash pine, loblolly pine, and longleaf pine are suitable for planting (fig. 10). The equipment limitation, seedling mortality, and plant competition are management concerns. Seasonal wetness is the main limitation. The use of equipment that has large tires or tracks helps to overcome the equipment limitation and minimizes compaction and root damage during thinning activities. Preparing the site and planting and harvesting the trees during the drier periods also help to overcome the equipment limitation. Good site preparation, such as harrowing and bedding, helps to establish seedlings, removes debris, helps to control competing vegetation, and facilitates planting. Leaving all plant debris on the site helps to maintain the content of organic matter in the soil. The trees respond well to applications of fertilizer.

This soil is well suited to grazeable woodland. The desirable forage is creeping bluestem, chalky bluestem, and blue maidencane. The forage composition and annual productivity are influenced by the forest canopy. Little grazing value can be expected after the canopy cover exceeds 60 percent.

This soil is severely limited as a site for dwellings without basements, for small commercial buildings, and for septic tank absorption fields because of the depth to the high water table during wet periods. A good drainage system is needed to remove excess water during wet periods and to control the water table. Adding suitable fill material increases the depth to the water table and thus helps to overcome the wetness.

The limitations affecting recreational uses are severe. The high water table is the major limitation. A good water-control system is needed. Trafficability also is a limitation. Because of the loose, sandy surface layer, soil blowing is a hazard during dry periods. Establishing and maintaining a good vegetative cover or windbreaks

Figure 10.—A well managed stand of slash pine in an area of Sapelo sand.

or adding suitable topsoil or some other material that can stabilize the surface improves trafficability and helps to control soil blowing.

The capability subclass is IVw. The woodland ordination symbol is 11W.

14—Pamlico and Croatan mucks. These nearly level, very poorly drained soils are in depressions. They do not occur in a regular repeating pattern on the landscape. Individual areas are irregularly shaped or elongated and range from 2 to more than 500 acres in size. Slopes are smooth or slightly concave and are less than 1 percent.

Typically, the surface layer of the Pamlico soil is muck about 40 inches thick. The upper 16 inches is dark brown, and the lower 24 inches is black. The underlying material to a depth of 80 inches or more is sand. The upper 10 inches is very dark grayish brown, and the lower 30 inches or more is grayish brown.

Typically, the surface layer of the Croatan soil is black muck about 23 inches thick. The underlying material extends to a depth of 80 inches or more. The upper 7 inches is very dark grayish brown mucky sandy loam. The next 35 inches is dark gray sandy clay loam. The lower 15 inches or more is gray sandy clay loam.

On 95 percent of the acreage mapped as Pamlico and Croatan mucks, Pamlico, Croatan, and similar soils make up 82 to 99 percent of the mapped areas. On 5 percent of the acreage, included soils make up more than 18 percent of the mapped areas. Generally, the mapped areas are about 52 percent Pamlico and similar soils and about 40 percent Croatan and similar soils. Some areas are Pamlico and similar soils, some are Croatan and similar soils, and some are both Pamlico and Croatan soils. Each of the soils does not necessarily occur in every mapped area. The relative proportion of the soils varies from area to area. Areas of the individual soils are large enough to be mapped separately. Because of the present and predicted land uses, however, they were mapped as one unit.

Small areas of soils that are similar to the Pamlico and Croatan soils are included in mapping. These are Dorovan soils and soils having an organic surface layer that is 8 to 16 inches thick.

Small areas of soils that are dissimilar to the Pamlico and Croatan soils are included in this map unit. These are Surrency soils and soils having coarse pockets of sand and loamy sand between the organic material and the underlying material. The dissimilar soils make up about 1 to 18 percent of most mapped areas.

Undrained areas of the Pamlico and Croatan soils are ponded for 6 months or more during the year, and a seasonal high water table is within 12 inches of the surface for 6 to 12 months during most years. The available water capacity is very high. Permeability is moderately slow to moderately rapid.

Most areas support natural vegetation, which consists of sweetbay, red maple, scattered pondcypress, and widely scattered pond pine. The understory includes large gallberry, fetterbush lyonia, willow, maidencane, and other water-tolerant plants. Areas of these soils provide cover for deer and are excellent habitat for wading birds and other wetland wildlife.

Under natural conditions, these soils are not suited to cultivated crops, tame pasture, planted pine trees, or grazeable woodland. The excessive wetness is the main limitation. Installing adequate water-control systems is difficult. Many areas are in isolated ponds or wet depressions that do not have suitable drainage outlets. In properly managed areas where a good drainage system can be installed, good-quality grass or grass-clover pastures can be established.

The limitations affecting urban uses are severe. Excess water on or near the surface during much of the year and the thick surface layer of muck are the dominant limitations. Drainage systems that would adequately remove the water and effectively regulate the water table are expensive and cannot be easily installed or maintained. Most areas do not have good drainage outlets. Even where adequate drainage systems are installed, maintaining the systems is a continuing problem. Suitable fill material is needed on sites for dwellings, small commercial buildings, and septic tank absorption fields.

The limitations affecting recreational uses are severe. The ponding and the mucky surface layer are the major limitations. A good water-control system is necessary. Also, suitable fill material is needed to improve trafficability and to increase the depth to the water table.

The capability subclass is VIIw. The woodland ordination symbol is 2W.

16—Foxworth fine sand, 0 to 5 percent slopes. This nearly level to gently sloping, moderately well drained soil is on uplands. Individual areas are irregular in shape and range from 2 to more than 150 acres in size. Slopes are smooth to convex.

Typically, the surface layer is very dark gray fine sand about 8 inches thick. The underlying material to a depth of 80 inches or more is sand. The upper 20 inches is yellowish brown, the next 47 inches is brownish yellow, and the lower 5 inches or more is very pale brown.

On 95 percent of the acreage mapped as Foxworth fine sand, 0 to 5 percent slopes, Foxworth and similar soils make up 83 to 99 percent of the mapped areas. On 5 percent of the acreage, included soils make up more than 17 percent of the mapped areas.

Small areas of soils that are similar to the Foxworth soil are included in mapping. These are Blanton and Lakeland soils; soils having a layer that is weakly coated with organic matter at a depth of about 50 inches or more; soils having a dark surface layer that is 10 to 19 inches thick; and, in a few areas, soils that have slopes of as much as 8 percent.

Small areas of soils that are dissimilar to the Foxworth soil are included in this map unit. These are Albany and Chipley soils and soils having ironstone concretions that make up less than 15 percent, by volume, of any one horizon. The dissimilar soils make up about 1 to 17 percent of most mapped areas.

Under natural conditions, the Foxworth soil has a seasonal high water table at a depth of 42 to 72 inches for 1 to 3 months. The water table is at a depth of 30 to 40 inches for less than 30 cumulative days in some years. The available water capacity is low. Permeability is very rapid.

Most areas are used for crops or tame pasture. The natural vegetation consists of live oak, laurel oak, turkey oak, and bluejack oak and some longleaf pine and slash pine. Other trees, such as dogwood, hickory, ironwood, and cherry, grow in some areas. The understory includes huckleberry, gallberry, pineland threeawn, and various other weeds and grasses.

If used for cultivated crops, this soil has severe limitations. Droughtiness, low natural fertility, and rapid leaching of plant nutrients limit the choice of suitable plants and reduce the potential crop yields. The high water table provides water through capillary rise and thus helps to compensate for the low available water capacity of the soil. Good management includes growing the crops in rotation with close-growing, soil-improving crops; returning crop residue to the soil; and applying fertilizer and lime. Irrigation of high-value crops generally is feasible where irrigation water is readily available. Soil blowing is a hazard where the surface is unprotected, especially during dry periods. Leaving crop residue on the surface can help to prevent excessive soil loss and conserves moisture.

This soil is moderately suited to tame pasture and hay. It is suited to deep-rooted plants, such as improved bermudagrass and bahiagrass, but yields are reduced by periodic droughtiness. If properly managed, good pastures can be established. Regular applications of fertilizer and lime are needed. Controlled grazing helps to maintain plant vigor.

The potential productivity of this soil is moderately high for pines. Slash pine and longleaf pine are suitable for planting. The equipment limitation, seedling mortality, and plant competition are management concerns. The use of equipment that has large tires or tracks helps to overcome the equipment limitation caused by the sandy surface layer. The soil is droughty. During long dry periods, it does not provide enough moisture for plant growth. Selecting special planting stock that is larger than usual or that is containerized reduces the seedling mortality rate. Retarding the growth of the hardwood understory by chemical or mechanical means helps to control plant competition. Leaving all plant debris on the site helps to maintain the content of organic matter in the soil.

This soil is moderately suited to grazeable woodland. The desirable forage is creeping bluestem, indiangrass, and low panicum. The forage composition and annual productivity are influenced by the forest canopy. Little grazing value can be expected after the canopy cover exceeds 60 percent.

This soil has slight limitations if used as a site for dwellings without basements or for small commercial buildings and moderate limitations if used as a site for septic tank absorption fields. No corrective measures are needed. Because of a poor filtering capacity, however, ground water contamination is a hazard in areas that have a concentration of dwellings with septic tanks.

The limitations affecting recreational uses are severe. The sandy surface layer limits trafficability, and soil blowing is a hazard. These limitations can be overcome by establishing and maintaining a good vegetative cover or windbreaks or by adding suitable topsoil or some other material that can stabilize the surface.

The capability subclass is IIIs. The woodland ordination symbol is 10S.

17—Blanton fine sand, 0 to 5 percent slopes. This nearly level to gently sloping, moderately well drained soil is in the uplands. Individual areas are irregular in shape and range from 2 to more than 500 acres in size. Slopes are smooth to convex.

Typically, the surface layer is very dark gray fine sand about 9 inches thick. The subsurface layer extends to a depth of about 42 inches. It is fine sand. The upper 27 inches is yellowish brown, and the lower 6 inches is very pale brown and has about 5 percent quartz gravel and ironstone nodules. The subsoil extends to a depth of 80 inches or more. In sequence downward, it is 6 inches of light yellowish brown loamy fine sand, 13 inches of light yellowish brown sandy clay loam that has 5 percent quartz gravel and ironstone nodules, 13 inches of gray sandy clay, and 6 or more inches of white sandy clay.

On 95 percent of the acreage mapped as Blanton fine sand, 0 to 5 percent slopes, Blanton and similar soils make up 82 to 99 percent of the mapped areas. On 5 percent of the acreage, included soils make up more than 18 percent of the mapped areas.

Small areas of soils that are similar to the Blanton soil are included in mapping. These are Foxworth and Troup soils; soils that have 15 to 35 percent, by volume, ironstone nodules or weathered phosphatic, gravel-sized limestone fragments in one or more horizons; soils that have loamy material at a depth of 20 to 40 inches; and, adjacent to drainageways, soils that have slopes of more than 5 percent.

Small areas of soils that are dissimilar to the Blanton soil are included in this map unit. These are Albany, Lakeland, and Ocilla soils, which make up about 1 to 18 percent of most mapped areas.

The Blanton soil has a perched water table at a depth of 48 to 72 inches for 2 to 4 months in most years. The water table is at a depth of 36 to 48 inches for less than 30 cumulative days in some years. It recedes to a depth of more than 72 inches during extended dry periods. The available water capacity is low. Permeability is moderate.

Most areas of this soil are used for tame pasture or cultivated crops. The natural vegetation consists of bluejack oak and turkey oak and scattered live oak, longleaf pine, and slash pine. Various other hardwoods, such as dogwood, ironwood, hickory, and cherry, are common. The understory includes pineland threeawn, creeping bluestem, low panicum, and various other grasses.

If used for cultivated crops, this soil has severe limitations. Droughtiness, low natural fertility, and rapid leaching of plant nutrients limit the choice of suitable crops and reduce the potential crop yields. The high water table provides water through capillary rise and thus helps to compensate for the low available water capacity of the soil. Good management includes growing the crops in rotation with close-growing, soil-improving crops; returning crop residue to the soil; and applying fertilizer and lime. Irrigation of high-value crops generally is feasible where irrigation water is readily available. Soil blowing is a hazard where the surface is unprotected, especially during dry periods. Leaving crop residue on the surface can help to prevent excessive soil loss and conserves moisture.

This soil is moderately well suited to tame pasture and hay. It is well suited to deep-rooted plants, such as improved bermudagrass and improved bahiagrass, but yields are reduced by periodic droughtiness. Regular applications of fertilizer and lime are needed. Controlled grazing helps to maintain plant vigor.

The potential productivity of this soil is high for pines. Slash pine, longleaf pine, and loblolly pine are suitable for planting. The equipment limitation and seedling mortality are management concerns. The soil is droughty. During long dry periods, it does not provide enough moisture for plant growth. Selecting special planting stock that is larger than usual or that is containerized reduces the seedling mortality rate. The use of equipment that has large tires or tracks helps to overcome the equipment limitation on this loose, sandy soil. Retarding the growth of the hardwood understory by chemical or mechanical means helps to control plant competition. Leaving all plant debris on the site helps to maintain the content of organic matter in the soil. The trees respond well to applications of fertilizer.

This soil is moderately suited to grazeable woodland. The desirable forage is creeping bluestem, indiangrass, and low panicum. The forage composition and annual productivity are influenced by the forest canopy. Little grazing value can be expected after the canopy cover exceeds 60 percent.

This soil has slight limitations if used as a site for dwellings without basements or for small commercial buildings. It is moderately limited as a site for septic tank absorption fields because of the depth to the water table during wet periods. In most areas corrective measures are not needed. Adding suitable fill material or installing a drainage system, however, helps to overcome the wetness.

The limitations affecting recreational uses are severe. The sandy surface layer limits trafficability, and soil blowing is a hazard. These limitations can be overcome by establishing and maintaining a good vegetative cover or windbreaks or by adding suitable topsoil or some other material that can stabilize the surface.

The capability subclass is IIIs. The woodland ordination symbol is 11S.

18—Lakeland sand, 0 to 5 percent slopes. This nearly level to gently sloping, excessively drained soil is on broad, slightly elevated ridges in the uplands. Individual areas are regular in shape and range from 20 to 100 acres in size. Slopes are smooth to convex.

Typically, the surface layer is very dark grayish brown sand about 8 inches thick. The underlying material to a depth of 80 inches or more is sand. The upper 40 inches is dark yellowish brown, and the lower 32 inches or more is strong brown and has about 2 percent ironstone concretions.

On 95 percent of the acreage mapped as Lakeland sand, 0 to 5 percent slopes, Lakeland and similar soils make up 83 to 99 percent of the mapped areas. On 5 percent of the acreage, included soils make up more than 17 percent of the mapped areas.

Small areas of soils that are similar to the Lakeland soil are included in mapping. These are Troup soils; soils having thin, discontinuous strata of loamy material at a depth of about 70 inches or more; and, in a few areas, soils that have slopes of as much as 12 percent.

Small areas of soils that are dissimilar to the Lakeland soil are included in this map unit. These are Blanton soils, which make up about 1 to 17 percent of most mapped areas.

The Lakeland soil has a water table below a depth of 80 inches. The available water capacity is low. Permeability is rapid.

Most areas of this soil support natural vegetation. Some areas are used for tame pasture or urban development. The natural vegetation consists of bluejack oak, turkey oak, sand post oak, slash pine, and cherry. The understory includes poison oak, pricklypear cactus, persimmon, sumac, lopsided indiangrass, purple lovegrass, and pineland threeawn.

If used for cultivated crops, this soil has very severe limitations. It does not retain a sufficient amount of moisture during the drier periods because of the coarse texture. Applied plant nutrients are rapidly leached from the soil. Corn, peanuts, and watermelons can be grown, but intensive management is needed. This includes growing soil-improving cover crops, returning crop residue to the soil, applying fertilizer and lime, and using suitable crop rotations. Irrigation is needed during droughty periods. Soil blowing is a severe hazard where the surface is unprotected. It can damage tender crops.

This soil is moderately suited to tame pasture grasses and hay. It is suited to deep-rooted plants, such as improved bermudagrass and improved bahiagrass, but yields are reduced by periodic droughtiness. Regular applications of fertilizer and lime are needed. Controlled grazing helps to maintain plant vigor. Irrigation improves the quality of the pasture and hay. Shallow-rooted pasture plants do not grow well because the root zone does not retain a sufficient amount of moisture.

The potential productivity of this soil is moderately high for pines. Slash pine, longleaf pine, and sand pine are suitable for planting. The equipment limitation and seedling mortality are management concerns. The soil is droughty. During long dry periods, it does not provide enough moisture for plant growth. Selecting special planting stock that is larger than usual or that is containerized reduces the seedling mortality rate. The use of equipment that has large tires or tracks helps to overcome the equipment limitation on this loose, sandy soil. Leaving all plant debris on the site helps to maintain the content of organic matter in the soil.

This soil is moderately suited to grazeable woodland. The desirable forage is creeping bluestem, indiangrass, and panicum. The forage composition and annual productivity are influenced by the forest canopy. Little grazing value can be expected after the canopy cover exceeds 60 percent.

This soil has slight limitations if used as a site for dwellings, for small commercial buildings, or for septic tank absorption fields. Because of a poor filtering capacity, however, ground water contamination is a hazard in areas that have a concentration of dwellings with septic tanks.

The limitations affecting recreational uses are severe. The sandy surface layer limits trafficability, and soil blowing is a hazard. These limitations can be overcome by establishing and maintaining a good vegetative cover or windbreaks or by adding suitable topsoil or some other material that can stabilize the surface.

The capability subclass is IVs. The woodland ordination symbol is 9S.

20—Grifton and Elloree soils, frequently flooded. These nearly level, poorly drained soils are on flood plains along the New River and other major drainageways throughout the county. They do not occur in a regular repeating pattern on the landscape. Some areas are isolated by meandering stream channels. Individual areas are narrow and elongated and range from 5 to more than 500 acres in size. Slopes are smooth to concave and range from 0 to 2 percent.

Typically, the surface layer of the Grifton soil is very dark gray loamy fine sand about 4 inches thick. The subsurface layer is dark gray loamy fine sand about 6 inches thick. The subsoil extends to a depth of 65 inches or more. In sequence downward, it is 8 inches of dark gray sandy clay loam, 34 inches of dark gray and gray sandy clay loam that has pockets and discontinuous bands of soft carbonate, and 13 or more inches of gray sandy loam.

Typically, the surface layer of the Elloree soil is black fine sand about 5 inches thick. The subsurface layer extends to a depth of about 33 inches. It is fine sand. The upper 10 inches is grayish brown, and the lower 18 inches is gray. The subsoil extends to a depth of about 80 inches. The upper 10 inches is light gray sandy loam, the next 12 inches is grayish brown sandy loam, and the lower 25 inches is grayish brown sandy clay loam.

On 95 percent of the acreage mapped as Grifton and Elloree soils, frequently flooded, Grifton, Elloree, and similar soils make up 82 to 99 percent of the mapped areas. On 5 percent of the acreage, included soils make up more than 18 percent of the mapped areas. Generally, the mapped areas are about 67 percent Grifton and similar soils and about 26 percent Elloree and similar soils. Some areas are Grifton and similar soils, some are Elloree and similar soils, and some are both Grifton and Elloree soils. Each of the soils does not necessarily occur in every mapped area. The relative proportion of the soils varies from area to area. Areas of the individual soils are large enough to be mapped separately. Because of the present and predicted land uses, however, they were mapped as one unit.

Small areas of soils that are similar to the Grifton and Elloree soils are included in mapping. These are soils that have loamy sand, sand, or fine sand at a depth of about 50 inches or more; soils that have a thick, dark surface layer; and soils that have a surface layer of fine sand or sand underlain by a subsoil of sandy clay loam or sandy clay.

Small areas of soils that are dissimilar to the Grifton and Elloree soils are included in this map unit. These are Ousley soils and Fluvaquents, which make up about 1 to 18 percent of most mapped areas.

Under natural conditions, the Grifton and Elloree soils have a seasonal high water table within 12 inches of the surface for 2 to 6 months during most years. The duration of flooding is from several days to several weeks during extended periods of heavy rainfall. Ponding occurs in the lower areas of these soils for long periods. The available water capacity is low or moderate. Permeability is moderate or moderately rapid.

Most areas support natural vegetation, which consists of various water-tolerant hardwoods, such as overcup oak, water oak, sweetgum, ironwood, red maple, scattered slash pine, loblolly pine, and baldcypress. The understory vegetation includes scattered dwarf palmetto, greenbrier, waxmyrtle, and other water-tolerant plants.

Unless major drainage systems are installed, these soils are not suited to cultivated crops, tame pasture grasses, or grazeable woodland because of the prolonged wetness and the hazard of flooding. Establishing and maintaining a drainage system are difficult because of the hazard of flooding.

These soils generally are not used for the production of pine trees. The equipment limitation, plant competition, and seedling mortality are management concerns. A water-control system is needed to remove excess surface water. Slash pine, loblolly pine, baldcypress, and hardwoods are suitable for planting. Harvesting and planting should be scheduled for dry periods.

These soils are severely limited as sites for urban and recreational uses because of the hazard of flooding and the wetness. Intensive flood-control and drainage measures are necessary. Fill material is needed to elevate building sites, septic tank absorption fields, and local roads and streets.

These soils are well suited to habitat for wetland and woodland wildlife. Shallow water areas are easily developed, and the natural vegetation provides abundant food and shelter for wildlife.

The capability subclass is VIw. The woodland ordination symbol is 11W.

22—Chipley fine sand, 0 to 5 percent slopes. This nearly level to gently sloping, somewhat poorly drained soil is on low knolls and ridges in the flatwoods and on toe slopes in the uplands. Individual areas are irregularly shaped or elongated and range from 3 to more than 20 acres in size. Slopes are smooth or slightly convex.

Typically, the surface layer is very dark grayish brown fine sand about 5 inches thick. The underlying material extends to a depth of 80 inches or more. In sequence downward, it is 13 inches of yellowish brown fine sand, 20 inches of brownish yellow fine sand, 15 inches of yellow fine sand, 19 inches of pale brown fine sand, and 8 inches or more of light gray sand.

On 95 percent of the acreage mapped as Chipley fine sand, 0 to 5 percent slopes, Chipley and similar soils make up 78 to 99 percent of the mapped areas. On 5 percent of the acreage, included soils make up more than 22 percent of the mapped areas.

Small areas of soils that are similar to the Chipley soil are included in mapping. These are Albany soils.

Small areas of soils that are dissimilar to the Chipley soil are included in this map unit. These are Blanton and Foxworth soils, which make up about 1 to 22 percent of most mapped areas.

Under natural conditions, the Chipley soil has a seasonal high water table at a depth of 24 to 36 inches for 2 to 4 months in most years. The water table is at a depth of 12 to 24 inches for less than 30 cumulative days in some years. It recedes to a depth of 60 inches or more during extended dry periods. The available water capacity is low. Permeability is rapid.

Most areas of this soil are used for cultivated crops, tame pasture, or planted pine or support natural vegetation, which consists of longleaf pine, slash pine, scattered bluejack oak, post oak, turkey oak, live oak, and laurel oak. The understory includes waxmyrtle, gallberry, chalky bluestem, hairy panicum, pineland threeawn, and various other grasses.

If used for cultivated crops, this soil has severe limitations because of the wetness, low natural fertility, and the hazard of erosion. The high water table retards root development during wet periods. A well designed, simple drainage system can overcome this limitation. If good management that includes water-control measures is applied, the soil is suited to most locally grown crops. Good management includes growing the crops in rotation with close-growing, soil-improving crops; returning crop residue to the soil; and applying fertilizer and lime. Irrigation generally is feasible if water is readily available. Soil blowing is a hazard where the surface is unprotected, especially during dry periods. Leaving crop residue on the surface can help to prevent excessive soil loss and conserves moisture.

This soil is moderately suited to tame pasture and hay. It is suited to deep-rooted plants, such as improved bermudagrass and bahiagrass, but yields are reduced by periodic droughtiness. If properly managed, good pastures of grass or of grass-legume mixtures can be established. Regular applications of fertilizer and lime are needed. Controlled grazing helps to maintain plant vigor and thus helps to ensure maximum yields.

The potential productivity of this soil is high for pines. Slash pine, longleaf pine, and loblolly pine are suitable for planting. The equipment limitation, seedling mortality, and plant competition are management concerns. The use of equipment that has large tires or tracks helps to overcome the equipment limitation and minimizes compaction and root damage during thinning activities. Good site preparation, such as harrowing and bedding, helps to establish seedlings, removes debris, helps to control competing vegetation, and facilitates planting. Retarding the growth of the hardwood understory by chemical or mechanical means helps to control plant competition.

This soil is moderately suited to grazeable woodland.

The desirable forage is creeping bluestem, indiangrass, and panicum. The forage composition and annual productivity are influenced by the forest canopy. Little grazing value can be expected after the canopy cover exceeds 60 percent.

This soil is severely limited as a site for dwellings without basements, for small commercial buildings, and for septic tank absorption fields because of the depth to the water table during wet periods. Adding suitable fill material increases the depth to the water table and thus helps to overcome the wetness. If outlets are available, a surface drainage system can be installed.

The limitations affecting recreational uses are severe. The sandy surface layer limits trafficability, and soil blowing is a hazard. These limitations can be overcome by establishing and maintaining a good vegetative cover or windbreaks or by adding suitable topsoil or some other material that can stabilize the surface.

The capability subclass is IIIs. The woodland ordination symbol is 11S.

23—Pelham-Pelham, wet, fine sands. These nearly level, poorly drained soils generally are in broad areas in the flatwoods. The wet Pelham soil is in the slightly lower areas and in poorly defined drainageways. The soils occur in a regular repeating pattern on the landscape. Excess water ponds in the low areas during the rainy season and for short periods after heavy rainfall (fig. 11). Individual areas are broad or irregularly shaped and range from 2 to more than 3,600 acres in size. Slopes are smooth or slightly concave and range from 0 to 2 percent.

Typically, the surface layer of the Pelham soil in broad areas in the flatwoods is very dark gray fine sand about 8 inches thick. The subsurface layer extends to a depth of about 31 inches. It is fine sand. The upper 7 inches is dark gray, and the lower 16 inches is gray. The subsoil extends to a depth of 80 inches or more. The upper 5 inches is gray fine sandy loam, the next 26 inches is gray sandy clay loam, and the lower 18 inches is light gray sandy clay.

Typically, the surface layer of the wet Pelham soil is very dark gray fine sand about 8 inches thick. The subsurface layer extends to a depth of about 22 inches. It is gray fine sand. The subsoil extends to a depth of 80 inches or more. The upper 26 inches is gray fine sandy loam, the next 13 inches is gray sandy clay loam, and the lower 32 inches or more is dark gray sandy clay loam.

On 95 percent of the acreage mapped as Pelham-Pelham, wet, fine sands, Pelham and similar soils make up 85 to 98 percent of the mapped areas. On 5 percent of the acreage, included soils make up more than 15 percent of the mapped areas. Generally, the mapped areas are about 52 percent Pelham and similar soils in broad areas in the flatwoods and 39 percent wet Pelham soil and similar soils. The components of this map unit occur as areas so intricately intermingled that it is not practical to map them separately at the scale used in mapping. The proportions and patterns of both of the Pelham soils and of the similar soils are relatively consistent in most mapped areas.

Small areas of soils that are similar to the Pelham soils are included in mapping. These are Plummer soils; soils that have 5 to 15 percent, by volume, ironstone nodules or weathered phosphatic, gravel-sized limestone fragments in one or more horizons; soils in which the subsoil is within a depth of 20 inches; soils that have more than 35 percent base saturation in the subsoil; soils that have a substratum of sand or loamy sand at a depth of 60 inches or more; and, in a few areas adjacent to well defined drainageways, soils that have slopes of as much as 5 percent and a yellow subsurface layer.

Small areas of soils that are dissimilar to the Pelham soils are included in this map unit. These are Albany and Surrency soils, which make up about 2 to 15 percent of most mapped areas.

Under natural conditions, the Pelham soil in broad areas in the flatwoods has a water table within about 6 to 18 inches of the surface for 2 to 4 months and the wet Pelham soil has one at or above the surface for 2 to 4 months during rainy periods and for short periods after heavy rainfall. The water table recedes to a depth of 24 to 40 inches or more in both soils during droughty periods. The available water capacity is low. Permeability is moderate.

Most areas support second-growth pine or planted pine. A few areas are used for tame pasture, hay, or urban development. The natural vegetation consists of slash pine, longleaf pine, laurel oak, scattered sweetgum, blackgum, and water oak in the flatwoods. Pond pine, pondcypress, scattered sweetgum, and slash pine grow in the lower areas. The understory includes waxmyrtle, blackberry, tarflower, gallberry, grape, greenbrier, lopsided indiangrass, chalky bluestem, scattered saw palmetto, panicum, pineland threeawn, and little bluestem in the flatwoods and maidencane, St Johnswort, and various other water-tolerant grasses in the lower areas.

If used for cultivated crops under natural conditions, these soils have very severe limitations because of the wetness and low natural fertility. They are suited to most vegetable crops, however, if intensive management that includes a water-control system to remove excess water rapidly and provide for subsurface irrigation is applied. Soil-improving crops and crop residue can protect the soils from erosion and maintain

Figure 11.—Ponding on the wet Pelham soil in an area of Pelham-Pelham, wet, fine sands. The site has been cleared and prepared for the next planting of pine trees.

the content of organic matter. Seedbed preparation should include bedding of rows. Fertilizer should be applied according to the needs of the crop.

If water is properly controlled, these soils are well suited to improved bermudagrasses, bahiagrass, and legumes. If properly managed, good pastures of grass or of grass-legume mixtures can be established. Water-control measures are needed to remove excess surface water during long rainy periods. Irrigation is needed for the best yields of white clover or other adapted shallow-rooted pasture plants during dry periods. Establishing an optimum plant population, applying fertilizer and lime, and controlling grazing help to maintain a good plant cover and increase forage production.

In most areas the potential productivity of these soils is high for pines. Slash pine and loblolly pine are suitable for planting. The equipment limitation, seedling mortality, and plant competition are management concerns. Seasonal wetness is the main limitation. The use of equipment that has large tires or tracks helps to overcome the equipment limitation and minimizes compaction and root damage during thinning activities. Preparing the site and planting and harvesting the trees during the drier periods also help to overcome the equipment limitation. Good site preparation, such as harrowing and bedding, helps to establish seedlings, helps to control competing vegetation, and facilitates planting. Leaving all plant debris on the site helps to maintain the content of organic matter in the soils. The trees respond well to applications of fertilizer.

These soils are well suited to grazeable woodland. The desirable forage is creeping bluestem, chalky bluestem, and blue maidencane. The forage composition and annual productivity are influenced by the forest canopy. Little grazing value can be expected after the canopy cover exceeds 60 percent.

These soils are severely limited as sites for dwellings without basements, for small commercial buildings, and for septic tank absorption fields because of the depth to the high water table during wet periods. A good drainage system is needed to remove excess water during wet periods and to control the water table. Adding suitable fill material increases the depth to the water table and thus helps to overcome the wetness.

The limitations affecting recreational uses are severe. The high water table is the major limitation. A good water-control system is needed. The sandy surface layer limits trafficability, and soil blowing is a hazard. These limitations can be overcome by establishing and maintaining a good vegetative cover or windbreaks or by adding suitable topsoil or some other material that can stabilize the surface.

The Pelham soil in broad areas in the flatwoods is assigned to capability subclass IIIw. The wet Pelham soil is assigned to capability subclass Vw. Both soils are assigned to woodland ordination symbol 11W.

24—Starke mucky fine sand, depressional. This nearly level, very poorly drained soil is in depressions in the flatwoods. Individual areas are circular, irregularly shaped, or elongated and range from 2 to more than 15 acres in size. Slopes are smooth to concave and range from 0 to 2 percent.

Typically, the upper part of the surface layer is black mucky fine sand about 7 inches thick. The lower part is black fine sand about 11 inches thick. The subsurface layer extends to a depth of about 46 inches. It is fine sand. The upper 8 inches is dark grayish brown, and the lower 20 inches is brown. The subsoil extends to a depth of 80 inches or more. It is gray sandy loam in the upper 13 inches and gray sandy clay loam in the lower 21 inches or more.

On 95 percent of the acreage mapped as Starke mucky fine sand, depressional, Starke and similar soils make up 84 to 99 percent of the mapped areas. On 5 percent of the acreage, included soils make up more than 16 percent of the mapped areas.

Small areas of soils that are similar to the Starke soil are included in mapping. These are Plummer and Surrency soils and soils that have a surface layer of muck 8 to 16 inches thick.

Small areas of soils that are dissimilar to the Starke soil are included in this map unit. These are Croatan, Pamlico, and Plummer soils, which make up about 1 to 16 percent of most mapped areas.

Undrained areas of the Starke soil are ponded for 4 to 8 months during the year, and the water table is within 12 inches of the surface for 6 to 9 months during most years. The available water capacity and permeability are moderate.

Most areas of this soil support natural vegetation, which consists of pondcypress, scattered slash pine, sweetbay, red maple, and tupelo. The understory includes maidencane, brackenfern, sedge, greenbrier, gallberry, St Johnswort, and other water-tolerant plants.

Under natural conditions, this soil is not suited to cultivated crops, tame pasture, planted pine trees, or grazeable woodland. The excessive wetness is the main limitation. Installing adequate water-control systems is difficult. Many areas are in isolated ponds or wet depressions that do not have suitable drainage outlets. In properly managed areas where a good drainage system can be installed, good-quality grass or grass-clover pastures can be established.

The limitations affecting urban uses are severe. Excess water on or near the surface during much of the year is the dominant limitation. Drainage systems that would adequately remove the water and effectively regulate the water table are expensive and cannot be easily installed or maintained. Most areas do not have good drainage outlets. Even where adequate drainage systems are installed, maintaining the systems is a continuing problem. Suitable fill material is needed on sites for dwellings, small commercial buildings, and septic tank absorption fields.

The limitations affecting recreational uses are severe. The ponding and the sandy texture are the major limitations. A good water-control system is necessary. Also, suitable fill material is needed to improve trafficability and to increase the depth to the water table.

The capability subclass is VIIw. The woodland ordination symbol is 2W.

25—Fluvaquents-Ousley association, occasionally flooded. These nearly level, poorly drained and somewhat poorly drained soils are on the flood plains along the Santa Fe River, the New River, and other major drainageways throughout the county. The soils occur in a regular repeating pattern on the landscape. Some areas are isolated by meandering stream channels. Individual areas are long and narrow or broad and irregularly shaped and range from 10 to more than 500 acres in size. Slopes are smooth to concave or are undulating in dissected areas. They generally range from 0 to 2 percent.

Typically, the surface layer of the Fluvaquents is grayish brown loamy sand about 5 inches thick. The underlying material extends to a depth of 80 inches or more. In sequence downward, it is 14 inches of grayish brown loam, 11 inches of grayish brown sand, 12 inches of dark grayish brown sandy clay loam, and 38 or more inches of dark grayish brown sand.

Typically, the surface layer of the Ousley soil is dark grayish brown fine sand about 4 inches thick. The underlying material extends to a depth of 80 inches or more. In sequence downward, it is 20 inches of brown fine sand, 16 inches of very pale brown fine sand, 15 inches of light brownish gray sand, and 25 or more inches of light gray sand.

On 95 percent of the acreage mapped as the Fluvaquents-Ousley association, occasionally flooded, Fluvaquents, Ousley, and similar soils make up 95 to 99 percent of the mapped areas. On 5 percent of the acreage, included soils make up more than 5 percent of the mapped areas. Generally, the mapped areas are about 78 percent Fluvaquents and similar soils and about 18 percent Ousley and similar soils. Some areas are Fluvaquents and similar soils, some are Ousley and similar soils, and some are both Fluvaquents and Ousley soils. Each of the soils does not necessarily occur in every mapped area. The relative proportion of the soils varies from area to area. Areas of the individual soils are large enough to be mapped separately. Because of the present and predicted land uses, however, they were mapped as one unit.

Soils that are similar to the Fluvaquents are included in mapping. These are soils that are loamy or sandy throughout or that have a thin surface layer of muck. Small areas of soils that are similar to the Ousley soil are included in mapping. These soils have thin, discontinuous layers of loamy material.

Small areas of soils that are dissimilar to the Ousley soil and Fluvaquents are included in this map unit. These are Grifton and Elloree soils, which make up about 1 to 5 percent of most mapped areas.

Under natural conditions, the Fluvaquents have a seasonal high water table within a depth of 12 inches for 2 to 6 months. The water table recedes to a depth of 12 to 40 inches during the rest of the year. The Ousley soil has a seasonal high water table at a depth of 18 to 36 inches for 2 to 4 months and at a depth of 12 to 18 inches for brief periods after heavy rainfall. The water table recedes to a depth of 60 inches or more during extended dry periods. The frequency, duration, and extent of flooding vary and are directly related to the intensity and frequency of rainfall. The flooding normally lasts from 7 weeks to 6 months or more on the Fluvaquents and for less than 7 days on the Ousley soil. Excess water ponds in the lower areas of the Fluvaquents. The available water capacity is low or moderate in the Fluvaquents and very low in the Ousley soil. Permeability varies in the Fluvaquents and is rapid in the Ousley soil.

Most areas support natural vegetation, which consists of baldcypress, sweetgum, sweetbay, water oak, red maple, laurel oak, blackgum, sparkleberry, and common sweetleaf. The understory includes dwarf palmetto, ferns, gallberry, waxmyrtle, greenbrier, low panicum, and other water-tolerant plants.

These soils are not suited to cultivated crops, tame pasture grasses, or grazeable woodland because of the prolonged wetness and the hazard of flooding. Numerous backwater channels, low areas, and steep banks severely limit the use of equipment even in dry periods. Because the soils vary greatly over short distances and are subject to flooding, applying management measures is difficult.

These soils generally are not suited to planted pines. In a few areas, however, the potential productivity of the Ousley soil is moderately high for pines. Slash pine is suitable for planting. The equipment limitation, seedling mortality, and plant competition are management concerns. The hazard of flooding and the wetness in adjacent areas severely restrict the use of these soils for planted pines. The use of equipment that has large tires or tracks helps to overcome the equipment limitation and minimizes compaction and root damage during thinning activities. Good site preparation, such as harrowing and bedding, helps to establish seedlings, removes debris, helps to control competing vegetation, and facilitates planting. Retarding the growth of the hardwood understory by chemical or mechanical means helps to control plant competition.

These soils are severely limited as sites for urban and recreational uses because of the hazard of flooding and the wetness. Intensive flood-control and drainage measures are necessary. Fill material is needed to elevate building sites, septic tank absorption fields, and local roads and streets.

These soils are well suited to habitat for wetland and woodland wildlife. Shallow water areas are easily developed, and the natural vegetation provides abundant food and shelter for wildlife.

The Fluvaquents are assigned to capability subclass

Vw and woodland ordination symbol 7W. The Ousley soil is assigned to capability subclass IIIw and woodland ordination symbol 10W.

28—Arents, moderately wet, 0 to 5 percent slopes. These nearly level to gently sloping soils are in areas that have been reworked or filled in during earthmoving activities. The soil material in these areas is used as fill in shallow depressions, swamps, and other low areas. The soils are mainly in shallow landfills, on elevated building sites, on airstrips, and adjacent to bodies of water. Individual areas are irregularly shaped or rectangular and range from 1 to more than 100 acres in size.

These soils consist of material dug from several areas that have different kinds of soil. Typically, the upper 8 inches is brown and dark brown fine sand. It is underlain by 14 inches of grayish brown sandy loam and 5 inches of pale brown loamy fine sand. Below this to a depth of 80 inches is undisturbed soil. In sequence downward, the undisturbed soil is 6 inches of very dark gray fine sand, 14 inches of light brownish gray fine sand, 9 inches of light gray fine sand, and 24 or more inches of grayish brown sandy loam. The texture of the fill material ranges from fine sand to sandy clay loam. Thin, discontinuous lenses or clods of a dark, sandy subsoil or a few rock fragments can be scattered throughout the matrix.

Included with these soils in mapping are small areas of soils that are similar to the Arents but have slopes of more than 5 percent as a result of stockpiling; small areas of undisturbed soils; small areas of water; areas where soil material has been removed, backfilled, or both to a depth of 80 inches or more; and areas where sand or fine sand is mixed with discontinuous loamy fragments. Also included are areas that are used as sanitary landfills and are as much as 50 percent or more solid waste material. These areas are delineated as "sanitary landfill" on the soil map. The percentage of included soils varies from one area to another but generally does not exceed 30 percent.

Most properties of the Arents vary. Permeability generally is moderately rapid or rapid. Depth to the water table varies, depending on the amount of fill material and the extent of artificial drainage in any given area. In most years the water table is at a depth of 18 to 36 inches for 2 to 4 months. In some areas where the Arents consist of two or more strata of sandy and loamy material, it is perched over the layer of loamy material after heavy rainfall. The water table can be at a depth of 60 inches or more during extended dry periods. Reaction ranges from slightly acid to moderately alkaline. The available water capacity generally ranges from very low to moderate.

The natural vegetation has been removed from most areas of these soils. The existing vegetation consists of scattered slash pine and various weeds or grasses. Cypress and water-tolerant plants grow in some low areas. Some areas have been leveled and seeded to various grasses.

Most areas of these soils are used for urban development. Onsite investigations are needed to determine the suitability for all uses because both the soil material and the depth to the high water table vary, depending on the amount of fill material and the extent of artificial drainage.

No capability subclass or woodland ordination symbol is assigned.

29—Dorovan muck, frequently flooded. This nearly level, very poorly drained, organic soil is on flood plains and in drainageways. Individual areas are narrow and elongated or broad and irregularly shaped and range from 40 to 5,600 acres in size. Slopes are smooth and range from 0 to 2 percent.

Typically, the surface layer is dark brown muck about 25 inches thick. Below this to a depth of 80 inches or more is very dark brown muck.

On 95 percent of the acreage mapped as Dorovan muck, frequently flooded, Dorovan and similar soils make up 93 to 99 percent of the mapped areas. On 5 percent of the acreage, included soils make up more than 7 percent of the mapped areas.

Small areas of soils that are similar to the Dorovan soil are included in mapping. These are Pamlico and Croatan soils. Pamlico soils are around the outer edges of the mapped areas.

Small areas of soils that are dissimilar to the Dorovan soil are included in this map unit. These are Pantego soils, which make up about 1 to 7 percent of most mapped areas.

Under natural conditions, the Dorovan soil has a water table at or above the surface for 6 months or more during most years. Flooding occurs frequently during rainy periods. The duration and extent of flooding vary and are directly related to the intensity and frequency of rainfall. The flooding generally lasts from 1 to 4 months. The available water capacity is very high. Permeability is moderate.

Most areas of this soil support natural vegetation, which consists of baldcypress, red maple, sweetbay, sweetgum, and swamp tupelo. The understory includes scattered fetterbush lyonia, greenbrier, and various water-tolerant grasses.

Unless major drainage systems are installed, this soil is not suited to cultivated crops, tame pasture grasses, planted pine trees, or grazeable woodland because of the prolonged wetness and the hazard of flooding.

Establishing and maintaining a drainage system are difficult.

This soil is severely limited as a site for urban and recreational uses because of the hazard of flooding, the wetness, and excess humus. Intensive flood-control and drainage measures are necessary. The organic material should be removed. Fill material is needed to elevate building sites, septic tank absorption fields, and local roads and streets.

This soil is well suited to habitat for wetland and woodland wildlife. Shallow water areas are easily developed, and the natural vegetation provides abundant food and shelter for wildlife.

The capability subclass is VIIw. The woodland ordination symbol is 7W.

30—Troup sand, 0 to 5 percent slopes. This nearly level to gently sloping, well drained soil is in the uplands. Individual areas are regular in shape and range from 3 to 40 acres in size. Slopes are smooth or slightly convex.

Typically, the surface layer is very dark grayish brown sand about 9 inches thick. The subsurface layer extends to a depth of about 50 inches. It is yellowish brown fine sand. The subsoil to a depth of 80 inches is sandy loam. The upper 15 inches is yellowish brown, and the lower 15 inches or more is brownish yellow.

On 80 percent of the acreage mapped as Troup sand, 0 to 5 percent slopes, Troup and similar soils make up 78 to 97 percent of the mapped areas. On 20 percent of the acreage, included soils make up less than 3 percent or more than 22 percent of the mapped areas.

Areas of soils that are similar to the Troup soil are included in mapping. These soils have a loamy subsoil at a depth of 20 to 40 inches.

Small areas of soils that are dissimilar to the Troup soil are included in this map unit. These are well drained soils that are sandy throughout and soils that have thin, discontinuous bands of loamy sand at a depth of 50 inches or more. The dissimilar soils make up about 3 to 22 percent of most mapped areas.

The Troup soil has a water table below a depth of 72 inches. The available water capacity is low. Permeability is moderate.

Most areas of this soil support natural vegetation or are used for crops or tame pasture. The natural vegetation consists of slash pine, live oak, bluejack oak, and scattered hickory. The understory includes dwarf huckleberry, sassafras, ferns, and pineland threeawn.

If used for most cultivated crops, this soil has severe limitations. Droughtiness, rapid leaching of plant nutrients, and low fertility limit the choice of suitable plants and reduce the potential crop yields. Good management includes growing the crops in rotation with close-growing, soil-improving crops; returning crop residue to the soil; and applying fertilizer and lime. Soil blowing is a hazard where the surface is unprotected, especially during dry periods. Leaving crop residue on the surface can help to prevent excessive soil loss and conserves moisture. Irrigation increases the yields of most crops.

This soil is moderately well suited to pasture and hay. It is suited to deep-rooted plants, such as improved bermudagrass and improved bahiagrasses, but yields can be reduced by periodic droughtiness. Regular applications of fertilizer and lime are needed. Controlled grazing helps to maintain plant vigor and a good ground cover.

The potential productivity of this soil is high for pines. Longleaf pine, loblolly pine, and slash pine are suitable for planting. The equipment limitation, seedling mortality, and plant competition are management concerns. The soil is droughty. During long dry periods, it does not provide enough moisture for plant growth. Selecting special planting stock that is larger than usual or that is containerized reduces the seedling mortality rate. The use of equipment that has large tires or tracks helps to overcome the equipment limitation on this loose, sandy soil. Retarding the growth of the hardwood understory by chemical or mechanical means helps to control plant competition. Leaving all plant debris on the site helps to maintain the content of organic matter in the soil. The trees respond well to applications of fertilizer.

This soil is moderately suited to grazeable woodland. The desirable forage is creeping bluestem, indiangrass, and low panicum. The forage composition and annual productivity are influenced by the forest canopy. Little grazing value can be expected after the canopy cover exceeds 60 percent.

This soil has slight limitations if used as a site for dwellings, for small commercial buildings, or for septic tank absorption fields. These uses require no special measures.

The limitations affecting recreational uses are severe. The sandy surface layer limits trafficability, and soil blowing is a hazard. These limitations can be overcome by establishing and maintaining a good vegetative cover or windbreaks or by adding suitable topsoil or some other material that can stabilize the surface.

The capability subclass is IIIs. The woodland ordination symbol is 11S.

34—Goldhead fine sand. This nearly level, poorly drained soil is on flats in low upland areas and in seeps adjacent to drainageways. Individual areas are irregularly shaped and range from 2 to more than 70 acres in size. Slopes are smooth to convex and range mainly from 0 to 3 percent.

Typically, the surface layer is black fine sand about 9 inches thick. The subsurface layer extends to a depth of about 23 inches. It is fine sand. The upper 8 inches is dark gray, and the lower 6 inches is light gray. The subsoil to a depth of 80 inches or more is fine sandy loam. It is grayish brown in the upper 21 inches, gray in the next 24 inches, and light gray in the lower 24 inches.

On 95 percent of the acreage mapped as Goldhead fine sand, Goldhead and similar soils make up 76 to 99 percent of the mapped areas. On 10 percent of the acreage, included soils make up more than 24 percent of the mapped areas.

Small areas of soils that are similar to the Goldhead soil are included in mapping. These are soils that have a subsoil at a depth of more than 40 inches; soils in which the subsoil is within a depth of 20 inches; soils that have a thick, dark surface layer; and soils that have about 30 percent, by volume, ironstone nodules and weathered phosphatic limestone fragments in the subsurface layer or in the subsoil.

Small areas of soils that are dissimilar to the Goldhead soil are included in this map unit. These are Surrency and Wampee soils, which make up about 1 to 24 percent of most mapped areas.

Under natural conditions, the Goldhead soil has a seasonal high water table within a depth of about 6 to 18 inches for 2 to 4 months during most years. The available water capacity is low. Permeability is moderately slow in the subsoil.

Most areas of this soil are used as tame pasture. The natural vegetation consists of slash pine, scattered laurel oak, red maple, hickory, and ironwood. The understory consists of gallberry, waxmyrtle, greenbrier, scattered saw palmetto, pineland threeawn, and various other grasses.

If this soil is used for cultivated crops under natural conditions, the wetness is a very severe limitation. The soil is suited to most crops, however, if intensive management that includes a water-control system to remove excess water rapidly and provide for subsurface irrigation is applied. Soil-improving crops and crop residue can protect the soil from erosion and maintain the content of organic matter. Seedbed preparation should include bedding of rows. Fertilizer should be applied according to the needs of the crop.

If water is properly controlled, this soil is well suited to improved bermudagrass, bahiagrass, and legumes. If properly managed, good pastures of grass or of grass-legume mixtures can be established. Water-control measures are needed to remove excess surface water during long rainy periods. Irrigation is needed for the best yields of white clover or other adapted shallow-rooted pasture plants during dry periods. Establishing an optimum plant population, applying fertilizer and lime, and controlling grazing help to maintain a good plant cover and increase forage production.

In most areas the potential productivity of this soil is moderately high for pines. Slash pine, loblolly pine, and longleaf pine are suitable for planting. The equipment limitation, seedling mortality, and plant competition are management concerns. Seasonal wetness is the main limitation. The use of equipment that has large tires or tracks helps to overcome the equipment limitation and minimizes compaction and root damage during thinning activities. Preparing the site and planting and harvesting the trees during the drier periods also help to overcome the equipment limitation. Good site preparation, such as harrowing and bedding, helps to establish seedlings, helps to control competing vegetation, and facilitates planting. Leaving all plant debris on the site helps to maintain the content of organic matter in the soil. The trees respond well to applications of fertilizer.

This soil is well suited to grazeable woodland. The desirable forage is creeping bluestem, chalky bluestem, and blue maidencane. The forage composition and annual productivity are influenced by the forest canopy. Little grazing value can be expected after the canopy cover exceeds 60 percent.

This soil is severely limited as a site for dwellings without basements, for small commercial buildings, and for septic tank absorption fields because of the depth to the high water table during wet periods. A good drainage system is needed to remove excess water during wet periods and to control the water table. Adding suitable fill material increases the depth to the water table and thus helps to overcome the wetness.

The limitations affecting recreational uses are severe. The high water table is the major limitation. A good water-control system is needed. The sandy surface layer limits trafficability, and soil blowing is a hazard. These limitations can be overcome by establishing and maintaining a good vegetative cover or windbreaks or by adding suitable topsoil or some other material that can stabilize the surface.

The capability subclass is IIIw. The woodland ordination symbol is 10W.

35—Wampee loamy fine sand, 5 to 12 percent slopes. This moderately sloping and strongly sloping, somewhat poorly drained soil is in low upland areas adjacent to poorly defined drainageways or flood plains along streams. Individual areas are long and narrow or broad and irregularly shaped and range from 5 to more than 150 acres in size. Slopes are smooth to convex.

Typically, the surface layer is loamy fine sand about

13 inches thick. The upper 6 inches is very dark grayish brown, and the lower 7 inches is dark brown. The subsurface layer is pale brown fine sand about 11 inches thick. The subsoil extends to a depth of about 69 inches. The upper 5 inches is light gray loamy fine sand, the next 21 inches is light gray gravelly sandy clay loam, and the lower 19 inches is light gray sandy clay. The substratum to a depth of 80 inches or more is light gray clay. Limestone fragments and ironstone nodules are throughout the soil.

On 95 percent of the acreage mapped as Wampee loamy fine sand, 5 to 12 percent slopes, Wampee and similar soils make up 80 to 99 percent of the mapped areas. On 5 percent of the acreage, included soils make up more than 20 percent of the mapped areas.

Areas of soils that are similar to the Wampee soil are included in mapping. These are slightly eroded soils in which the subsoil is within a depth of 20 inches; soils that have no coarse fragments; soils that have more than 30 percent, by volume, coarse fragments in the subsurface layer and subsoil; soils that have less than 35 percent base saturation; and, on short, steep slopes, soils that are wet as the result of lateral seepage.

Small areas of soils that are dissimilar to the Wampee soil are included in this map unit. These are moderately well drained soils that do not have a significant content of gravel and limestone fragments and poorly drained and somewhat poorly drained soils that have a subsoil at a depth of 40 inches or more. The dissimilar soils make up about 1 to 22 percent of most mapped areas.

Under natural conditions, the Wampee soil has a seasonal high water table at a depth of 12 to 36 inches for 2 to 6 months during most years or for short periods after heavy rainfall. The available water capacity is low. Permeability is moderately slow.

Most areas of this soil support native hardwoods. Some areas have been cleared and are used as tame pasture. The natural vegetation consists of sweetgum, hickory, slash pine, southern magnolia, laurel oak, and red maple. The understory includes waxmyrtle, American beautyberry, dwarf palmetto, greenbrier, Virginia creeper, wild grape, pineland threeawn, and panicum.

If used for cultivated crops, this soil has very severe limitations because of the wetness, low natural fertility, the hazard of erosion, and the slope. The high water table retards root development during wet periods. A well designed, simple drainage system can overcome this limitation. Good management includes planting on the contour; growing the crops in rotation with close-growing, soil-improving crops; returning crop residue to the soil; and applying fertilizer and lime. A drainage system is needed for some crops. Soil blowing is a hazard where the surface is unprotected, especially during dry periods. Leaving crop residue on the surface can help to prevent excessive soil loss and conserves moisture.

This soil is moderately suited to tame pasture and hay. It is suited to deep-rooted plants, such as improved bermudagrass and bahiagrass, but yields are reduced by periodic droughtiness. If properly managed, good pastures of grass or of grass-legume mixtures can be established. Regular applications of fertilizer and lime are needed. Controlled grazing helps to maintain plant vigor.

The potential productivity of this soil is moderately high for pines. Slash pine, longleaf pine, and loblolly pine are suitable for planting. The equipment limitation and plant competition are management concerns. The use of equipment that has large tires or tracks helps to overcome the equipment limitation and minimizes compaction and root damage during thinning activities. Good site preparation, such as harrowing and bedding, helps to establish seedlings, removes debris, helps to control competing vegetation, and facilitates planting. Retarding the growth of the hardwood understory by chemical or mechanical means helps to control plant competition. The trees respond well to applications of fertilizer.

This soil is moderately suited to grazeable woodland. The desirable forage is creeping bluestem, indiangrass, and low panicum. The forage composition and annual productivity are influenced by the forest canopy. Little grazing value can be expected after the canopy cover exceeds 60 percent.

This soil has severe limitations if used as a site for dwellings without basements, for small commercial buildings, or for septic tank absorption fields because of the depth to the water table during wet periods and the slope. Adding suitable fill material increases the depth to the water table and thus helps to overcome the wetness. A surface drainage system can be installed. Land shaping can help to overcome the slope.

The limitations affecting recreational uses are severe. The sandy surface layer limits trafficability, and soil blowing is a hazard. These limitations can be overcome by establishing and maintaining a good vegetative cover or windbreaks or by adding suitable topsoil or some other material that can stabilize the surface. The slope is a limitation on sites for some recreational uses.

The capability subclass is IVs. The woodland ordination symbol is 10W.

37—Pamlico and Croatan mucks, frequently flooded. These nearly level, very poorly drained soils are on flood plains. They do not occur in a regular repeating pattern on the landscape. Individual areas are irregularly shaped or elongated and range from 40 to more than 400 acres in size. Slopes are smooth or slightly concave and are less than 1 percent.

Typically, the surface layer of the Pamlico soil is muck about 48 inches thick. The upper 16 inches is dark brown, and the lower 32 inches is black. The underlying material to a depth of 80 inches or more is sand. The upper 17 inches is dark brown, and the lower 15 inches or more is pale brown.

Typically, the surface layer of the Croatan soil is black muck about 38 inches thick. The next 10 inches is very dark gray mucky sandy loam. The underlying material to a depth of 80 inches or more is dark gray sandy loam.

On 95 percent of the acreage mapped as Pamlico and Croatan mucks, frequently flooded, Pamlico, Croatan, and similar soils make up 89 to 99 percent of the mapped areas. On 5 percent of the acreage, included soils make up more than 11 percent of the mapped areas. Generally, the mapped areas are about 53 percent Pamlico and similar soils and about 43 percent Croatan and similar soils. Some areas are Pamlico and similar soils, some are Croatan and similar soils, and some are both Pamlico and Croatan soils. Each of the soils does not necessarily occur in every mapped area. The relative proportion of the soils varies from area to area. Areas of the individual soils are large enough to be mapped separately. Because of the present and predicted land uses, however, they were mapped as one unit.

Small areas of soils that are similar to the Pamlico and Croatan soils are included in mapping. These are Dorovan soils, soils that have an organic surface layer that is 8 to 16 inches thick, and Pamlico soils that have a loamy substratum at a depth of more than 40 inches.

Small areas of soils that are dissimilar to the Pamlico and Croatan soils are included in this map unit. These are Starke and Surrency soils, which make up about 1 to 11 percent of most mapped areas.

Under natural conditions, the Pamlico and Croatan soils have a seasonal high water table at or above the surface for more than 6 months during most years. Flooding occurs frequently during rainy periods. The duration and extent of flooding vary and are directly related to the intensity and frequency of rainfall. The flooding normally lasts from 2 to 4 months. Ponding occurs in the lower areas of these soils for long periods. The available water capacity is very high. Permeability is moderately slow to moderately rapid.

Most areas support natural vegetation, which consists of sweetbay, blackgum, swamp tupelo, baldcypress, red maple, and pond pine. The understory includes gallberry, buttonbush, greenbrier, and waxmyrtle.

Unless major drainage systems are installed, these soils are not suited to cultivated crops, tame pasture grasses, planted pine trees, or grazeable woodland because of the prolonged wetness and the hazard of flooding. Establishing and maintaining a drainage system are difficult because of the hazard of flooding.

These soils are severely limited as sites for urban and recreational uses because of the hazard of flooding, the wetness, and excess humus. Intensive flood-control and drainage measures are necessary. The organic material should be removed. Fill material is needed to elevate building sites, septic tank absorption fields, and local roads and streets.

These soils are well suited to habitat for wetland and woodland wildlife. Shallow water areas are easily developed, and the natural vegetation provides abundant food and shelter for wildlife.

The capability subclass is VIIw. The woodland ordination symbol is 7W.

39—Blanton fine sand, 5 to 12 percent slopes. This moderately sloping and strongly sloping, moderately well drained soil is on uplands. Individual areas are irregularly shaped or elongated and range from 2 to more than 50 acres in size. Slopes are smooth to convex.

Typically, the surface layer is dark gray fine sand about 6 inches thick. The subsurface layer extends to a depth of about 59 inches. It is fine sand. The upper 8 inches is brown, the next 22 inches is light yellowish brown, and the lower 23 inches is very pale brown. The subsoil to a depth of 80 inches or more is yellowish red sandy loam.

On 95 percent of the acreage mapped as Blanton fine sand, 5 to 12 percent slopes, Blanton and similar soils make up 75 to 99 percent of the mapped areas. On 5 percent of the acreage, included soils make up more than 25 percent of the mapped areas.

Small areas of soils that are similar to the Blanton soil are included in mapping. These are Foxworth and Troup soils, soils that have slopes of less than 5 percent, and soils that have less than 15 percent, by volume, ironstone nodules and weathered phosphatic limestone fragments in the subsurface layer and subsoil.

Small areas of soils that are dissimilar to the Blanton soil are included in this map unit. These are Albany and Lakeland soils, which make up about 1 to 25 percent of most mapped areas.

The Blanton soil has a perched water table at a depth of 48 to 72 inches for 2 to 4 months in most years. The water table is at a depth of 36 to 48 inches for less than 30 cumulative days in some years. In areas where seepage occurs at the base of the slopes, the water table is within a depth of 30 inches for brief periods after heavy rainfall. The available water capacity is low. Permeability is moderate.

Most areas are used for tame pasture or cultivated crops. The natural vegetation consists of live oak, bluejack oak, and turkey oak and scattered longleaf pine and slash pine. Various hardwoods, such as dogwood, ironwood, hickory, and cherry, are common. The understory includes pineland threeawn, creeping bluestem, low panicum, and various other grasses.

If used for most cultivated crops, this soil has very severe limitations. Droughtiness, low natural fertility, rapid leaching of plant nutrients, and the slope limit the choice of suitable plants and reduce the potential crop yields. The high water table provides water through capillary rise and thus helps to compensate for the low available water capacity of the soil. Good management includes growing the crops in rotation with close-growing, soil-improving crops; returning crop residue to the soil; planting on the contour; and applying fertilizer and lime. Soil blowing is a hazard where the surface is unprotected, especially during dry periods. Leaving crop residue on the surface can help to prevent excessive soil loss and conserves moisture.

This soil is moderately suited to tame pasture and hay. It is suited to deep-rooted plants, such as improved bermudagrass and improved bahiagrass, but yields are reduced by periodic droughtiness. Regular applications of fertilizer and lime are needed. Controlled grazing helps to maintain plant vigor and a good ground cover.

The potential productivity of this soil is high for pines. Slash pine, loblolly pine, and longleaf pine are suitable for planting. The equipment limitation, seedling mortality, and plant competition are management concerns. The soil is droughty. During long dry periods, it does not provide enough moisture for plant growth. Selecting special planting stock that is larger than usual or that is containerized reduces the seedling mortality rate. The use of equipment that has large tires or tracks helps to overcome the equipment limitation on this loose, sandy soil. Leaving all plant debris on the site helps to maintain the content of organic matter in the soil. The trees respond well to applications of fertilizer.

This soil is moderately suited to grazeable woodland. The desirable forage is creeping bluestem, indiangrass, and low panicum. The forage composition and annual productivity are influenced by the forest canopy. Little grazing value can be expected after the canopy cover exceeds 60 percent.

The slope is a slight or moderate limitation on sites for dwellings without basements and a moderate or severe limitation on sites for small commercial buildings. Land shaping can help to overcome this limitation. The soil has moderate limitations if used as a site for septic tank absorption fields because of the depth to the water table during wet periods and the slope. Corrective measures may or may not be needed. Land shaping and adding suitable fill material can overcome these limitations.

The limitations affecting recreational uses are severe. The sandy surface layer limits trafficability, and soil blowing is a hazard. These limitations can be overcome by establishing and maintaining a good vegetative cover or windbreaks or by adding suitable topsoil or some other material that can stabilize the surface. The slope is a limitation on sites for some recreational uses.

The capability subclass is IVs. The woodland ordination symbol is 11S.

41—Bonneau fine sand, 6 to 10 percent slopes. This moderately sloping, moderately well drained soil is on uplands. Individual areas are irregularly shaped or elongated and range from about 2 to more than 60 acres in size. Slopes are dominantly smooth to concave.

Typically, the surface layer is very dark grayish brown fine sand about 8 inches thick. The subsurface layer extends to a depth of about 28 inches. The upper 7 inches is brown loamy fine sand, and the lower 13 inches is brown fine sand. The subsoil extends to a depth of 80 inches or more. The upper 6 inches is yellowish brown fine sandy loam, the next 14 inches is yellowish brown sandy clay loam, and the lower 32 inches is light gray, mottled sandy clay loam.

On 95 percent of the acreage mapped as Bonneau fine sand, 6 to 10 percent slopes, Bonneau and similar soils make up 75 to 99 percent of the mapped areas. On 5 percent of the acreage, included soils make up more than 25 percent of the mapped areas.

Small areas of soils that are similar to the Bonneau soil are included in mapping. These are Blanton soils; soils that have slopes of less than 6 percent; soils that have more than 15 percent, by volume, ironstone nodules and weathered phosphatic limestone fragments in the subsurface layer and subsoil; soils in which the subsoil is within a depth of 20 inches; and, in a few areas, severely eroded soils.

Small areas of soils that are dissimilar to the Bonneau soil are included in this map unit. These are Albany, Ocilla, Troup, and Wampee soils, which make up about 1 to 25 percent of most mapped areas.

Under natural conditions, the Bonneau soil has a seasonal high water table at a depth of 42 to 60 inches for 1 to 3 months during most years. The water table is within a depth of 36 inches for brief periods after heavy rainfall. In some areas wetness is the result of lateral seepage instead of an apparent high water table. The available water capacity is low. Permeability is moderate.

Most areas are used for tame pasture or cultivated crops. The natural vegetation consists of live oak, bluejack oak, and turkey oak and scattered longleaf pine and slash pine. Various hardwoods, such as dogwood, ironwood, hickory, and cherry, are common. The understory includes pineland threeawn, creeping bluestem, low panicum, indiangrass, and various other grasses.

If used for cultivated crops, this soil has severe limitations. Droughtiness, low natural fertility, rapid leaching of plant nutrients, and the slope limit the choice of suitable plants and reduce the potential crop yields. The high water table provides water through capillary rise and thus helps to compensate for the low available water capacity of the soil. Good management includes growing the crops in rotation with close-growing, soil-improving crops; returning crop residue to the soil; planting on the contour; and applying fertilizer and lime. Soil blowing is a hazard where the surface is unprotected, especially during dry periods. Leaving crop residue on the surface can help to prevent excessive soil loss and conserves moisture.

This soil is moderately suited to tame pasture and hay. It is suited to deep-rooted plants, such as improved bermudagrass and improved bahiagrass, but yields are reduced by periodic droughtiness. Regular applications of fertilizer and lime are needed. Controlled grazing helps to maintain plant vigor and a good ground cover.

The potential productivity of this soil is high for pines. Slash pine, loblolly pine, and longleaf pine are suitable for planting. The equipment limitation, seedling mortality, and plant competition are management concerns. The use of equipment that has large tires or tracks helps to overcome the equipment limitation on this loose, sandy soil. Good site preparation, such as chopping and burning, removes debris, helps to control competing vegetation, and facilitates planting. The slope limits the use of equipment and the method of harvesting. Planting the trees on the contour helps to control erosion. Firelines and access roads should slope gently to streams and cross them at a right angle. The trees respond well to applications of fertilizer.

This soil is moderately suited to grazeable woodland. The desirable forage is creeping bluestem, indiangrass, and low panicum. The forage composition and annual productivity are influenced by the forest canopy. Little grazing value can be expected after the canopy cover exceeds 60 percent.

The slope is a slight or moderate limitation on sites for dwellings without basements and a moderate or severe limitation on sites for small commercial buildings. Land shaping can help to overcome this limitation. The soil has moderate limitations if used as a site for septic tank absorption fields because of the depth to the water table during wet periods and the slope. Corrective measures may or may not be needed. Land shaping and adding suitable fill material can overcome these limitations.

The limitations affecting recreational uses are severe. The sandy surface layer limits trafficability, and soil blowing is a hazard. These limitations can be overcome by establishing and maintaining a good vegetative cover or windbreaks or by adding suitable topsoil or some other material that can stabilize the surface. The slope is a limitation on sites for some recreational uses.

The capability subclass is IIIs. The woodland ordination symbol is 11S.

43—Dorovan muck. This nearly level, very poorly drained, organic soil is in depressions. Individual areas are circular or irregularly shaped and range from about 40 to 3,000 acres in size. Slopes are smooth or slightly concave and range from 0 to 2 percent.

Typically, the soil is muck to a depth of about 59 inches. The upper 12 inches is dark reddish brown, and the lower 47 inches is black. The underlying material to a depth of about 72 inches is sand. The upper 8 inches is very dark brown, and the lower 5 inches is grayish brown.

On 95 percent of the acreage mapped as Dorovan muck, Dorovan soils make up 78 to 99 percent of the mapped areas. On 10 percent of the acreage, included soils make up more than 22 percent of the mapped areas.

Small areas of soils that are dissimilar to the Dorovan soil are included in this map unit. These are Pamlico and Croatan soils, which make up about 1 to 22 percent of most mapped areas.

Undrained areas of the Dorovan soil are ponded for 6 months or more during most years. The available water capacity is very high. Permeability is moderate.

Most areas support natural vegetation, which consists of pondcypress, sweetgum, red maple, swamp tupelo, blackgum, and scattered pond pine. The understory includes Coastal Plain willow, fetterbush lyonia, smilax, greenbrier, maidencane, lizards tail, cinnamon fern, and various other water-tolerant weeds and grasses. The natural areas of this soil provide cover for deer and are excellent habitat for wading birds and other wetland wildlife.

Under natural conditions, this soil is not suited to cultivated crops, tame pasture, planted pine trees, or grazeable woodland. The excessive wetness is the main limitation. Installing adequate water-control systems is difficult. Many areas are in isolated ponds or wet depressions that do not have suitable drainage outlets.

The limitations affecting urban uses are severe. Excess water on or near the surface during much of the year and excess humus are the main limitations. Drainage systems that adequately remove the water and effectively regulate the water table are expensive and cannot be easily installed or maintained. Most areas do not have good drainage outlets. Where adequate drainage systems are installed, subsidence is a continuing limitation. The organic material should be replaced with suitable fill material on sites for dwellings, small commercial buildings, and septic tank absorption fields.

The limitations affecting recreational uses are severe. Ponding and excess humus are the major limitations. A good water-control system is necessary. Also, suitable fill material is needed to improve trafficability and to increase the depth to the water table.

The capability subclass is VIIw. The woodland ordination symbol is 2W.

Use and Management of the Soils

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

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

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

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

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

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for buildings, streets, roads, campgrounds, playgrounds, and pond reservoir areas and for other uses.

Crops and Pasture

Jacque Breman, county extension agent, Institute of Food and Agricultural Sciences, Union County, Florida, helped prepare this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, 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 19,000 acres in Union County is used for crops, pasture, or grazeable woodland *(26)*. Of this total, about 9,000 acres is harvested cropland. The acreage used for crops and pasture has been gradually decreasing as more and more land is used for urban development. Many areas of cropland have been planted to pine trees or have reverted to woodland.

The production of field crops in the county is limited because of economic factors. Many crops that are not commonly grown would be well suited to the soils and climate in the county. Watermelons are grown on about 500 acres. Vegetable crops, such as squash, peppers, cucumbers, peas, green beans, and sweet potatoes, are grown on about 600 acres. The rest of the acreage is divided among corn, soybeans, and, to a smaller extent, tobacco and peanuts. Most vegetable crops should be irrigated to ensure the highest possible yields. Crops grown in soils in the flatwoods, such as Mascotte, Pelham, Plummer, and Sapelo soils, generally require a combination of drainage measures and irrigation.

Pastures in Union County produce forage for many small to medium-sized beef cattle or cow-calf enterprises and a few small horse ranches. Bahiagrass and improved bermudagrass are the main hay crops. About 1,500 acres of pasture is overseeded with small grain, which forms a perennial grass sod for winter and spring forage. About 3,000 acres of cropland is planted to rye, wheat, and oats for winter grazing after a vegetable or row crop is grown. Legumes, especially white clover, can be grown on many of the pastures in the flatwoods. Pasture management is based on the

Figure 12.—An area of Ocilla fine sand, 0 to 5 percent slopes, where a pecan grove is used as pasture.

relationship of soils, plants, lime, fertilizer, moisture, and grazing systems. Yields can be increased by properly combining these factors.

Although pecan groves were once plentiful and productive as a source of income in Union County, only a few small groves remain in the county. Many pecan groves are also used as pasture (fig. 12).

The paragraphs that follow describe the major concerns in managing the soils in the county for crops and pasture.

Water erosion is not a major problem in most of Union County. It can be a problem, however, in areas in the southern and southwestern parts of the county where the soils commonly have slopes of more than 3 percent and have a surface layer of fine sand or finer textured material. Erosion is a hazard on Albany, Blanton, Bonneau, Chipley, Foxworth, Lakeland, Ocilla, Troup, and Wampee soils.

Erosion-control practices help to ensure maximum productivity for future growing seasons. Loss of the fertile surface layer is especially damaging on such soils as Bonneau, Ocilla, and Wampee soils, which have a fine-loamy to clayey subsoil. On many sloping fields, preparing a good seedbed and proper tillage are difficult in fine-loamy to clayey areas where the topsoil has been eroded away. Erosion reduces the productivity of soils that tend to be droughty, such as Blanton, Foxworth, Lakeland, and Troup soils. Erosion on farmland can also result in sedimentation, decreasing the quality of water for municipal use, for recreation, and for fish and wildlife.

Erosion-control practices provide a protective cover, reduce the runoff rate, and increase the rate of water infiltration. A good cropping system that keeps a vegetative cover on the soil for extended periods can greatly reduce soil losses. For example, conservation tillage systems in sloping areas used for corn or soybeans are effective in controlling runoff and erosion.

Terraces and diversions reduce the length of slopes, thus reducing the runoff rate and the hazard of erosion. They are most practical on deep, well drained soils that have uniform slopes. Contour farming and stripcropping are very effective erosion-control practices on most soils that have smooth, uniform slopes.

Soil blowing is a hazard on sandy soils if the topsoil is dry. Windblown sand can seriously damage a young crop in only a few hours. Maintaining a vegetative cover, stripcropping with small grain, and establishing windbreaks along edges of fields are effective in controlling soil blowing and in reducing the extent of crop damage caused by windblown sand.

Soil drainage is a management concern on about 25 percent of the acreage used for crops and pasture in Union County. In most years the poorly drained soils are too wet for many crops, and drainage measures, such as bedding and tile drainage, generally are required. Most of these soils have a low available water capacity and are droughty during periods of low rainfall. Irrigation systems generally are needed on a wide variety of soils in Union County. Permanent or movable irrigation systems help to maximize yields in most areas, particularly on the deep, sandy, better drained soils.

More information about water-control systems and erosion-control practices is available from the local office of the Soil Conservation Service.

Soil fertility is naturally low in most of the soils in Union County. Because of strong acidity, applications of ground limestone generally are needed before legumes and other crops can grow well.

Nitrogen and available phosphorus and potash levels are naturally low in most of the mineral soils. Soil fertility changes, however, as the soil is used. On all soils, additions of lime and fertilizer should be based on the results of soil tests, on the needs of the crop, and on the expected level of yields. Soil fertility can be increased by returning crop residue to the soil, adding manure, and planting cover crops. These practices increase the content of organic matter and the nutrient and water-holding capacity of the topsoil. The Cooperative Extension Service can help in determining the kinds and amounts of fertilizer and lime required.

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 land capability classification of each map unit also is shown in the table.

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 most kinds of field crops. 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. There are no class I soils in Union County.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices. There are no class II soils in Union County.

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 have other limitations, impractical to remove, that limit their use.

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

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

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

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

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

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

Woodland Management and Productivity

Jay Tucker, county forester, Florida Division of Forestry, helped prepare this section.

Forestry has played an important role in the economic development of Union County. The forest industry presently ranks second to the Department of Corrections in providing jobs in the county *(26).*

In the last few years, the demand for wood products in Florida has increased because of the migration of the timber industry from the Northwest to the South. The market for these products is expected to continue upward well into the next century, and there is pressure to increase overall farm revenues through alternative crops. Because of these economic factors, many farmers and landowners have incorporated timber management into their farm enterprises.

About 123,000 acres in Union County, or 78 percent of the land area, is used as woodland *(26).* Ownership of this woodland is split mainly between the large forest products industries and private landowners.

The soils and climate of Union County are well suited to commercial timber production. Currently, most of the woodland in the county is in areas of Pelham, Sapelo, Plummer, and Mascotte soils. These are typical of the poorly drained soils in the flatwoods throughout the county. On the better drained sites, the soils commonly used as woodland include Blanton, Albany, Ocilla, Lakeland, and Foxworth soils. These soils are in the southern and southwestern parts of the county, in and around Worthington Springs and Providence.

In the early 1900's, natural stands of longleaf pine dominated the better drained soils and slash pine grew on the wetter soils in the flatwoods. Loblolly pine, cypress, sweetgum, blackgum, red maple, and various varieties of bays and oaks were the principal trees around the lakes, on the flood plains along rivers, and in drainageways and swamps.

In the past and to some extent in the present, timber cutting practices by private landowners have failed to provide adequate regeneration of commercially desired tree species. Also, fire prevention has allowed an invasion of hardwoods, further inhibiting the reestablishment and growth of pine trees. As a result, the growth of quality wood on privately owned natural woodland has declined in Union County.

Because of its fast growth rate and its suitability for a wide range of sites, slash pine is the dominant commercial species in Union County. It grows best on the poorly drained soils in the flatwoods. It also grows on the better drained soils. On the wetter soils in ponds, swamps, and drainageways, the most common tree species having limited commercial value are cypress, blackgum, bay, red maple, live oak, laurel oak, water oak, and sweetgum. On the better drained soils in areas where fire has been virtually eliminated, associated species include longleaf pine, live oak, laurel oak, and turkey oak. Except for longleaf pine, these species have limited commercial value *(4).*

Timber management consists mainly of clearcutting, site preparation, planting of seedlings, and prescribed burning on a 20- to 30-year rotation. Of lesser extent is selective cutting and thinning by forest products industries and by small private landowners. Fire is often used to reduce the extent of "rough" created by heavy needle litter and brush accumulation and to expose mineral soil that can be used as a seedbed for natural reproduction. The hazard of wildfire is reduced by prescribed burning of underbrush at regular 3- to 5-year intervals.

A major management concern on the soils in the flatwoods in most of Union County is the seasonal high water table, which results in seedling mortality and plant competition and restricts the use of equipment. Site preparation, such as harrowing and bedding, helps to establish seedlings, reduces the seedling mortality rate, and increases early growth rates. Bedding should not hinder natural drainage.

Before the most can be made of an investment in commercial woodland, suitable trees must be selected for planting. This selection can be made through an evaluation of soil productivity as it relates to tree growth, which is determined mainly by the physical and chemical properties of the soil. One of the most important considerations that affects the productive capacity is the ability of the soil to provide adequate moisture. Other factors include the thickness of the surface layer and its organic matter content, the texture and consistency of the soil material, aeration, internal drainage, and the depth to and duration of the seasonal high water table.

A well managed stand of trees can conserve soil and water resources. It protects the soil against erosion. The tree cover allows more moisture to enter the soil and thus increases the supply of ground water.

There is an excellent market for forest products in the county. A number of forest products industries throughout northeastern Florida and southern Georgia create a great demand for pulpwood, chip-n-saw, sawlogs, and veneer and plywood. Wood for treatment plants, for numerous small cypress and pine sawmills, and for secondary industries also is in demand.

Table 5 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for an indicator tree species. The number indicates the volume, in cubic meters per hectare per year, which the indicator species can produce. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *R* indicates steep slopes; *X*, stoniness or rockiness; *W*, excess water in or on the soil; *T*, toxic substances in the soil; *D*, restricted rooting depth; *C*, clay in the upper part of the soil; *S*, sandy texture; and *F*, a high content of rock fragments in the soil. The letter *A* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: R, X, W, T, D, C, S, and F.

In table 5, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Equipment limitation reflects the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. The chief characteristics and conditions considered in the ratings are slope, stones on the surface, rock outcrops, soil wetness, and texture of the surface layer. A rating of *slight* indicates that under normal conditions the kind of equipment or season of use is not significantly restricted by soil factors. Soil wetness can restrict equipment use, but the wet period does not exceed 1 month. A rating of *moderate* indicates that equipment use is moderately restricted because of one or more soil factors. If the soil is wet, the wetness restricts equipment use for a period of 1 to 3 months. A rating of *severe* indicates that equipment use is severely restricted either as to the kind of equipment that can be used or the season of use. If the soil is wet, the wetness restricts equipment use for more than 3 months.

Seedling mortality refers to the death of naturally occurring or planted tree seedlings, as influenced by the kinds of soil, soil wetness, or topographic conditions. The factors used in rating the soils for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, effective rooting depth, and slope aspect. A rating of *slight* indicates that seedling mortality is not likely to be a problem under normal conditions. Expected mortality is less than 25 percent. A rating of *moderate* indicates that some problems from seedling mortality can be expected. Extra precautions are advisable. Expected mortality is 25 to 50 percent. A rating of *severe* indicates that seedling mortality is a serious problem. Extra precautions are important. Replanting may be necessary. Expected mortality is more than 50 percent.

Plant competition ratings indicate the degree to which undesirable species are expected to invade and grow when openings are made in the tree canopy. The main factors that affect plant competition are the depth to the water table and the available water capacity. A rating of *slight* indicates that competition from undesirable plants is not likely to prevent natural regeneration or suppress the more desirable species. Planted seedlings can become established without undue competition. A rating of *moderate* indicates that competition may delay the establishment of desirable species. Competition may hamper stand development, but it will not prevent the eventual development of fully stocked stands. A rating of *severe* indicates that competition can be expected to prevent regeneration unless precautionary measures are applied.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index* and as a *volume* number. The site index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

The *volume*, a number, is the yield likely to be produced by the most important trees. This number, expressed as cubic feet per acre per year, indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand *(3, 13, 21, 23)*.

Site quality is the average height, in feet, at age 25 years. *Productivity* is the number of cords per acre per year based on the 25-year average of corresponding site quality.

The first species listed under *common trees* for a soil is the indicator species for that soil. It is the dominant species on the soil and the one that determines the ordination class.

Trees to plant are those that are suitable for commercial wood production.

More detailed information about woodland management can be obtained from local offices of the Soil Conservation Service, the Cooperative Extension Service, and the Florida Division of Forestry.

Grazeable Woodland

R. Gregory Hendricks, range conservationist, Soil Conservation Service, helped prepare this section.

Union County has about 123,000 acres of woodland, much of which can be grazed by cattle *(26)*. Woodland ownership in the county is about 75 percent corporate and 25 percent individual or family land holdings. The woodland grazing resources can complement improved pasture grazing systems. Grazeable woodland provides a low-overhead and low-maintenance winter forage reserve.

Grazeable woodland has an understory of native grasses, legumes, forbs, and shrubs. The understory is an integral part of the forest plant community. The native plants can be grazed without significantly impairing other forest values. Grazing is compatible with timber management if it is controlled or managed in such a manner that both timber and forage resources are maintained or enhanced. The native forage in wooded areas is readily available to livestock and is an economic resource. Integrating woodland and grazing management offers opportunities to obtain income from the woodland during the first 2 to 12 years of the pine rotation and possibly during the life of the rotation when double-row planting techniques are applied.

The North Florida Flatwoods is the largest grazeable woodland site in Union County. It has the best potential for forage production in the county. The native forage plants include chalky bluestem, creeping bluestem, blue maidencane, and indiangrass. Associated annual forbs, ground blueberry, gallberry, and a variety of sedges and rushes are an excellent source of food for wildlife.

Forage production on grazeable woodland is influenced by soil types, site preparation and planting techniques, the frequency of burning, and canopy closure. The degree of wetness is critical in determining the annual forage production levels of a woodland site. For example, soils that have a high water table, such as Pelham, Plummer, and Sapelo soils, support the vegetation characteristic of a North Florida Flatwoods site. Suggested annual stocking rates range from 8 to 30 acres per cow on these soils. Better drained soils, such as Albany, Blanton, and Chipley soils, support hardwoods on upland hammocks. Suggested stocking rates range from 18 to 40 acres per cow annually on these soils.

Windbreaks and Environmental Plantings

Windbreaks protect livestock, buildings, and yards from wind. They also protect fruit trees and gardens, and they furnish habitat for wildlife. Several rows of low- and high-growing broadleaf and coniferous trees and shrubs provide the most protection.

Field windbreaks are narrow plantings made at right angles to the prevailing wind and at specific intervals across the field. The interval depends on the erodibility of the soil. Field windbreaks protect cropland and crops from wind and provide food and cover for wildlife.

Environmental plantings help to beautify and screen houses and other buildings and to abate noise. The plants, mostly evergreen shrubs and trees, are closely spaced. To ensure plant survival, a healthy planting stock of suitable species should be planted properly on a well prepared site and maintained in good condition.

Additional information on planning windbreaks and screens and on planting and caring for trees and shrubs can be obtained from local offices of the Soil Conservation Service or the Cooperative Extension Service or from a commercial nursery.

Recreation

The soils of the survey area are rated in table 6 according to 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, if any, 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 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 mild 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 or a hardpan 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. Also, they have moderate to level 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. Also, they have moderate to level slopes. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

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

Union County has extensive areas of good wildlife habitat. The large areas of flatwoods and swamps provide better habitat than other areas in the county. Important areas include the 106,000-acre Lake Butler Wildlife Management Area.

The main game species include white-tailed deer, squirrel, turkey, bobwhite quail, mourning dove, feral hogs, and waterfowl. Nongame species include raccoon, rabbit, armadillo, opossum, skunks, bobcat, gray fox, red fox, otter, and a variety of songbirds, wading birds, woodpeckers, predatory birds, reptiles, and amphibians. Bear are occasionally sighted in the extensive flatwoods of the Lake Butler Wildlife Management Area.

Union County has four lakes more than 100 acres in size. Palestine Lake, the largest, is nearly 1,000 acres. The lakes and the rivers and their larger tributaries provide good opportunities for fishing (fig. 13). Game and nongame fish species include largemouth bass, channel catfish, bullhead catfish, bluegill, redear, spotted sunfish, warmouth, black crappie, chain pickerel, gar, bowfin, and suckers.

Some endangered and threatened species inhabit Union County. Examples are the rare red-cockaded woodpecker and the more common southeastern kestrel. A detailed list of these species and information on their range and habitat are available at the local

Figure 13.—Palestine Lake, the largest lake in Union County, provides wildlife habitat and opportunities for fishing.

office of the Soil Conservation Service.

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

In table 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, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, sorghum, browntop millet, and grain sorghum.

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

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

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, available water capacity, and wetness. Examples of these plants are oak, maple, cherry, sweetgum, willow, bay, wild grape, hickory, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are firethorn, wild plum, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine 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, and slope. Examples of wetland plants are smartweed, St Johnswort, cordgrass, rushes, sedges, and reeds.

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

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

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

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 should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreation 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 gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, 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, if any, are minor and easily overcome; *moderate* if soil properties or site features are somewhat restrictive 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 that special design, soil reclamation, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

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

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. A high water table, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. 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, a high water table, the available water capacity in the upper 40 inches, and the content of sulfidic materials affect plant growth. Flooding, wetness, slope, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 9 shows the degree and 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, if any, are minor and easily overcome; *moderate* if soil properties or site features are somewhat restrictive for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if one or more 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 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, a high water table, and flooding affect absorption of the effluent. A cemented pan can interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel are 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 and state 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, a high water table, depth to a cemented pan, flooding, and content of organic matter.

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

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 a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, highly organic layers, and soil reaction affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

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

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

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over 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 to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

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

Soils rated *good* contain significant amounts of sand 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-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and 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.

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

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

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles and have slopes of less than 8 percent. They are naturally fertile or respond well to fertilizer and are not so wet that excavation is difficult.

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

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

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

Water Management

Table 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, if any, are minor and are easily overcome; *moderate* if soil properties or site features are somewhat restrictive 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 for the use that special design and possibly increased maintenance or alteration are required.

This table also gives for each soil the restrictive features that affect 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. 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 even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

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

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

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on 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 a cemented pan, 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. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The performance of a system is affected by the depth of the root zone 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, and depth to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of soil blowing or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

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 a cemented pan affect the construction of grassed waterways. A hazard of soil blowing, low available water capacity, restricted rooting depth, 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 about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

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

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

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

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in table 18.

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 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 determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 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 downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

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

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

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

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

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

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

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is 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. Coarse sands, sands, fine sands, and very fine sands. These soils are extremely erodible, and vegetation can be 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 not protected by vegetation are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

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

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

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

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

If a soil is assigned to two hydrologic groups in table 14, the first letter is for drained areas and the second is for undrained areas. Onsite investigation is needed to determine the hydrologic group in a particular area.

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

Table 14 gives the frequency and duration of flooding. Frequency and duration are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is near 0 percent to 5 percent in any year); *occasional* that it occurs, on the average, once or less in 2 years (the chance of flooding is 5 to 50 percent in any year); and *frequent* that it occurs, on the average, more than once in 2 years (the chance of flooding is more than 50 percent in any year). *Common* means that flooding is either occasional or frequent. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 days to 1 month, and *very long* if more than 1 month.

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

Also considered are 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 and the kind of water table—that is, perched or apparent. 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.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

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 usually is a result of oxidation.

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

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

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

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

Physical, Chemical, and Mineralogical Analyses of Selected Soils

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

Parameters for physical, chemical, and mineralogical properties of representative pedons sampled in Union 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 descriptions of the analyzed soils are given in the section "Soil Series and Their Morphology." Laboratory data and profile information for additional soils in Union County, as well as for other counties in Florida, are on file at the University of Florida, Soil Science Department.

Typical 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 a soil survey investigations report *(22)*.

Particle-size distribution was determined using a modified pipette method with sodium hexametaphosphate dispersion. Hydraulic conductivity and bulk density were determined on undisturbed soil cores. Water retention parameters were obtained from duplicate undisturbed soil cores placed in tempe pressure cells. Weight percentages of water retained at 100-centimeters water (1/10 bar) and 345-centimeters water (1/3 bar) were calculated from volumetric water percentages divided by bulk density. Samples were 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. Cation-exchange capacity was calculated by summation of 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-angstrom, 14-angstrom, 7.2-angstrom, and 4.31-angstrom positions represent montmorillonite, interstratified expandable vermiculite or 14-angstrom intergrades, kaolinite, and quartz, respectively. Peaks were measured, added, and normalized to give the percent of soil minerals identified in the x-ray diffractograms. These percentage values do not indicate absolute determined quantities of soil minerals but do imply a relative distribution of minerals in a particular mineral suite. Absolute percentages would require additional knowledge of particle size, crystallinity, unit structure substitution, and matrix problems.

Physical Properties

The results of physical analyses are shown in table 15. Soils sampled in Union County for laboratory analyses are inherently very sandy; however, all of the pedons have an argillic horizon in the lower part of the solum. Blanton, Plummer, and Sapelo soils have more than 90 percent sand to a depth of 1 meter or more.

The content of the clay in the upper horizons of the soils that were sampled rarely is more than 2.5 percent. The content of clay in the deeper argillic horizons ranges from 17.6 to 35.5 percent. The argillic horizon in the Bonneau, Goldhead, and Wampee soils is within 1 meter of the surface. It has 12.1 to 40 percent clay.

The content of silt ranges from 2.2 percent in the Btg2 horizon of Blanton fine sand to 11.2 percent in the Cg horizon of Wampee loamy fine sand.

Fine sand dominates the sand fractions in all of the soils, ranging from 18.2 percent in the Cg horizon of Wampee loamy fine sand to 54 percent in the E2 horizon of Blanton fine sand. The content of very fine sand is more than 13 percent in one or more horizons of all the soils. It ranges from 1.8 percent in the Btg2 horizon of Bonneau fine sand to 19.6 percent in the Eg1 horizon of Goldhead sand. The content of coarse sand ranges from 2.1 percent to 9.6 percent. The content of very coarse sand is less than 2 percent in all horizons of all the pedons. Soils that have a thick, sandy epipedon, such as the Blanton soils, become very droughty during periods of low precipitation when rainfall is widely scattered. Soils with inherently poor drainage, such as the Plummer soils, can remain saturated because the ground water is close to the surface for long periods.

Hydraulic conductivity values are much higher in the upper sandy epipedons than in the argillic horizons. Values for hydraulic conductivity range from 5.9 to 35.2 centimeters per hour in the upper sandy horizons and from 0.1 centimeter to 3.2 centimeters per hour in the argillic horizons. Low hydraulic conductivity values at a shallow depth in the Bonneau, Goldhead, and Wampee soils can affect the design and performance of septic tank absorption fields. Hydraulic conductivity values in the Bh horizon of the Sapelo soil are much higher than those generally recorded for spodic horizons in most soils in Florida.

The amount of available water to plants can be estimated from bulk density and water content data. In excessively sandy soils, such as those in Union County that have a thick, sandy epipedon, the amount of available water to plants is low. Soils that have a higher amount of fine textured material, such as Bonneau soils, retain larger amounts of available water.

Chemical Properties

The results of chemical analyses are shown in table 16. Most of the soils in Union County have a low content of extractable bases. All of the soils that were sampled have one or more horizons with less than 1 milliequivalent per hundred grams extractable bases. Except for the surface layer, Plummer and Sapelo soils have less than 1 milliequivalent per hundred grams extractable bases to a depth of 2 meters or more. Extractable bases in the surface layer of all the soils that were sampled range from 1.44 to 6.88 milliequivalents per hundred grams. The relatively mild, humid climate of Union County results in a rapid depletion of basic cations (calcium, magnesium, potassium, and sodium) through leaching.

Calcium is the dominant base in all of the soils; however, levels of magnesium are slightly more than those of calcium in the deeper argillic horizons in the Blanton, Bonneau, and Sapelo soils. Extractable calcium in the Ap horizons ranges from 1.10 to 5.37 milliequivalents per 100 grams. In these layers, extractable magnesium ranges from 0.14 to 0.99 milliequivalent per 100 grams. The amount of sodium generally is less than 0.10 milliequivalent per hundred grams; however, several horizons in the Goldhead soil and the Cg horizon in the Wampee soil slightly exceed this amount. Potassium occurs in similarly low amounts. Only a few horizons exceed 0.10 milliequivalent per hundred grams. Blanton, Plummer, and Sapelo soils have one or more horizons with nondetectable amounts of extractable potassium.

Values for cation-exchange capacity, an indication of plant-nutrient capacity, are not more than 10 milliequivalents per hundred grams in the surface layer of any of the soils and are only slightly more than this amount in the Bt horizon in Bonneau, Goldhead, and Wampee soils and in the Bh horizon of Sapelo sand. Enhanced cation-exchange capacities parallel the higher content of clay in the deeper Bt horizons in Blanton, Bonneau, Goldhead, Plummer, and Wampee soils. Soils that have a low cation-exchange capacity in the surface layer require only small amounts of lime or sulfur to alter significantly the base status and soil reaction. Generally, soils that are inherently low in fertility are associated with low values for extractable bases and a low cation-exchange capacity. 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 1.72 percent in all horizons of all the soils that were sampled. It ranges from 0.54 percent in the surface layer of Plummer sand to 1.71 percent in the surface layer of Wampee loamy fine sand. The content generally decreases rapidly with increasing depth. It increases, however, between the E horizon and the Bh horizon in the Sapelo soil. Since the content of organic carbon in the surface layer is directly related to the nutrient- and water-holding capacities of sandy soils, management practices that conserve organic carbon are highly desirable.

Electrical conductivity values are low for all of the soils sampled in Union County, exceeding 0.05 millimhos per centimeter only in the Goldhead and Wampee soils. A nondetectable electrical conductivity value was recorded for the Bh1 horizon of Sapelo sand. These data indicate that the content of soluble salts in the soils sampled in Union County are insufficient to hinder the growth of salt-sensitive plants.

Soil reaction in water generally ranges from pH 4.0 to 5.5 in the soils that were sampled. Values slightly more than this range occurred in the Goldhead, Plummer, and Wampee soils. With few exceptions, the reaction in calcium chloride and potassium chloride is within 0.5 pH unit of the water measurements. The maximum availability of plant nutrients is generally attained when reaction is between pH 6.5 and 7.5. In Florida, however, maintaining reaction above pH 6.0 is not economically feasible for most kinds of agricultural production.

The ratio of sodium pyrophosphate carbon and aluminum to clay in the Bh horizon of Sapelo sand is sufficient to meet the chemical criteria established for spodic horizons. Sodium pyrophosphate extractable iron is 0.01 percent in the Bh horizon. The ratio of sodium pyrophosphate extractable iron and aluminum to citrate-dithionite extractable iron and aluminum in this soil also is sufficient to meet the criteria for spodic horizons.

The content of citrate-dithionite extractable iron in the Bt horizon of Blanton, Goldhead, Plummer, Sapelo, and Wampee soils ranges from 0.12 to 1.14 percent. The content is much higher in the Bt horizon than in the Bh horizon. The content of aluminum extracted by citrate-dithionite from these horizons ranges from 0.10 to 0.28 percent. The content of extractable iron and aluminum in the soils in Union County is not sufficient to restrict the availability of phosphorus.

Mineralogical Properties

The mineralogy of the sand fractions, which are 0.05 millimeter to 2.0 millimeters in size, is siliceous. Quartz is overwhelmingly dominant in all of the soils sampled in Union County. Varying amounts of heavy minerals are in all horizons. The greatest concentration is in the very fine sand fraction. The soils have no weatherable minerals. The crystalline mineral components of the clay fraction, which is less than 0.002 millimeter in size, are reported in table 17 for the major horizons of the pedons sampled. The clay mineralogical suite was made mostly of montmorillonite, a 14-angstrom intergrade, kaolinite, and quartz.

Montmorillonite occurs only in the Goldhead soil. The 14-angstrom intergrade mineral, kaolinite, and quartz occur in all horizons in all of the soils sampled. The amount of mica is insufficient for the assignment of numerical values.

Montmorillonite in the soils in Union County appears to have been inherited from the sediments in which the soils formed. It generally occurs most abundantly in poorly drained soils where the alkaline elements have not been leached by percolating rainwater; however, montmorillonite can occur in moderate amounts regardless of present drainage or chemical conditions. It is probably the least stable mineral component in the present acidic environment. It is a minor constituent of the clay minerals in Goldhead sand. Since the amount of montmorillonite is minor and sands dominate the particle-size distribution of this soil, the amount of shrinking and swelling is negligible. None of the soils sampled in Union County contains sufficient amounts of montmorillonite to create construction problems.

The 14-angstrom intergrade, a mineral of uncertain origin, is widespread in the 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 mineral is a major constituent of sand grain coatings in the upper sandy horizons of the Blanton soil. The occurrence of relatively large amounts of 14-angstrom intergrades and the general tendency of these minerals to decrease in abundance with increasing depth suggest that the 14-angstrom intergrade minerals are among the most stable species in this weathering environment.

Kaolinite was most likely inherited from the parent material, or it could have formed as a weathering product of other minerals. It is relatively stable in the acidic environment of the soils in Union County. The general tendency of kaolinite to increase in abundance with increasing depth indicates that this mineral species is less stable than the 14-angstrom intergrades in the severe weathering environment near the surface. Clay-sized quartz has mainly resulted from decrements of the silt fraction. As is usual for Florida soils, mica occurs infrequently and in very small amounts. Soils that are dominated by montmorillonite have a higher capacity for plant nutrient retention than soils dominated by kaolinite, 14-angstrom intergrade minerals, or quartz. Since montmorillonite is a minor constituent that occurs in only a few soils, the total content of clay influences the use and management of the soils in Union County more frequently than the clay mineralogy.

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 Florida Department of Transportation, Soils Laboratory, Bureau of Materials and Research.

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

Table 18 contains engineering test data about some of the major soils in Union County. These tests help to evaluate the soils for engineering purposes. The classifications given are based on data obtained by mechanical analysis and by tests to determine liquid limits and plastic limits.

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

Liquid limit and plasticity index indicate the effect of water on the strength and consistence of the soil material. As the moisture content of a dry, clayey soil is increased, the material changes from a dry state to a semisolid state and then to a plastic state. If the moisture content is further increased, the material changes from plastic to liquid. The plastic limit is the moisture content at which the soil material changes from a semisolid state to a plastic state, and the liquid limit is the moisture content at which the soil material changes from a plastic state to a liquid state. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content within which soil material is plastic. The data on liquid limit and plasticity index in table 18 are based on laboratory tests of soil samples.

Compaction, or moisture-density, data are important in earthwork. If soil material is compacted at a successively higher moisture content, assuming that the compactive effort remains constant, the density of the compacted material increases until the optimum moisture content is reached. After that, density decreases with an increase in moisture content. The highest dry density obtained in the compactive test is termed maximum dry density. As a rule, maximum strength of earthwork is obtained if the soil is compacted to the maximum dry density.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(20)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 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 Psamment (*Psamm*, meaning sandy horizons, plus *ent*, from Entisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Quartzipsamments (*Quartz*, meaning dominated by quartz, plus *psamments*, the sandy suborder of the Entisols).

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 Quartzipsamments.

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 thermic, coated Typic Quartzipsamments.

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. The texture of the surface layer or of the underlying material can differ 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 typical pedon for some of the soils is located in Bradford County. The detailed description of each soil horizon follows standards in the *Soil Survey Manual (19)*. Many of the technical terms used in the descriptions are defined in *Soil Taxonomy (20)*. 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."

Albany Series

The Albany series consists of somewhat poorly drained soils that formed in deposits of sandy and loamy marine sediments. These nearly level to gently sloping soils are on low uplands and in slightly elevated areas in the flatwoods. They are loamy, siliceous, thermic Grossarenic Paleudults.

Albany soils are associated with the Blanton, Chipley, Ocilla, Pelham, Plummer, and Sapelo soils. Blanton soils are moderately well drained. Ocilla and Pelham soils have an argillic horizon at a depth of 20 to 40 inches. Pelham, Plummer, and Sapelo soils are poorly drained. Also, Sapelo soils have a spodic horizon within a depth of 30 inches. Chipley soils are sandy to a depth of 80 inches or more.

Typical pedon of Albany fine sand, 0 to 5 percent slopes, 1,000 feet north of County Road 239A, 0.95 mile east of County Road 241, SE¼NE¼ sec. 15, T. 6 S., R. 18 E.

Ap—0 to 8 inches; dark gray (10YR 4/1) fine sand; weak fine granular structure; very friable; few fine and medium roots; medium acid; abrupt wavy boundary.

E1—8 to 22 inches; brown (10YR 5/3) sand; single grained; loose; few fine and medium roots; strongly acid; gradual wavy boundary.

E2—22 to 42 inches; light brownish gray (10YR 6/2) fine sand; few fine distinct yellowish brown (10YR 5/6) mottles; single grained; loose; medium acid; gradual wavy boundary.

E3—42 to 50 inches; light gray (10YR 7/2) fine sand; single grained; loose; medium acid; clear wavy boundary.

Bt—50 to 60 inches; yellowish brown (10YR 5/6) fine sandy loam; common coarse prominent light gray (10YR 7/2) and strong brown (7.5YR 5/6) mottles; weak coarse subangular blocky structure; very friable; sand grains coated and bridged with clay; very strongly acid; clear wavy boundary.

Btg—60 to 80 inches; light gray (10YR 7/2) sandy clay loam; common coarse prominent strong brown (7.5YR 5/6) and yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; clay films on faces of peds; very strongly acid.

The solum is more than 60 inches thick. Reaction ranges from extremely acid to slightly acid in the A and E horizons and from very strongly acid to medium acid in the Bt and Btg horizons.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2. The thickness of this horizon ranges from 6 to 10 inches.

The E horizon has hue of 10YR or 2.5Y, value of 5 to 8, and chroma of 2 to 8. It is mottled in shades of yellow, brown, gray, or red in some parts. Mottles or matrix colors with chroma of 2 or less are within 30 inches of the surface. This horizon is sand or fine sand. The combined thickness of the A and E horizons ranges from 41 to 70 inches.

Some pedons have a BE horizon. This horizon has hue of 10YR, value of 6, and chroma of 4 to 6 or hue of 2.5Y, value of 7, and chroma of 4. It is mottled in shades of gray, yellow, or brown. The texture is loamy sand or loamy fine sand. This horizon ranges from 0 to 10 inches in thickness.

The Bt horizon has hue of 7.5YR, value of 5 to 7, and chroma of 6 to 8 or hue of 10YR, value of 5 to 8, and chroma of 3 to 8. It is mottled in shades of brown, yellow, gray, or red. The texture is sandy loam, fine sandy loam, or sandy clay loam. This horizon ranges from 7 to 10 inches in thickness.

The Btg horizon has hue of 10YR or 2.5Y, value of 5 to 8, and chroma of 2 or less, or it is gleyed with hue of 5Y, value of 5 to 7, and chroma of 1. It is mottled in shades of brown, yellow, or gray. The textures are the same as those of the Bt horizon.

Blanton Series

The Blanton series consists of moderately well drained soils that formed in sandy and loamy marine deposits. These nearly level to strongly sloping soils are in the uplands. They are loamy, siliceous, thermic Grossarenic Paleudults.

Blanton soils are geographically associated with the Albany, Foxworth, Ocilla, and Troup soils. Albany and Ocilla soils are somewhat poorly drained. Ocilla soils have an argillic horizon at a depth of 20 to 40 inches. Foxworth soils are sandy throughout. Troup soils are well drained.

Typical pedon of Blanton fine sand, 0 to 5 percent slopes, about 0.4 mile east of County Road 241 and 0.8 mile south of County Road 238, NE¼NW¼ sec. 6, T. 6 S., R. 18 E.

Ap—0 to 9 inches; very dark gray (10YR 3/1) fine sand; weak fine granular structure; very friable; common fine roots; strongly acid; abrupt wavy boundary.

E1—9 to 36 inches; yellowish brown (10YR 5/4) fine sand; single grained; loose; few fine roots; strongly acid; clear wavy boundary.

E2—36 to 42 inches; very pale brown (10YR 7/3) fine sand; few fine distinct brownish yellow (10YR 6/6) mottles; single grained; loose; few fine roots; about 5 percent quartz gravel and ironstone nodules; very strongly acid; clear wavy boundary.

BE—42 to 48 inches; light yellowish brown (10YR 6/4) loamy fine sand; single grained; loose; few fine roots; about 5 percent quartz gravel and ironstone nodules; very strongly acid; abrupt wavy boundary.

Bt—48 to 61 inches; light yellowish brown (10YR 6/4) sandy clay loam; common coarse distinct strong brown (7.5YR 5/6) mottles; weak coarse subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; about 5 percent quartz gravel and ironstone nodules; very strongly acid; clear wavy boundary.

Btg1—61 to 74 inches; gray (5Y 5/1) sandy clay; common medium and coarse prominent brownish yellow (10YR 6/8) and few medium prominent red (2.5YR 4/8) mottles; weak coarse subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; common discontinuous clay films on faces of peds; extremely acid; clear wavy boundary.

Btg2—74 to 80 inches; white (10YR 8/1) sandy clay; few medium prominent red (2.5YR 4/8) and common fine distinct brownish yellow (10YR 6/8) mottles; weak coarse subangular blocky structure; friable, slightly sticky and slightly plastic; extremely acid.

The solum is 80 or more inches thick. Unless lime has been applied, reaction ranges from very strongly acid to medium acid in the A and E horizons. It ranges from extremely acid to strongly acid in the Bt and Btg horizons.

The A horizon has hue of 10YR, value of 3 to 6, and chroma of 1 to 3. The thickness of this horizon ranges from 6 to 9 inches.

The E horizon generally has hue of 10YR, value of 5 to 8, and chroma of 1 to 8. The lower part also has hue of 7.5YR, value of 5, and chroma of 6 to 8 and is mottled in shades of brown, yellow, or red. This horizon is fine sand, sand, loamy sand, or loamy fine sand. In some pedons it has 5 percent or less ironstone nodules or quartz gravel. The combined thickness of the A and E horizons ranges from 42 to 72 inches.

The BE horizon, if it occurs, has hue of 10YR, value of 5 to 7, and chroma of 4 to 6. The texture is loamy sand or loamy fine sand. This horizon is less than 10 inches thick.

The Bt horizon has hue of 10YR, value of 5 or 6, and chroma of 3 to 8 or hue of 10YR, value of 7, and chroma of 3 or 4. It is mottled in shades of brown, yellow, or red. The texture is loamy fine sand, sandy loam, fine sandy loam, or sandy clay loam.

The Btg horizon, if it occurs, has hue of 5Y, value of 5, and chroma of 1 or 2 or hue of 10YR, value of 5 to 8, and chroma of 1 or 2. It is mottled in shades of brown, yellow, red, or gray. The texture is dominantly sandy loam or sandy clay loam. In some pedons, however, it ranges to sandy clay below a depth of 60 inches or more.

Bonneau Series

The Bonneau series consists of moderately well drained soils that formed in loamy marine sediments. These moderately sloping soils are in the uplands. They are loamy, siliceous, thermic Arenic Paleudults.

Bonneau soils are associated with the Blanton, Lakeland, Ocilla, and Troup soils. Ocilla soils are somewhat poorly drained. Blanton and Troup soils have an argillic horizon at a depth of 40 to 80 inches. Also, Troup soils are well drained. Lakeland soils are excessively drained and are sandy throughout.

Typical pedon of Bonneau fine sand, 6 to 10 percent slopes, 0.25 mile south of County Road 241A and 0.4 mile west of PinchGut Road, NW¼SE¼ sec. 7, T. 6 S., R. 18 E.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) fine sand; single grained; loose; many fine and medium roots; less than 5 percent, by volume, quartz gravel and ironstone nodules; strongly acid; abrupt wavy boundary.

E1—8 to 15 inches; brown (10YR 4/3) loamy fine sand; many very dark grayish brown charcoal stains; single grained; loose; common fine roots; less than 5 percent, by volume, quartz gravel and ironstone nodules; strongly acid; gradual wavy boundary.

E2—15 to 28 inches; brown (10YR 4/3) fine sand; few dark brown charcoal stains; single grained; loose; common fine roots; strongly acid; clear wavy boundary.

Bt1—28 to 34 inches; yellowish brown (10YR 5/6) fine sandy loam; weak fine granular structure; very friable; common fine roots; about 5 percent, by volume, quartz gravel and ironstone nodules; strongly acid; clear wavy boundary.

Bt2—34 to 48 inches; yellowish brown (10YR 5/4) sandy clay loam; common fine and medium faint light brownish gray and many medium and coarse distinct strong brown (7.5YR 5/8) mottles; weak fine subangular blocky structure; friable; few fine roots; about 12 percent, by volume, quartz gravel and ironstone nodules; very strongly acid; gradual wavy boundary.

Btg1—48 to 63 inches; light gray (10YR 7/2) sandy clay loam; many medium and coarse distinct yellowish brown (10YR 5/6) and few coarse faint light yellowish brown mottles; weak medium subangular blocky structure; friable; few fine roots; about 5 percent, by volume, quartz gravel and ironstone nodules; very strongly acid; gradual wavy boundary.

Btg2—63 to 80 inches; light gray (10YR 7/1) sandy clay loam; many medium and coarse distinct brownish yellow (10YR 6/6) and common fine distinct dark yellowish brown (10YR 4/6) mottles; weak fine subangular blocky structure; very friable; very strongly acid.

The solum is more than 60 inches thick. Reaction is strongly acid or medium acid in the A, Ap, and E horizons and very strongly acid or strongly acid in the Bt horizon. The content of quartz gravel and ironstone nodules is as much as 10 percent, by volume, in the solum.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 1 to 3. The thickness of this horizon ranges from 3 to 9 inches.

The E horizon has hue of 7.5YR or 10YR, value of 4 to 7, and chroma of 2 to 6. The texture is sand, fine sand, loamy sand, or loamy fine sand. The combined thickness of the A and E horizons ranges from 21 to 37 inches.

The Bt horizon has hue of 10YR or 7.5YR, value of 5 to 7, and chroma of 3 to 8. The texture is fine sandy loam, sandy loam, or sandy clay loam. This horizon ranges from 15 to 35 inches in thickness.

The Btg horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. It is mottled in shades of gray, brown, red, or yellow. The texture is fine sandy loam, sandy loam, or sandy clay loam.

Chipley Series

The Chipley series consists of somewhat poorly drained soils that formed in thick deposits of sandy marine sediments. These nearly level to gently sloping soils are on low knolls and ridges in the flatwoods and on toe slopes in the uplands. They are thermic, coated Aquic Quartzipsamments.

Chipley soils are associated with the Albany, Blanton, Foxworth, Lakeland, Pelham, Plummer, and Sapelo soils. Pelham soils have an argillic horizon at a depth of 20 to 40 inches, and Albany, Blanton, Plummer, and Sapelo soils have one at a depth of more than 40 inches. Sapelo soils have a spodic horizon within a depth of 30 inches. Lakeland soils are excessively drained, Blanton and Foxworth soils are moderately well drained, and Pelham, Plummer, and Sapelo soils are poorly drained.

Typical pedon of Chipley fine sand, 0 to 5 percent slopes, about 1,400 feet north of the Santa Fe River, 80 feet west of Southwest 55th Street, SW¼NE¼ sec. 18, T. 7 S., R. 20 E., in Bradford County:

Ap—0 to 5 inches; very dark grayish brown (10YR 3/2) fine sand; weak fine granular structure; very friable; very strongly acid; clear smooth boundary.

C1—5 to 18 inches; yellowish brown (10YR 5/4) fine sand; single grained; loose; strongly acid; clear wavy boundary.

C2—18 to 38 inches; brownish yellow (10YR 6/6) fine sand; common fine prominent yellowish red (5YR 5/8) and common medium faint yellowish brown (10YR 5/8) mottles; single grained; loose; medium acid; clear wavy boundary.

C3—38 to 53 inches; yellow (10YR 7/6) fine sand; few fine distinct light gray (10YR 7/2) and common fine distinct strong brown (7.5YR 5/6) mottles; single grained; loose; strongly acid; clear wavy boundary.

C4—53 to 72 inches; pale brown (10YR 6/3) fine sand; common fine distinct reddish brown (5YR 5/4) and yellow (10YR 8/6) mottles; single grained; loose; strongly acid; gradual wavy boundary.

C5—72 to 80 inches; light gray (10YR 7/2) sand; few fine distinct yellow (10YR 8/6) mottles; single grained; loose; very strongly acid.

Unless lime has been applied, reaction ranges from extremely acid to medium acid in the A horizon. It ranges from very strongly acid to slightly acid in the C horizon.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1 or 2. The thickness of this horizon ranges from 4 to 7 inches.

The C horizon has hue of 10YR. It has value of 7 and chroma of 1 to 6, value of 8 and chroma of 1 to 4, value of 5 or 6 and chroma of 2 to 6, or value of 4 and chroma of 3. Few or common mottles in shades of yellow or brown are at a depth of more than 12 inches in some pedons. Mottles in shades of gray or reddish and yellowish, segregated iron mottles are at a depth of 20 to 40 inches. This horizon is sand or fine sand.

Croatan Series

The Croatan series consists of very poorly drained soils that formed in moderately thick deposits of organic material underlain by loamy marine sediments. These nearly level soils are in depressions and on flood plains. They are loamy, siliceous, dysic, thermic Terric Medisaprists.

Croatan soils are geographically associated with the Dorovan, Pamlico, and Surrency soils. Dorovan soils are organic to a depth of 51 inches or more. Pamlico soils are organic to a depth of 16 to 50 inches and are underlain by sandy material. The mineral Surrency soils have an umbric epipedon. Also, they have an argillic horizon at a depth of 20 to 40 inches.

Typical pedon of Croatan muck, in an area of Pamlico and Croatan mucks; about 1 mile north of County Road 125 and 2.3 miles west of U.S. Highway

301, SE¼NE¼ sec. 9, T. 5 S., R. 22 E., in Bradford County:

Oa—0 to 23 inches; black (10YR 2/1) muck; about 20 percent fiber unrubbed, less than 5 percent rubbed; massive; very friable; extremely acid; gradual wavy boundary.

C—23 to 30 inches; very dark grayish brown (10YR 3/2) mucky sandy loam; massive; very friable; very strongly acid; gradual wavy boundary.

Cg1—30 to 65 inches; dark gray (10YR 4/1) sandy clay loam; massive; slightly sticky and slightly plastic; very strongly acid; gradual wavy boundary.

Cg2—65 to 80 inches; gray (10YR 5/1) sandy clay loam; massive; slightly sticky and slightly plastic; strongly acid.

The thickness of the organic material commonly ranges from 16 to 35 inches, but it can be as much as 50 inches. Reaction is extremely acid in the organic material and ranges from extremely acid to slightly acid in the mineral layers.

The Oa horizon has hue of 10YR or 7.5YR, value of 2 or 3, and chroma of 1 or 2 or is neutral in hue and has value of 2. The content of mineral material is less than 15 percent. The content of fiber is less than 10 percent after rubbing.

The C horizon has hue of 10YR, value of 2 to 5, and chroma of 1 to 3 or hue of 5Y, value of 4, and chroma of 1. The texture is mucky sandy loam, sandy loam, fine sandy loam, or loam. This horizon ranges from 3 to 10 inches in thickness.

The Cg horizon has hue of 10YR to 5Y, value of 3 to 5, and chroma of 1 or 2 or hue of 10YR, value of 4 or 5, and chroma of 3. This horizon is sandy loam, sandy clay loam, or fine sandy loam.

Dorovan Series

The Dorovan series consists of very poorly drained soils that formed in highly decomposed organic material more than 51 inches thick. This organic material is decomposed leaves, twigs, roots, and plants. These nearly level soils are in depressions and on flood plains. They are dysic, thermic Typic Medisaprists.

Dorovan soils are associated with the Croatan, Mascotte, Pamlico, Pelham, Plummer, Sapelo, Starke, and Surrency soils. Croatan and Pamlico soils are organic to a depth of less than 51 inches and are underlain by loamy and sandy material, respectively. The mineral Mascotte, Pelham, Plummer, and Sapelo soils are poorly drained. Mascotte and Pelham soils have an argillic horizon at a depth of 20 to 40 inches, and Plummer and Sapelo soils have one at a depth of 40 to 80 inches. Mascotte and Sapelo soils have a spodic horizon within a depth of 30 inches. Starke and Surrency soils have an umbric epipedon and are very poorly drained. Also, Starke soils have an argillic horizon at a depth of 40 to 80 inches, and Surrency soils have one at a depth of 20 to 40 inches.

Typical pedon of Dorovan muck, frequently flooded, 0.87 mile north of Little Santa Fe Lake, 0.53 mile northwest of County Road 21B, SW¼SE¼ sec. 15, T. 8 S., R. 22 E., in Bradford County:

Oa1—0 to 25 inches; dark brown (7.5YR 3/2) muck; about 30 percent fiber unrubbed, 5 percent rubbed; fine to coarse roots rubbed and partly decomposed leaves, twigs, and wood fragments; massive; nonsticky; extremely acid; diffuse wavy boundary.

Oa2—25 to 40 inches; very dark brown (10YR 2/2) muck; about 20 percent fiber unrubbed, 5 percent rubbed; fine and medium, partly decomposed roots and wood fragments; massive; nonsticky; extremely acid; diffuse wavy boundary.

Oa3—40 to 80 inches; very dark brown (10YR 2/2) muck; about 5 percent fiber unrubbed, 2 percent rubbed; decomposed parts of plants; massive; nonsticky; extremely acid.

The Oa horizon ranges from 51 to more than 80 inches in thickness. It has hue of 5YR, 7.5YR, or 10YR, value of 2 or 3, and chroma of 1 or 2. The content of fiber ranges from 10 to 40 percent before rubbing and from less than 5 percent to 15 percent after rubbing. This horizon has few or common partly decomposed leaves, roots, and twigs and the remains of hydrophytic plants. A few logs and large wood fragments are in the lower part.

Some pedons have a Cg horizon. This horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. The texture is sand to sandy loam.

Elloree Series

The Elloree series consists of poorly drained soils that formed in sandy and loamy sediments. These nearly level soils are on flood plains. They are loamy, siliceous, thermic Arenic Ochraqualfs.

Elloree soils are associated with the Grifton, Ousley, Pelham, Plummer, Sapelo, and Surrency soils and Fluvaquents. Grifton soils have an argillic horizon within a depth of 20 inches, and Plummer and Sapelo soils have one at a depth of 40 to 80 inches. Also, Sapelo soils have a spodic horizon within a depth of 30 inches. Fluvaquents have stratified fluvial material of varying textures throughout. Ousley soils are somewhat poorly drained and are sandy to a depth of 80 inches or more.

Pelham and Surrency soils have an argillic horizon at a depth of 20 to 40 inches. Also, Surrency soils have an umbric epipedon. Pelham, Plummer, and Surrency soils have a base saturation of less than 35 percent.

Typical pedon of Elloree fine sand, in an area of Grifton and Elloree soils, frequently flooded; about 0.5 mile northeast of County Road 125, about 900 feet south of the New River, NE¼NW¼SE¼ sec. 36, T. 5 S., R. 11 E., in Bradford County:

Ap—0 to 5 inches; black (10YR 2/1) fine sand; weak medium granular structure; very friable; medium acid; clear wavy boundary.

Eg1—5 to 15 inches; grayish brown (10YR 5/2) fine sand; few medium uncoated sand grains; single grained; loose; medium acid; gradual wavy boundary.

Eg2—15 to 33 inches; gray (10YR 6/2) fine sand; common uncoated sand grains; single grained; loose; medium acid; clear wavy boundary.

Btg1—33 to 43 inches; light gray (5Y 7/1) sandy loam; few fine distinct yellowish brown (10YR 5/4) mottles; moderate medium subangular blocky structure; friable; medium acid; gradual wavy boundary.

Btg2—43 to 55 inches; grayish brown (10YR 5/2) sandy loam; common medium distinct yellowish brown (10YR 5/4) mottles; weak medium subangular blocky structure; moderately alkaline; gradual wavy boundary.

Btg3—55 to 80 inches; grayish brown (10YR 5/2) sandy clay loam; common medium distinct yellowish brown (10YR 5/4) mottles; moderate medium subangular blocky structure; friable; mildly alkaline.

The solum is more than 50 inches thick. Reaction ranges from very strongly acid to slightly acid in the A horizon, from strongly acid to neutral in the E horizon, and from strongly acid to moderately alkaline in the Btg and Cg horizons.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 2 or less. The thickness of this horizon ranges from 2 to 7 inches.

The Eg horizon has hue of 10YR, value of 4 to 7, and chroma of 2 or less. The texture is sand, fine sand, or loamy sand. This horizon ranges from 15 to 30 inches in thickness.

The Btg horizon, if it occurs, has hue of 10YR to 5Y, value of 4 to 7, and chroma of 2 or less. It is mottled in shades of gray, yellow, or brown. The texture is sandy loam or sandy clay loam.

Some pedons have a Cg horizon. This horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 2 or less. The texture is sand, loamy sand, sandy loam, or sandy clay loam.

Foxworth Series

The Foxworth series consists of moderately well drained soils that formed in thick deposits of sandy marine or eolian sediments. These nearly level to gently sloping soils are in the uplands. They are thermic, coated Typic Quartzipsamments.

Foxworth soils are associated with the Albany, Blanton, Chipley, Lakeland, Ocilla, Plummer, and Troup soils. Albany, Blanton, Plummer, and Troup soils have an argillic horizon at a depth of 40 to 80 inches, and Ocilla soils have one at a depth of 20 to 40 inches. Albany, Chipley, and Ocilla soils are somewhat poorly drained, Plummer soils are poorly drained, Troup soils are well drained, and Lakeland soils are excessively drained.

Typical pedon of Foxworth fine sand, 0 to 5 percent slopes, about 50 feet west of William Kelly Road and 0.18 mile south of stream, NE¼SW¼ sec. 29, T. 6 S., R. 20 E., in Bradford County:

Ap—0 to 8 inches; very dark gray (10YR 3/1) fine sand; weak fine granular structure; very friable; medium acid; clear wavy boundary.

C1—8 to 28 inches; yellowish brown (10YR 5/4) sand; single grained; loose; strongly acid; gradual wavy boundary.

C2—28 to 52 inches; brownish yellow (10YR 6/6) sand; single grained; loose; strongly acid; gradual wavy boundary.

C3—52 to 75 inches; brownish yellow (10YR 6/6) sand; few fine distinct strong brown (7.5YR 5/6) mottles and few pale brown splotches; single grained; loose; strongly acid; gradual wavy boundary.

C4—75 to 80 inches; very pale brown (10YR 7/4) sand; few medium distinct yellowish red (5YR 5/8) mottles; single grained; loose; strongly acid.

The sandy material is 80 or more inches thick. Reaction ranges from very strongly acid to medium acid throughout the profile. The texture is sand or fine sand in the C horizon. The content of silt combined with the content of clay is 5 to 10 percent in the 10- to 40-inch control section.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 1 to 3. The thickness of this horizon ranges from 4 to 8 inches.

The C1 and C2 horizons have hue of 10YR, value of 5 to 7, and chroma of 3 to 8. Few fine mottles or pockets of uncoated sand grains are at a depth of 36 to 42 inches in some pedons. They are not indicative of wetness.

The C3 and C4 horizons have hue of 10YR, value of 5 to 8, and chroma of 1 to 6. Few or common, fine or medium mottles in shades of yellow, brown, or red are at a depth of 45 to about 60 inches. Few to many uncoated sand grains are in these horizons. In pedons with thin C1 and C2 horizons, the C3 horizon can have the same colors as those horizons.

Goldhead Series

The Goldhead series consists of poorly drained soils that formed in sandy and loamy marine sediments. These nearly level soils are in low upland areas and in seeps adjacent to drainageways. They are loamy, siliceous, thermic Arenic Ochraqualfs.

Goldhead soils are geographically associated with the Albany, Ocilla, Pelham, Plummer, Surrency, and Wampee soils. All of the associated soils, except for Wampee soils, have a base saturation of less than 35 percent. Albany, Ocilla, and Wampee soils are somewhat poorly drained. Albany and Plummer soils have an argillic horizon at a depth of more than 40 inches. Surrency soils are very poorly drained and have an umbric epipedon.

Typical pedon of Goldhead fine sand, about 0.4 mile east of County Road 241 and 1.8 miles north of County Road 238, SW¼NW¼ sec. 28, T. 5 S., R. 18 E.

Ap—0 to 9 inches; black (10YR 2/1) fine sand; weak fine granular structure; very friable; few fine roots; medium acid; clear wavy boundary.

Eg1—9 to 17 inches; dark gray (10YR 4/1) fine sand; single grained; loose; few fine roots; less than 5 percent iron and phosphatic concretions; medium acid; gradual wavy boundary.

Eg2—17 to 23 inches; light gray (10YR 7/1) fine sand; few fine prominent brownish yellow (10YR 6/8) mottles; single grained; loose; few fine roots; about 5 percent iron and phosphatic concretions; medium acid; clear wavy boundary.

Btg1—23 to 42 inches; grayish brown (10YR 5/2) fine sandy loam; common coarse prominent brownish yellow (10YR 6/6) mottles; weak coarse subangular blocky structure; very friable; about 10 to 15 percent iron and phosphatic concretions; strongly acid; gradual wavy boundary.

Btg2—42 to 66 inches; gray (10YR 6/1) fine sandy loam; many coarse prominent brownish yellow (10YR 6/8) and many fine prominent yellowish red (5YR 4/6) mottles; weak coarse subangular blocky structure; friable; about 5 to 10 percent concretions; strongly acid; gradual wavy boundary.

Btg3—66 to 80 inches; light gray (10YR 7/1) fine sandy loam; few fine prominent yellowish red (5YR 4/6) and common medium and coarse faint white (10YR 8/2) mottles; weak coarse subangular blocky structure; friable; less than 5 percent concretions; strongly acid.

The solum is more than 60 inches thick. Reaction ranges from very strongly acid to neutral in the A and Eg horizons and from strongly acid to neutral in the Btg horizon.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The texture is sand or fine sand. The thickness of this horizon ranges from 4 to 9 inches.

The Eg horizon has hue of 10YR, value of 4 to 7, and chroma of 1 or 2. The texture is sand or fine sand. The content of ironstone nodules or weathered phosphatic limestone fragments ranges from 0 to 5 percent, by volume. This horizon ranges from 14 to 26 inches in thickness.

The Btg horizon has hue of 10YR, value of 4 to 7, and chroma of 1 or 2 or hue of 5GY, value of 4 to 7, and chroma of 1. It is sandy loam, fine sandy loam, sandy clay loam, or the gravelly analogs of those textures. The content of ironstone nodules and weathered phosphatic limestone fragments ranges from 0 to 25 percent.

Some pedons have a Cg horizon. This horizon has hue of 10YR, value of 4 to 7, and chroma of 1 or 2. The texture is sand or loamy sand.

Grifton Series

The Grifton series consists of poorly drained soils that formed in thick beds of sandy and loamy marine and alluvial sediments. These nearly level soils are on flood plains and in drainageways. They are fine-loamy, siliceous, thermic Typic Ochraqualfs.

Grifton soils are associated with the Elloree, Ousley, Pelham, Plummer, and Surrency soils and Fluvaquents. Fluvaquents have stratified alluvial material of varying textures throughout. Pelham and Plummer soils are not subject to frequent flooding. Elloree and Pelham soils have an argillic horizon at a depth of 20 to 40 inches, and Plummer soils have one at a depth of 40 to 80 inches. Surrency soils have an umbric epipedon. They have an argillic horizon at a depth of 20 to 40 inches. Pelham, Plummer, and Surrency soils have a base saturation of less than 35 percent. Ousley soils are somewhat poorly drained and are sandy to a depth of 80 inches or more.

Typical pedon of Grifton loamy fine sand, in an area of Grifton and Elloree soils, frequently flooded; 150 feet south of the New River and 2 miles west of County Road 16, SE¼NW¼ sec. 21, T. 5 S., R. 21 E., in Bradford County:

A—0 to 4 inches; very dark gray (10YR 3/1) loamy fine sand; weak fine granular structure; very friable; very strongly acid; clear wavy boundary.

Eg—4 to 10 inches; dark gray (10YR 4/1) loamy fine sand; weak fine granular structure; very friable; strongly acid; abrupt wavy boundary.

Btg1—10 to 18 inches; dark gray (10YR 4/1) sandy clay loam; common medium yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; friable; neutral; clear wavy boundary.

Btg2—18 to 24 inches; dark gray (10YR 4/1) sandy clay loam; many medium prominent brownish yellow (10YR 6/8) mottles; moderate medium subangular blocky structure; slightly sticky and slightly plastic; about 5 percent, by volume, pockets and thin discontinuous bands of soft white calcium carbonate accumulations; neutral; gradual wavy boundary.

Btg3—24 to 52 inches; gray (10YR 5/1) sandy clay loam; common medium distinct yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; slightly sticky and slightly plastic; about 5 percent, by volume, pockets and thin discontinuous bands of soft white calcium carbonate accumulations; moderately alkaline; gradual wavy boundary.

BCg—52 to 65 inches; gray (10YR 5/1) sandy loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; slightly sticky and nonplastic; neutral.

The solum is 60 or more inches thick. Reaction ranges from very strongly acid to slightly acid in the A and E horizons, from very strongly acid to moderately alkaline in the Btg horizon, and from medium acid to moderately alkaline in the BCg and Cg horizons.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 2 or less. The thickness of this horizon ranges from 4 to 8 inches.

The Eg horizon, if it occurs, has hue of 10YR, value of 4 to 7, and chroma of 1 or 2. The texture is loamy sand, loamy fine sand, or sandy loam. The combined thickness of the A and E horizons ranges from 6 to 17 inches.

Some pedons have a BEg horizon. This horizon has hue of 10YR, value of 5, and chroma of 1 or 2. The texture is loamy sand or sandy loam. This horizon ranges from 0 to 7 inches in thickness.

The Btg horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 2 or less. It is mottled in shades of yellow or brown. The texture is sandy loam or sandy clay loam. This horizon ranges from 18 to 45 inches in thickness.

Some pedons have a Cg or 2Cg horizon. This horizon has hue of 10YR to 5GY, value of 4 to 7, and chroma of 2 or less. The texture is sand, fine sand, or loamy fine sand.

Lakeland Series

The Lakeland series consists of excessively drained soils that formed in thick beds of eolian or marine sand. These nearly level to gently sloping soils are on broad, slightly elevated ridges in the uplands. They are thermic, coated Typic Quartzipsamments.

Lakeland soils are associated with the Albany, Blanton, Chipley, Foxworth, and Troup soils. Troup soils are well drained, Blanton and Foxworth soils are moderately well drained, and Chipley and Albany soils are somewhat poorly drained. Also, Albany, Blanton, and Troup soils have an argillic horizon at a depth of 40 to 80 inches.

Typical pedon of Lakeland sand, 0 to 5 percent slopes, 0.4 mile west of County Road 241A, about 0.6 mile south of State Road 238, NW¼NE¼ sec. 1, T. 6 S., R. 17 E.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) sand; single grained; loose; few uncoated sand grains; common fine roots; medium acid; abrupt wavy boundary.

C1—8 to 32 inches; dark yellowish brown (10YR 4/4) sand; single grained; loose; common fine roots; few uncoated sand grains; strongly acid; gradual wavy boundary.

C2—32 to 48 inches; dark yellowish brown (10YR 4/6) sand; single grained; loose; few fine roots; few uncoated sand grains; strongly acid; gradual wavy boundary.

C3—48 to 80 inches; strong brown (7.5YR 5/6) sand; single grained; loose; few uncoated sand grains; about 2 percent ironstone nodules; strongly acid.

The sand is more than 80 inches thick. Unless lime has been applied, reaction is very strongly acid to medium acid throughout the profile.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 1 or 2. The thickness of this horizon ranges from 3 to 9 inches.

The C horizon has hue of 10YR, value of 4 to 7, and chroma of 3 to 8 or hue of 7.5YR, value of 5 or 6, and chroma of 6. Some pedons have less than 5 percent, by volume, ironstone nodules at a depth of more than 40 inches.

Mascotte Series

The Mascotte series consists of poorly drained soils that formed in thick deposits of sandy and loamy marine sediments. These nearly level soils are in the flatwoods. They are sandy, siliceous, thermic Ultic Haplaquods.

Mascotte soils are associated with the Albany, Ocilla, Pantego, Pelham, Plummer, Sapelo, and Surrency soils. All of the associated soils, except for Sapelo soils, have no spodic horizon. Albany and Ocilla soils are somewhat poorly drained. Pantego and Surrency soils have an umbric epipedon. Pantego soils have an argillic horizon within a depth of 20 inches, and Albany, Plummer, and Sapelo soils have one at a depth of more than 40 inches.

Typical pedon of Mascotte sand, 0.75 mile north of County Road 18, about 2.2 miles east of the Seaboard Coast Line Railroad, NW¼SE¼ sec. 11, T. 7 S., R. 20 E., in Bradford County:

Ap—0 to 6 inches; black (10YR 2/1) sand; weak fine granular structure; very friable; few coarse, common medium, and many fine roots; extremely acid; clear wavy boundary.

E—6 to 19 inches; grayish brown (10YR 5/2) sand; single grained; loose; common medium and fine roots; very strongly acid; clear wavy boundary.

Bh1—19 to 23 inches; black (5YR 2/1) loamy sand; moderate medium subangular blocky structure; very friable; few medium and fine roots; very strongly acid; clear wavy boundary.

Bh2—23 to 27 inches; dark reddish brown (5YR 2/2) sand; weak fine subangular blocky structure; very friable; few fine roots; very strongly acid; gradual wavy boundary.

E′—27 to 35 inches; light yellowish brown (10YR 6/4) sand; common fine and medium very dark gray (10YR 3/1) spodic bodies; single grained; loose; few fine roots; very strongly acid; clear wavy boundary.

Btg1—35 to 38 inches; light gray (10YR 7/2) fine sandy loam; common coarse distinct strong brown (7.5YR 5/8) and many coarse faint light yellowish brown (10YR 6/4) mottles; moderate medium subangular blocky structure; friable; few fine roots; very strongly acid; gradual wavy boundary.

Btg2—38 to 60 inches; light gray (10YR 7/2) sandy clay loam; many medium and coarse distinct brownish yellow (10YR 6/8) and few fine and medium prominent red (2.5YR 4/8) mottles; moderate medium subangular blocky structure; friable; very strongly acid; gradual wavy boundary.

Btg3—60 to 80 inches; light gray (10YR 7/2) sandy clay loam; common coarse prominent light red (10R 6/8) and many fine distinct yellow (10YR 7/8) mottles; moderate medium subangular blocky structure; friable; very strongly acid.

Depth to the Bh horizon ranges from 14 to 29 inches, and depth to the Btg horizon ranges from 24 to 39 inches. Reaction ranges from extremely acid to strongly acid throughout the solum.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1. The thickness of this horizon ranges from 4 to 9 inches.

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 combined thickness of the A and E horizons is less than 30 inches.

The Bh horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2; hue of 7.5YR, value of 3 or 4, and chroma of 2 to 4; or hue of 5YR, value of 2 or 3, and chroma of 1 to 3. The texture is loamy sand, sand, or fine sand. This horizon ranges from 4 to 14 inches in thickness.

The E′ horizon has hue of 10YR, value of 5 to 7, and chroma of 2 to 4. In some pedons it has mottles in shades of brown or gray. The texture is sand or fine sand. This horizon ranges from 0 to 8 inches in thickness.

The Btg horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2 or hue of 2.5Y, value of 5 to 7, and chroma of 2. The texture is fine sandy loam, sandy loam, or sandy clay loam.

Ocilla Series

The Ocilla series consists of somewhat poorly drained soils that formed in deposits of sandy and loamy marine sediments. These nearly level to gently sloping soils are on low uplands and in slightly elevated areas in the flatwoods. They are loamy, siliceous, thermic Aquic Arenic Paleudults.

Ocilla soils are associated with the Albany, Blanton, Mascotte, Pelham, Plummer, and Sapelo soils. Albany, Plummer, and Sapelo soils have an argillic horizon at a depth of more than 40 inches. Blanton soils are moderately well drained, and Mascotte, Pelham, Plummer, and Sapelo soils are poorly drained. Also, Mascotte and Sapelo soils have a spodic horizon.

Typical pedon of Ocilla fine sand, 0 to 5 percent slopes, 0.8 mile north of County Road 225 and 1.1 miles west of County Road 16, NE¼SE¼ sec. 22, T. 5 S., R. 21 E., in Bradford County:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) fine sand; weak fine granular structure; very friable; many fine and medium roots; medium acid; abrupt wavy boundary.

E—8 to 20 inches; light yellowish brown (10YR 6/4) fine sand; single grained; loose; common fine, medium, and coarse roots; strongly acid; clear wavy boundary.

BE—20 to 25 inches; yellow (10YR 7/6) loamy fine sand; few fine faint brownish yellow mottles; weak fine granular structure; very friable; few fine and medium roots; less than 5 percent, by volume, ironstone nodules; strongly acid; clear wavy boundary.

Bt—25 to 39 inches; pale brown (10YR 6/3) sandy clay loam; many medium and coarse distinct brownish yellow (10YR 6/6) and common fine and medium distinct red (10R 4/8) mottles; weak coarse subangular blocky structure; friable; few fine and medium roots; clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg1—39 to 56 inches; gray (5Y 6/1) sandy clay loam; common medium distinct olive yellow (5Y 6/6), common medium distinct red (10R 4/8), and common coarse distinct yellowish red (5YR 5/8) mottles; moderate coarse subangular blocky structure; friable; clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg2—56 to 80 inches; gray (5Y 6/1) sandy clay loam; medium and coarse distinct yellowish red (5YR 5/8), many medium and coarse distinct red (10R 4/8), and few medium distinct olive yellow (5Y 6/6) mottles; moderate coarse subangular blocky structure; friable; clay films on faces of peds; very strongly acid.

The solum is 80 or more inches thick. Unless lime has been applied, it 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 thickness of this horizon ranges from 3 to 10 inches.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 1 to 4 or hue of 2.5Y, value of 6 to 8, and chroma of 2 to 4. In some pedons it has mottles in shades of brown, olive, or gray in the lower part. The texture is sand or fine sand. The thickness of this horizon ranges from 12 to 29 inches.

The BE horizon, if it occurs, has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 3 to 8. It is mottled in shades of gray, yellow, brown, or red. The texture is loamy sand, loamy fine sand, or sandy loam. This horizon ranges from 0 to 15 inches in thickness.

The Bt horizon has hue of 10YR, value of 5 to 7, and chroma of 3 to 8. It is mottled in shades of gray, yellow, brown, or red. The texture is sandy loam, fine sandy loam, or sandy clay loam. This horizon ranges from 4 to 16 inches in thickness.

The Btg horizon has hue of 10YR and has value of 5 to 7 and chroma of 2 to 8 or value of 6 or 7 and chroma of 1, or it has hue of 5Y, value of 6 to 8, and chroma of 1. It is mottled in shades of gray, yellow, brown, or red. The texture is sandy loam, sandy clay loam, or sandy clay.

Osier Series

The Osier series consists of poorly drained soils that formed in thick beds of sandy marine sediments. These nearly level soils are in the slightly lower areas in the flatwoods. They are siliceous, thermic Typic Psammaquents.

Osier soils are geographically associated with the Albany, Chipley, Pamlico, Plummer, Sapelo, and Starke soils. Albany, Plummer, Sapelo, and Starke soils have an argillic horizon at a depth of 40 to 80 inches. Albany and Chipley soils are somewhat poorly drained. Pamlico soils are organic to a depth of less than 51 inches and are underlain by sandy material. Sapelo soils have a spodic horizon within a depth of 30 inches. Starke soils are very poorly drained and have an umbric epipedon.

Typical pedon of Osier sand, about 15 feet north of County Road 18, about 0.6 mile east of the Santa Fe River, NE¼NE¼ sec. 3, T. 7 S., R. 19 E.

Ap—0 to 5 inches; very dark gray (10YR 3/1) sand; weak fine granular structure; very friable; common uncoated sand grains; common fine roots; slightly acid; clear wavy boundary.

Cg1—5 to 25 inches; dark grayish brown (10YR 4/2) sand; single grained; loose; few fine roots; medium acid; gradual wavy boundary.

Cg2—25 to 55 inches; grayish brown (10YR 5/2) sand; single grained; loose; medium acid; gradual wavy boundary.

Cg3—55 to 80 inches; light brownish gray (10YR 6/2) sand; single grained; loose; medium acid.

Unless lime has been applied, reaction is extremely acid to medium acid throughout the profile. The texture is fine sand or sand to a depth of 80 inches or more. The content of silt combined with the content of clay is 5 to 10 percent between depths of 10 and 40 inches.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1. The thickness of this horizon ranges from 5 to 7 inches.

The Cg horizon has hue of 10YR or 2.5Y, value of 4 to 8, and chroma of 1 or 2. In some pedons it has a few mottles in shades of brown, yellow, or gray.

Ousley Series

The Ousley series consists of somewhat poorly drained soils that formed in sandy fluvial sediments along the Santa Fe River, the New River, and various other creeks and streams. These nearly level soils are in high areas on flood plains. They are thermic, uncoated Aquic Quartzipsamments.

Ousley soils are associated with the Albany, Blanton, Elloree, Grifton, Ocilla, Pelham, and Plummer soils and

Fluvaquents. Albany, Blanton, and Plummer soils have an argillic horizon at a depth of 40 to 80 inches. Also, Blanton soils are moderately well drained. Elloree, Ocilla, and Pelham soils have an argillic horizon at a depth of 20 to 40 inches, and Grifton soils have one within a depth of 20 inches. Fluvaquents are poorly drained, and Elloree, Grifton, Pelham, and Plummer soils are very poorly drained. Also, Fluvaquents consist of stratified alluvial material of varying textures.

Typical pedon of Ousley fine sand, in an area of Fluvaquents-Ousley association, occasionally flooded; about 1.8 miles east of County Road 241, NW¼SE¼ sec. 26, T. 6 S., R. 18 E.

A—0 to 4 inches; dark grayish brown (10YR 4/2) fine sand; weak fine granular structure; very friable; few fine roots; very strongly acid; abrupt wavy boundary.
C1—4 to 24 inches; brown (10YR 5/3) fine sand; single grained; loose; few fine roots; very strongly acid; clear smooth boundary.
C2—24 to 40 inches; very pale brown (10YR 7/3) fine sand; single grained; loose; few fine roots; very strongly acid; clear smooth boundary.
C3—40 to 55 inches; light brownish gray (10YR 6/2) sand; single grained; loose; few fine roots; very strongly acid; clear smooth boundary.
C4—55 to 80 inches; light gray (10YR 7/2) sand; single grained; loose; very strongly acid.

The sandy material is 80 or more inches thick. Reaction is very strongly acid or strongly acid throughout the profile.

The A horizon has hue of 10YR and has value of 2 to 6 and chroma of 1 or value of 4 and chroma of 2. The thickness of this horizon ranges from 4 to 8 inches.

The C1 and C2 horizons have hue of 10YR and have value of 4 to 7 and chroma of 3 or value of 5 or less and chroma of 4. The texture is fine sand or sand. The combined thickness of the C1 and C2 horizons ranges from 25 to 44 inches.

The C3 and C4 horizons, if they occur, have hue of 10YR and have value of 6 or 7 and chroma of 2, value of 6 and chroma of 4, or value of 5 and chroma of 3. In some pedons they have mottles in shades of gray, brown, or yellow. The texture is sand or fine sand.

Pamlico Series

The Pamlico series consists of very poorly drained soils that formed in moderately thick deposits of organic material underlain by sandy marine sediments. These nearly level soils are in depressions and on flood plains. They are sandy or sandy-skeletal, siliceous, dysic, thermic Terric Medisaprists.

Pamlico soils are associated with the Croatan, Dorovan, Pantego, Starke, and Surrency soils. Croatan soils are organic to a depth of 16 to 50 inches and are underlain by loamy material. Dorovan soils are organic to a depth of 51 inches or more. The mineral Pantego and Surrency soils have an umbric epipedon. Also, Pantego soils have an argillic horizon within a depth of 20 inches, and Surrency soils have one at a depth of 20 to 40 inches. Starke soils have an umbric epipedon. Also, they have an argillic horizon at a depth of 40 to 80 inches.

Typical pedon of Pamlico muck, in an area of Pamlico and Croatan mucks; about 2,200 feet east of County Road 231 and 3,000 feet south of County Road 18, NW¼SW¼ sec. 15, T. 7 S., R. 20 E., in Bradford County:

Oa1—0 to 16 inches; dark brown (7.5YR 3/2) muck; about 10 percent fiber unrubbed, less than 5 percent rubbed; massive; very friable; brownish yellow (10YR 6/6) sodium pyrophosphate extract; extremely acid; gradual wavy boundary.
Oa2—16 to 40 inches; black (10YR 2/1) muck; about 15 percent fiber unrubbed, less than 5 percent rubbed; massive; very friable; yellowish brown (10YR 5/6) sodium pyrophosphate extract; extremely acid; clear wavy boundary.
C—40 to 50 inches; very dark grayish brown (10YR 3/2) sand; single grained; loose; strongly acid; gradual wavy boundary.
Cg—50 to 80 inches; grayish brown (10YR 5/2) sand; single grained; strongly acid.

The thickness of the organic material commonly ranges from 16 to 40 inches, but it can be as much as 50 inches. Reaction is extremely acid in the Oa horizon and ranges from extremely acid to strongly acid in the sandy layers.

The Oa horizon has hue of 10YR or 7.5YR, value of 2 or 3, and chroma of 1 or 2, or it is neutral in hue and has value of 2. The content of fiber is 10 percent or less after rubbing. Some pedons have a thin O or Oe horizon, which has colors similar to those of the Oa horizon.

The C horizon has hue of 10YR, value of 3 to 6, and chroma of 1 or 2. The texture is sand, fine sand, or loamy sand.

Pantego Series

The Pantego series consists of very poorly drained soils that formed in thick beds of loamy marine sediments. These nearly level soils are in depressions and on flood plains. They are fine-loamy, siliceous, thermic Umbric Paleaquults.

Pantego soils are associated with the Croatan, Elloree, Grifton, Mascotte, Pamlico, Pelham, Plummer, Sapelo, and Surrency soils. Croatan and Pamlico soils are organic to a depth of 16 to 50 inches. Also, Pamlico soils are underlain by sandy material. Mascotte, Pelham, Plummer, and Sapelo soils do not have an umbric epipedon and are poorly drained. Elloree and Mascotte soils have an argillic horizon within a depth of 40 inches, and Plummer and Sapelo soils have one at a depth of 40 to 80 inches. Mascotte and Sapelo soils have a spodic horizon within a depth of 30 inches. Surrency soils have an argillic horizon at a depth of 20 to 40 inches. Grifton soils do not have an umbric epipedon and have a high base saturation.

Typical pedon of Pantego mucky loamy sand, in an area of Surrency and Pantego soils, depressional; about 0.5 mile north of County Road 225 and 0.2 mile west of County Road 16, SW¼SE¼ sec. 23, T. 5 S., R. 21 E., in Bradford County:

A—0 to 15 inches; black (10YR 2/1) mucky loamy sand; weak fine granular structure; very friable; very strongly acid; clear wavy boundary.

BE—15 to 18 inches; grayish brown (10YR 5/2) sandy loam; weak medium subangular blocky structure; friable; very strongly acid; clear wavy boundary.

Btg1—18 to 32 inches; dark grayish brown (10YR 4/2) sandy clay loam; common medium distinct brown (10YR 5/3) mottles; weak medium subangular blocky structure; friable; very strongly acid; gradual wavy boundary.

Btg2—32 to 64 inches; dark brown (10YR 3/3) sandy clay; weak coarse subangular blocky structure; friable; very strongly acid.

The solum is more than 60 inches thick. Unless lime has been applied, reaction is very strongly acid or strongly acid throughout the profile.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The thickness of this horizon ranges from 9 to 18 inches.

The BE horizon, if it occurs, has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. The texture is loamy fine sand, sandy loam, or loam. This horizon ranges from 3 to 6 inches in thickness.

The Btg horizon has hue of 10YR, 2.5Y, or 5Y, value of 3 to 6, and chroma of 1 or 2. The number of mottles in shades of brown or yellow ranges from none to common. The texture is sandy clay loam or sandy clay.

Some pedons have a Cg horizon at a depth of more than 60 inches. This horizon has hue of 10YR, value of 4 to 7, and chroma of 1 or 2. The texture is sandy loam, loamy sand, or sand.

Pelham Series

The Pelham series consists of poorly drained soils that formed in deposits of sandy and loamy marine sediments. These nearly level soils are in the lower areas in the flatwoods and in poorly defined drainageways. They are loamy, siliceous, thermic Arenic Paleaquults.

Pelham soils are associated with the Albany, Mascotte, Ocilla, Pantego, Plummer, Sapelo, and Surrency soils. Albany, Plummer, and Sapelo soils have an argillic horizon at a depth of 40 to 80 inches. Albany and Ocilla soils are somewhat poorly drained. Mascotte and Sapelo soils have a spodic horizon within a depth of 30 inches. Pantego and Surrency soils have an umbric epipedon and are very poorly drained. Also, Pantego soils have an argillic horizon within a depth of 20 inches.

Typical pedon of Pelham fine sand, in an area of Pelham-Pelham, wet, fine sands; about 30 feet east of NW 23 Circle and 120 feet south of the intersection of North 60th Avenue and NW 23 Circle, NE¼NE¼ sec. 33, T. 4 S., R. 22 E., in Bradford County:

Ap—0 to 8 inches; very dark gray (10YR 3/1) fine sand; single grained; loose; many fine and medium roots; medium acid; clear wavy boundary.

Eg1—8 to 15 inches; dark gray (10YR 4/1) fine sand; single grained; loose; few fine roots; medium acid; clear wavy boundary.

Eg2—15 to 21 inches; gray (10YR 6/1) fine sand; single grained; loose; few fine roots; medium acid; gradual wavy boundary.

Eg3—21 to 31 inches; gray (10YR 5/1) fine sand; single grained; loose; few fine distinct yellowish brown (10YR 5/8) mottles; medium acid; clear wavy boundary.

Btg1—31 to 36 inches; gray (5Y 6/1) fine sandy loam; few fine prominent yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; slightly sticky and slightly plastic; strongly acid; gradual wavy boundary.

Btg2—36 to 48 inches; gray (5Y 6/1) sandy clay loam; many fine prominent strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; slightly sticky and slightly plastic; strongly acid; gradual wavy boundary.

Btg3—48 to 62 inches; gray (5Y 6/1) sandy clay loam; common fine prominent strong brown (7.5YR 5/8) and common medium distinct brownish yellow (10YR 6/6) and yellow (10YR 7/6) mottles; moderate medium subangular blocky structure; slightly sticky and slightly plastic; strongly acid; gradual wavy boundary.

Btg4—62 to 80 inches; light gray (10YR 7/1) sandy clay; common fine and medium distinct yellowish brown (10YR 5/8) and yellow (10YR 7/6) mottles; moderate medium subangular blocky structure; sticky and plastic; strongly acid.

The solum is more than 60 inches thick. Unless lime has been applied, reaction is very strongly acid or strongly acid throughout the profile.

The A horizon has hue of 10YR or 7.5YR or is neutral in hue. It has value of 2 to 4 and chroma of 0 to 2. The thickness of this horizon ranges from 3 to 8 inches.

The Eg horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2. The texture is sand, fine sand, or loamy sand. The combined thickness of the A and E horizons ranges from 27 to 39 inches.

Some pedons have a BE horizon. This horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. The number of yellow or yellowish brown mottles ranges from none to common. This horizon is sandy loam. It ranges from 0 to 10 inches in thickness.

The Btg horizon has hue of 10YR to 5Y or is neutral in hue. It has value of 5 to 7 and chroma of 0 to 2. The number of mottles in shades of yellow, brown, or red ranges from none to many. The texture is sandy loam, fine sandy loam, sandy clay loam, or sandy clay.

Some pedons have a Cg horizon. This horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 2 or less. The number of mottles in shades of yellow, gray, or brown ranges from none to many. The texture is sandy loam or loamy sand.

Plummer Series

The Plummer series consists of poorly drained soils that formed in deposits of sandy and loamy marine sediments. These nearly level soils are in the slightly lower areas in the flatwoods and in drainageways. They are loamy, siliceous, thermic Grossarenic Paleaquults.

Plummer soils are associated with the Albany, Mascotte, Ocilla, Pelham, Sapelo, Starke, and Surrency soils. Albany and Ocilla soils are slightly higher on the landscape than the Plummer soils and are somewhat poorly drained. Mascotte, Ocilla, Pelham, and Surrency soils have an argillic horizon at a depth of 20 to 40 inches. Mascotte and Sapelo soils have a spodic horizon at a depth of 20 to 30 inches. Starke and Surrency soils have an umbric epipedon and are very poorly drained.

Typical pedon of Plummer sand, in an area of Plummer-Plummer, wet, sands; about 0.2 mile north and 0.5 mile east of County Road 239A and 0.5 mile east of County Road 239, SW¼NW¼ sec. 18, T. 6 S., R. 19 E.

Ap—0 to 9 inches; very dark gray (10YR 3/1) sand; weak fine granular structure; very friable; many fine roots; medium acid; abrupt wavy boundary.

Eg1—9 to 27 inches; grayish brown (10YR 5/2) sand; few fine distinct brownish yellow (10YR 6/6) mottles; single grained; loose; few fine roots; medium acid; clear wavy boundary.

Eg2—27 to 35 inches; light gray (10YR 7/2) sand; few fine prominent brownish yellow (10YR 6/6) mottles; single grained; loose; few fine roots; strongly acid; gradual wavy boundary.

Eg3—35 to 56 inches; white (10YR 8/2) sand; few fine faint very pale brown mottles; single grained; loose; few fine roots; medium acid; abrupt wavy boundary.

BEg—56 to 61 inches; light brownish gray (10YR 6/2) loamy sand; few fine distinct yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; very friable; very strongly acid; clear wavy boundary.

Btg1—61 to 69 inches; light brownish gray (10YR 6/2) sandy clay loam; many medium distinct brownish yellow (10YR 6/8) and common fine prominent strong brown (7.5YR 5/6) mottles; weak coarse subangular blocky structure; friable, slightly sticky; few clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg2—69 to 80 inches; light gray (10YR 7/2) sandy clay loam; common medium prominent strong brown (7.5YR 5/6) mottles; weak coarse subangular blocky structure; friable, slightly sticky; extremely acid.

The thickness of the solum ranges from 72 to more than 80 inches. Unless lime has been applied, reaction is very strongly acid or strongly acid throughout the profile.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1 or 2. The thickness of this horizon ranges from 4 to 9 inches.

The Eg horizon has hue of 10YR, value of 4 to 8, and chroma of 1 or 2. The number of mottles in shades of yellow or brown ranges from none to common. The texture is sand or fine sand. The total thickness of the A and E horizons ranges from 48 to 65 inches.

The BE horizon, if it occurs, has colors similar to those of the Btg horizon. The texture is loamy sand or sandy loam. This horizon ranges from 2 to 7 inches in thickness.

The Btg horizon has hue of 10YR or 5Y, value of 5 to 7, and chroma of 1 or 2 or is neutral in hue and has value of 6. The number of mottles in shades of gray, brown, or yellow ranges from none to common. The texture is sandy loam, fine sandy loam, or sandy clay loam.

Sapelo Series

The Sapelo series consists of poorly drained soils that formed in thick beds of sandy and loamy marine sediments. These nearly level soils are in the flatwoods. They are sandy, siliceous, thermic Ultic Haplaquods.

Sapelo soils are associated with the Albany, Mascotte, Ocilla, Pelham, Plummer, Starke, and Surrency soils. Albany and Ocilla soils are somewhat poorly drained. Ocilla, Mascotte, and Pelham soils have an argillic horizon at a depth of 20 to 40 inches. Albany, Ocilla, Pelham, Plummer, Starke, and Surrency soils do not have a spodic horizon.

Typical pedon of Sapelo sand, about 0.1 mile north of County Road 239A, 0.3 mile east of County Road 239, SE¼NE¼ sec. 13, T. 6 S., R. 18 E.

Ap—0 to 8 inches; very dark gray (10YR 3/1) sand; single grained; loose; many fine roots; very strongly acid; clear wavy boundary.

E—8 to 15 inches; grayish brown (10YR 5/2) sand; single grained; loose; common fine roots; strongly acid; clear wavy boundary.

Bh1—15 to 21 inches; very dark brown (10YR 2/2) sand; few fine distinct dark yellowish brown (10YR 4/6) mottles; weak fine granular structure; very friable; few fine roots; extremely acid; gradual wavy boundary.

Bh2—21 to 29 inches; dark brown (10YR 3/3) sand; weak fine granular structure; very friable; few pockets and streaks of brown (10YR 5/3) sand; extremely acid; clear wavy boundary.

E′—29 to 50 inches; light gray (10YR 7/2) sand; few fine distinct brownish yellow (10YR 6/8) and common fine distinct dark brown (10YR 3/3) mottles; single grained; loose; very strongly acid; clear wavy boundary.

Btg1—50 to 60 inches; light gray (10YR 7/1) fine sandy loam; many medium and coarse prominent strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable, slightly sticky; common distinct clay films on faces of peds; extremely acid; gradual wavy boundary.

Btg2—60 to 80 inches; light gray (10YR 7/1) sandy clay loam; common coarse prominent strong brown (7.5YR 5/8), few medium distinct gray (5Y 5/1), and few medium prominent red (10R 4/8) mottles; weak coarse subangular blocky structure; friable, slightly sticky; extremely acid.

The solum ranges from 70 to more than 80 inches in thickness. Unless lime has been applied, it ranges from extremely acid to strongly acid. Depth to the Bh horizon is 10 to 20 inches, and depth to the Btg horizon is 40 to 70 inches.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1 or is neutral in hue and has value of 2. The thickness of this horizon ranges from 3 to 8 inches.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 2 or less. The texture is fine sand or sand. This horizon ranges from 7 to 16 inches in thickness.

The Bh horizon has hue of 5YR or 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. The texture is sand or fine sand. The thickness of this horizon ranges from 5 to 15 inches.

The E′ horizon has hue of 10YR and has value of 5 to 7 and chroma of 2, value of 6 and chroma of 3, or value of 7 and chroma of 4. The number of mottles in shades of red, brown, or yellow ranges from none to common. The texture is sand or fine sand. The number of fine to coarse, weakly cemented spodic bodies ranges from none to common. This horizon ranges from 20 to 31 inches in thickness.

The Btg horizon has hue of 10YR, value of 6 to 8, and chroma of 1 or 2 or hue of 5Y, value of 5 to 8, and chroma of 1 or 2. It is mottled in shades of yellow, red, or brown. This horizon is sandy loam, fine sandy loam, or sandy clay loam. It has lenses and pockets of sand and clay in some pedons.

Starke Series

The Starke series consists of very poorly drained soils that formed in thick beds of sandy and loamy marine sediments. These nearly level soils are in depressions. They are loamy, siliceous, thermic Grossarenic Paleaquults.

Starke soils are associated with the Croatan, Mascotte, Osier, Pamlico, Pantego, Pelham, Plummer, Sapelo, and Surrency soils. Croatan and Pamlico soils are organic to a depth of 16 to 51 inches. Mascotte and Sapelo soils have a spodic horizon and are poorly drained. Surrency and Pelham soils have an argillic horizon at a depth of 20 to 40 inches, and Pantego soils have one within a depth of 20 inches. Osier, Pelham, and Plummer soils are poorly drained and do not have an umbric epipedon. Also, Osier soils are sandy throughout.

Typical pedon of Starke mucky fine sand, depressional, about 0.1 mile north of County Road 231 and 1 mile west of County Road 18, SW¼SW¼ sec. 24, T. 7 S., R. 20 E., in Bradford County:

A1—0 to 7 inches; black (10YR 2/1) mucky fine sand; weak fine granular structure; very friable; very strongly acid; gradual wavy boundary.

A2—7 to 18 inches; black (10YR 2/1) fine sand; single grained; loose; very strongly acid; clear wavy boundary.

Eg1—18 to 26 inches; dark grayish brown (10YR 4/2) fine sand; single grained; loose; very strongly acid; gradual wavy boundary.

Eg2—26 to 46 inches; brown (10YR 5/3) fine sand; single grained; loose; very strongly acid; clear wavy boundary.

Btg1—46 to 59 inches; gray (10YR 5/1) sandy loam; common fine distinct dark yellowish brown (10YR 4/6) mottles; weak coarse subangular blocky structure; friable; very strongly acid; gradual wavy boundary.

Btg2—59 to 80 inches; gray (10YR 5/1) sandy clay loam; weak coarse subangular blocky structure; friable; very strongly acid.

The solum is more than 60 inches thick. Reaction ranges from extremely acid to medium acid throughout the profile.

The A horizon has hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 2 or less. It is sand, fine sand, loamy sand, or the mucky analogs of those textures. The thickness of this horizon ranges from 10 to 25 inches.

The Eg horizon has hue of 10YR, value of 4 to 7, and chroma of 3 or less or hue of 2.5Y, value of 5 to 7, and chroma of 2 or less. In some pedons it has mottles in varying shades of gray, yellow, or brown. This horizon is sand, fine sand, loamy sand, or loamy fine sand. The combined thickness of the A and E horizons ranges from 41 to 74 inches.

The Btg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 7, and chroma of 2 or less. The number of mottles in varying shades of gray, yellow, brown, or red ranges from none to common. The texture is sandy loam, fine sandy loam, or sandy clay loam. The thickness of this horizon ranges from 6 to 39 inches.

Some pedons have a Cg horizon. This horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 7, and chroma of 2 or less. It is sand to sandy clay.

Surrency Series

The Surrency series consists of very poorly drained soils that formed in thick beds of loamy and sandy marine sediments. These nearly level soils are on flood plains and in depressions. They are loamy, siliceous, thermic Arenic Umbric Paleaquults.

Surrency soils are associated with the Croatan, Elloree, Grifton, Mascotte, Ousley, Pamlico, Pantego, Pelham, Plummer, and Sapelo soils and Fluvaquents. Croatan and Pamlico soils are organic to a depth of 16 to 51 inches. Also, Pamlico soils do not have a Bt horizon. Mascotte, Pelham, Plummer, and Sapelo soils do not have an umbric epipedon and are poorly drained. Mascotte and Sapelo soils have a spodic horizon. Plummer and Sapelo soils have an argillic horizon at a depth of more than 40 inches, and Grifton and Pantego soils have one within a depth of 20 inches. Elloree and Grifton soils do not have an umbric epipedon and have a base saturation of more than 35 percent. Fluvaquents consist of stratified, alluvial material of varying textures throughout. Ousley soils are somewhat poorly drained and are sandy to a depth of 80 inches or more.

Typical pedon of Surrency mucky fine sand, in an area of Surrency and Pantego soils, depressional; about 2,900 feet south of County Road 125 and 2,700 feet east of U.S. Highway 301, NW¼SW¼ sec. 24, T. 5 S., R. 22 E., in Bradford County:

A1—0 to 9 inches; black (10YR 2/1) mucky fine sand; weak fine granular structure; very friable; very strongly acid; clear wavy boundary.

A2—9 to 18 inches; very dark grayish brown (10YR 3/2) sand; weak fine granular structure; very friable; very strongly acid; clear wavy boundary.

Eg1—18 to 25 inches; light brownish gray (10YR 6/2) sand; single grained; loose; very strongly acid; gradual wavy boundary.

Eg2—25 to 30 inches; light brownish gray (10YR 6/2) sand; few fine faint brown mottles; single grained; loose; very strongly acid; clear wavy boundary.

Btg1—30 to 45 inches; grayish brown (10YR 5/2) sandy loam; common fine distinct yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; friable; very strongly acid; gradual wavy boundary.

Btg2—45 to 55 inches; light gray (10YR 7/2) sandy clay loam; few fine distinct yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; friable; very strongly acid; gradual wavy boundary.

Btg3—55 to 80 inches; light gray (10YR 7/1) sandy clay loam; weak coarse subangular blocky structure; friable; very strongly acid.

The solum is 60 or more inches thick. Reaction is extremely acid or very strongly acid in the A and E horizons and very strongly acid or strongly acid in the Btg horizon.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The texture is mucky fine sand, loamy fine sand, fine sand, or sand. This horizon ranges from 10 to 18 inches in thickness.

The Eg horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2 or value of 4 and chroma of 2. It is mottled in shades of yellow or brown. The texture is loamy fine sand, loamy sand, fine sand, or sand. This horizon ranges from 7 to 20 inches in thickness.

The Btg horizon has hue of 10YR, value of 4 to 7, and chroma of 1 or 2 or hue of 5Y, value of 5 or 6, and chroma of 1. It is mottled in shades of yellow or brown. The texture is sandy loam or sandy clay loam.

Troup Series

The Troup series consists of well drained soils that formed in sandy and loamy marine deposits. These nearly level to rolling soils are in the uplands. They are loamy, siliceous, thermic Grossarenic Kandiudults.

Troup soils are geographically associated with the Blanton, Foxworth, Lakeland, and Ocilla soils. Blanton and Foxworth soils are moderately well drained, and Ocilla soils are somewhat poorly drained. Ocilla soils have an argillic horizon at a depth of 20 to 40 inches. Foxworth and Lakeland soils are sandy throughout. Lakeland soils are excessively drained.

Typical pedon of Troup sand, 0 to 5 percent slopes, 0.5 mile west of County Road 241A, 0.5 mile south of State Road 238, NE¼SW¼ sec. 1, T. 5 S., R. 17 E.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) sand; weak fine granular structure; very friable; common fine and medium roots; medium acid; clear smooth boundary.

E1—9 to 20 inches; yellowish brown (10YR 5/4) fine sand; single grained; loose; common fine roots; medium acid; gradual wavy boundary.

E2—20 to 50 inches; yellowish brown (10YR 5/6) fine sand; single grained; loose; common fine roots; medium acid; clear wavy boundary.

Bt1—50 to 65 inches; yellowish brown (10YR 5/6) sandy loam; weak coarse subangular blocky structure; friable; few fine roots; strongly acid; clear wavy boundary.

Bt2—65 to 80 inches; brownish yellow (10YR 6/6) sandy loam; weak coarse subangular blocky structure; friable; about 5 percent, by volume, ironstone nodules; few fine distinct light gray (10YR 7/2) mottles; sand grains coated and bridged with clay; strongly acid.

Unless lime has been applied, reaction is very strongly acid to medium acid in the A and E horizons and very strongly acid or strongly acid in the Bt horizon.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 to 4. The thickness of this horizon ranges from 4 to 9 inches.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 3 to 8. The texture is sand, fine sand, or loamy sand. The combined thickness of the A and E horizons is 50 to 76 inches.

Some pedons have a BE horizon. This horizon has hue of 10YR, value of 5 or 6, and chroma of 8 or hue of 7.5YR, value of 5 or 6, and chroma of 4 to 8. The content of ironstone nodules, weathered phosphatic limestone fragments, and quartz gravel ranges from 0 to 10 percent, by volume. The texture is loamy sand or sandy loam. This horizon ranges from 0 to 16 inches in thickness.

The Bt horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 to 8 or hue of 5YR, value of 4 to 6, and chroma of 6 to 8. In some pedons it has a few mottles in shades of red, yellow, or brown. The content of ironstone nodules, weathered phosphatic limestone fragments, and quartz gravel ranges from 0 to 10 percent, by volume. This horizon is sandy loam, fine sandy loam, or sandy clay loam.

Wampee Series

The Wampee series consists of somewhat poorly drained soils that formed in thick beds of sandy and loamy marine sediments. These moderately sloping and strongly sloping soils are on low uplands adjacent to drainageways and flood plains along streams. They are loamy, siliceous, thermic Aquic Arenic Hapludalfs.

Wampee soils are geographically associated with the Albany, Blanton, Goldhead, Ocilla, Pelham, and Plummer soils. All of the associated soils, except for Goldhead soils, have a base saturation of less than 35 percent. Albany soils have an argillic horizon at a depth of 40 to 80 inches. Blanton soils are moderately well drained and have an argillic horizon at a depth of 40 to 80 inches. Pelham and Plummer soils are poorly drained. Also, Plummer soils have an argillic horizon at a depth of 40 to 80 inches.

Typical pedon of Wampee loamy fine sand, 5 to 12 percent slopes, about 0.6 mile east of County Road 241 and 0.3 mile south of Swift Creek, SW¼NE¼ sec. 28, T. 5 S., R. 18 E.

Ap—0 to 6 inches; very dark grayish brown (10YR 3/2) loamy fine sand; weak fine granular structure; very friable; many fine and medium roots; about 1 percent, by volume, ironstone nodules and weathered phosphatic limestone fragments; slightly acid; clear wavy boundary.

AE—6 to 13 inches; dark brown (10YR 4/3) loamy fine sand; single grained; loose; common fine roots; about 1 percent, by volume, ironstone nodules and weathered phosphatic limestone fragments; slightly acid; gradual wavy boundary.

E—13 to 24 inches; pale brown (10YR 6/3) fine sand; single grained; loose; few fine roots; about 5 percent, by volume, ironstone nodules and weathered phosphatic limestone fragments; slightly acid; gradual wavy boundary.

BE—24 to 29 inches; light gray (10YR 7/2) loamy fine sand; few medium distinct brownish yellow (10YR 6/6) mottles; weak fine granular structure; very friable; few fine roots; about 10 percent, by volume, ironstone nodules and weathered phosphatic limestone fragments; slightly acid; clear wavy boundary.

Btg1—29 to 50 inches; light gray (10YR 7/2) gravelly sandy clay loam; few coarse distinct yellow (10YR 7/6) and few fine prominent strong brown (7.5YR 5/6) mottles; weak coarse subangular blocky structure; friable; few fine roots; about 15 percent, by volume, ironstone nodules and weathered phosphatic limestone fragments; medium acid; gradual wavy boundary.

Btg2—50 to 69 inches; light gray (10YR 7/1) sandy clay; moderate coarse subangular blocky structure; friable; few fine roots; very strongly acid; gradual wavy boundary.

Cg—69 to 80 inches; light gray (5Y 7/1) clay; common medium faint pale yellow (5Y 7/4) and common medium distinct yellow (2.5Y 7/6) mottles; massive; few fine roots; strongly acid.

The solum ranges from 50 to 80 inches in thickness. Reaction ranges from very strongly acid to neutral in the A and AE horizons and from very strongly acid to slightly acid in the E, BE, and Btg horizons.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1 or 2. The content of coarse fragments, mainly ironstone nodules, quartz gravel, and weathered phosphatic limestone fragments, ranges from 0 to 10 percent, by volume. This horizon ranges from 3 to 7 inches in thickness.

The AE horizon, if it occurs, has hue of 10YR and has value of 4 and chroma of 1 to 4 or value of 5 and chroma of 3. It is sand, fine sand, loamy sand, loamy fine sand, or the gravelly analogs of those textures. The content of coarse fragments, mainly ironstone nodules, quartz gravel, and weathered phosphatic limestone fragments, ranges from 0 to 15 percent, by volume. This horizon ranges from 0 to 7 inches in thickness.

The E horizon has hue of 10YR, value of 4 to 7, and chroma of 1 to 6. The number of mottles in shades of yellow or brown ranges from none to many. This horizon is sand, fine sand, loamy sand, loamy fine sand, or the gravelly analogs of those textures. The content of coarse fragments, mainly ironstone nodules, quartz gravel, and weathered phosphatic limestone fragments, ranges from 2 to 30 percent, by volume. The combined thickness of the A, AE, and E horizons ranges from 21 to 36 inches.

The BE horizon, if it occurs, has colors similar to those of the E horizon. The content and composition of coarse fragments also are similar. This horizon is loamy sand, loamy fine sand, or the gravelly analogs of those textures. It ranges from 0 to 6 inches in thickness.

The upper part of the Btg horizon has hue of 10YR to 5Y or is neutral in hue. It has value of 5 to 8 and chroma of 0 to 4. It has few or common mottles in varying shades of gray, yellow, or brown and in some pedons has few or common, fine or medium mottles in shades of red. It is sandy loam, fine sandy loam, sandy clay loam, sandy clay, or the gravelly analogs of those textures. The content of coarse fragments, mainly ironstone nodules, quartz gravel, and weathered phosphatic limestone fragments, ranges from 2 to 30 percent, by volume.

The lower part of the Btg horizon has hue of 10YR to 5Y or is neutral in hue. It has value of 5 to 8 and chroma of 0 to 2. The number of mottles in varying shades of gray, yellow, or brown ranges from none to common. The texture is sandy loam, fine sandy loam, sandy clay loam, or sandy clay. The content of coarse fragments is less than 10 percent, by volume. The Btg horizon ranges from 15 to 50 inches in thickness.

The Cg horizon has colors similar to those of the lower part of the Btg horizon. The texture ranges from loamy sand to clay.

Formation of the Soils

In this section the factors of soil formation are related to the soils in Union County. In addition, the processes of horizon differentiation are explained.

Factors of Soil Formation

Soil forms through weathering and other processes that act on deposited or accumulated geologic material. The kind of soil that forms depends on the type of parent material; the climate under which soil material has existed since accumulation; the plant and animal life in and on the soil; the relief, or lay of the land; and the length of time that the forces of soil formation have acted on the soil material *(9)*.

The five soil-forming factors are interdependent; each modifies the effects of the others. Any one of the 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 only quartz sand, the soil generally has only weakly expressed horizons. In some areas the effect of the parent material is modified greatly by the effects of climate, relief, and plants and animals in and on the soil. As a soil forms, it is influenced by all five factors, but in places one factor can have a dominant effect. A modification or variation in any of these factors results in a different kind of soil.

Parent Material

The soils in Union County formed mainly in marine deposits. These deposits were mostly quartz sand with varying amounts of clay and shell fragments. Clay is more abundant in soils that formed in the sediment on marine terraces and in lagoons, and it is virtually absent on shoreline ridges where most of the deposits are sandy eolian material. The parent material was transported by ocean current. The ocean covered the survey area a number of times during the Pleistocene age.

The various kinds of parent material in Union County differ somewhat from one another in mineral and chemical composition and in physical structure. The main physical differences, such as those between sand, silt, and clay, can be observed in the field. Other differences, such as mineral and chemical composition, are important to soil formation and affect the present physical and chemical characteristics of the soils. Many differences among soils in the county reflect original differences in the parent material as it was laid down.

Some organic soils are throughout the county. They formed in the partly decayed remains of wetland vegetation.

Climate

Precipitation, temperature, humidity, and wind are the climatic forces that act on the parent material of the soils in Union County. These forces have direct impact on the soil and also influence soil formation indirectly through their effect on plant and animal life.

The climate of Union County is warm and humid. The Gulf of Mexico and the Atlantic Ocean have a moderating effect on temperatures. Inland lakes moderate temperatures to a lesser extent. Summer temperatures vary only slightly. In winter, temperatures fluctuate widely, sometimes daily or for several days; however, temperatures are not below freezing long enough to freeze the soil. Rainfall averages about 54 inches per year *(25)*. It often occurs as brief, heavy thunderstorms during the summer and more moderate, lengthy rainfall with the passage of cold fronts in the winter.

Because of the warm climate and abundant rainfall, chemical and biological activity is high. Rainfall leaches many plant nutrients and thus lowers the fertility level of the soil. This process over time also accounts for the translocation of clay and organic matter, resulting in a sandy surface layer and the formation of a spodic horizon, an argillic horizon, or both deeper in the soil profile.

Plants and Animals

Plant life generally is the principal biological factor affecting soil formation in Union County. Animals, insects, bacteria, and fungi are also important. Plant and animal life furnishes organic matter. Through biological processes, such as leaf drop and death, plants recycle nutrients from varying depths within the soil and deposit nutrients along with organic matter on the surface. Animals also process nutrients and organic matter deposited on the surface.

Soil structure, porosity, and reaction are affected by plants and animals. Tree roots, crayfish, earthworms, and other burrowing organisms commonly improve soil structure and porosity. The breakdown of plant materials often influences soil reaction. Pine trees reduce alkalinity in many areas in the county.

Micro-organisms, such as bacteria and fungi, help to weather and break down minerals and recycle organic matter by breaking it down into more basic components and nutrients. These micro-organisms generally are more numerous in the surface layer, and their numbers and types increase with increasing depth. Earthworms and other burrowing or tunneling organisms mix soil material and influence its chemical composition.

Humans have influenced the formation of soils by altering the vegetative community; by cultivating, draining, irrigating, mixing, removing, covering, and compacting the soil; by discharging wastes and chemicals; and by applying pesticides. Some of the effects of these activities, such as erosion and improved drainage, are readily apparent, whereas others become apparent only after a long time.

Relief

Relief influences soil formation through its effects on drainage, erosion, temperature, and plant and animal life.

Union County has four general topographic areas. These are the scattered large swamps, marshes, and depressions in the northern part of the county; the seasonally wet flatwoods throughout the entire county, except for the southern and southwestern parts; the long, narrow flood plains along the southern, eastern, and western boundaries; and the low, rolling areas along the southern and southwestern boundaries.

The soils in the swamps, marshes, and depressions are covered with water for long periods. The soils in the flatwoods have a water table near the surface during periods of moderate or heavy rainfall. The soils on the flood plains are periodically submerged for brief periods when major drainageways flood. The soils in the low, rolling areas generally do not have a water table near the surface. They generally are extremely dry only during extended periods of low rainfall. These soils are more susceptible to erosion than the soils in the other topographic areas.

Elevations range from more than 165 feet above sea level near Palestine Lake to less than 45 feet near the junction of the Santa Fe River and Olustee Creek. Internal soil drainage generally is not related to elevation. Even in the low, rolling areas, a higher elevation does not necessarily mean better drainage.

Microrelief plays an important part in soil formation. Small rises in depressions and flatwoods and low areas in the uplands commonly support vegetation that differs from that in the surrounding areas. Also, the depth to a seasonal high water table differs.

Time

Most factors that influence soil formation require a long time to change the makeup of soils. Some geologic components are more resistant to breakdown and change than others. In Union County the dominant geologic material is highly resistant to weathering. The sand, the dominant component in most soils, is almost pure quartz.

Relatively little geologic time has elapsed since the material in which the soils in Union County formed emerged from the sea and was laid down. The loamy and clayey horizons formed in place through the process of clay translocation, were deposited by rivers and streams, or were deposited in beds and layers by the sea.

Processes of Horizon Differentiation

The processes involved in the formation of soils and the development of horizons are the deposition and translocation of organic matter; the translocation of iron and aluminum; the deposition of silts and clays; leaching of calcium carbonates, other bases, and silts; the reduction and transfer of iron and aluminum; and the accumulation of organic matter on the surface.

The deposition and translocation of organic matter in the soil profile can result in the formation of a spodic horizon. This process is caused dominantly by water. Rainfall leaches organic material that has been deposited on the surface into the soil profile.

Iron and aluminum also are leached into the soil profile. They adhere to sand grains, generally in a fluctuating zone of the water table. These materials coat individual sand grains. As development continues, individually coated sand grains begin to adhere to each other. The result is the formation of increasingly hard bodies. As development further continues, the movement of water is restricted, reducing permeability rates within the spodic horizon. In Union County organic matter generally is the dominant translocated material, resulting in the black or dark brown color in most spodic horizons. Over time, changes in the water table can result in the formation of spodic horizons at varying depths within the soil profile.

The translocation and deposition of silts and clays are caused by water. Rainfall moving through the soil translocates these soil particles downward through the profile. The material is deposited, forming an argillic horizon. Sand grains become coated and bridged. As the argillic horizon continues to form, permeability is eventually so restricted that water can be perched above the horizon.

Leaching of carbonates, bases, and silts has occurred in nearly all of the soils in the county. Rainfall and water movement in the soils cause these elements to be moved downward through the soils and then out of the profile. As a result, most of the soils in Union County, except for the soils along the major drainageways, are naturally acid.

Gleying, or the chemical reduction of iron, has occurred in the soils. The parts of a soil profile that are saturated for long periods commonly are gleyed with dull gray, yellow, or white colors or with mottles of varying colors. Many of the better drained soils that are not mottled have brighter colors in shades of yellow to red, indicating iron in the oxidized state. These soils are seldom saturated for extended periods.

The accumulation of organic material in or above the mineral surface layer occurs in all of the soils in Union County. The content of organic matter and thickness of the surface layer depend on drainage and vegetation. In droughty soils with sparse vegetation, the content of organic matter generally is low because of rapid oxidation of limited organic deposition. The surface layer of these soils is thin and light colored. The wetter soils support more vegetation. The organic matter in these soils is less oxidized, and the amount of available organic material is increased. As a result, the surface layer is thicker and darker. In very wet soils, where water stands above the surface for long periods, oxidation is greatly restricted. As a result, organic matter accumulates above and in the mineral surface layer, forming a very thick, dark mineral surface layer or an organic surface layer (muck). Plowing often mixes the dark surface layer with an underlying horizon, resulting in a thicker dark surface layer in some soils.

The formation of concretions or nodules occurs on a limited basis in Union County. These concretions are iron or phosphatic. They occur in a few soils and generally are moderately deep in the profile. Iron concretions or ironstone can result from the accumulation of translocated iron that adheres to form soft to hard, generally gravel-sized fragments. Phosphatic concretions may be the intermediate result of the weathering of soft limestone-phosphatic bedrock from which most of the carbonates have already been leached. These dominantly gravel-sized concretions are soft to firm.

The soil-forming processes have resulted in a succession of layers, or horizons, in the soil. Variations in the kinds of geologic material, in the soil-forming factors, and in the length of time that the soil-forming processes have been active have resulted in the formation of different soils and their associated properties. Soil formation is an ongoing process, and changes can occur in short or long periods of geologic time, depending on the soil-forming processes.

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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.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

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.

Bedding. A method of controlling excess water in areas of soils used for tree crops and cultivated crops. The surface soil is plowed into regularly spaced elevated beds, and the crops are planted on the beds. The ditches between the beds drain the excess water.

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.

Bottom land. The normal flood plain of a stream, subject to flooding.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

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.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

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

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

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

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

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

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

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

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

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Decreasers. The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

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, for example, fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Fast intake (in tables). The rapid movement of water into the soil.

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.*

Fill. Material used to raise the surface level of the land to a desired level.

Fine textured soil. Sandy clay, silty clay, and clay.

Flatwoods. Broad, nearly level areas of poorly drained soils that have a characteristic vegetation of open pine forest and an understory of saw palmetto and gallberry.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 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 (7.6 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.

Hammock. A densely wooded area, slightly elevated above adjacent areas, that has characteristic natural vegetation of oak and pine and an understory of saw palmetto, shrubs, and grasses.

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. The major horizons are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

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, any plowed or disturbed surface layer.

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; granular, prismatic, or blocky structure; redder or browner colors than those in the A horizon; or a combination of these.

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 overlying 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, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Hard, consolidated bedrock beneath the soil. The bedrock 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.

Increasers. Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasers commonly are the shorter plants and are less palatable to livestock.

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

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—
Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.
Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.
Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.
Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.
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.

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.

Marl. An unconsolidated mineral deposited in marine or fresh water. It consists chiefly of silt- and clay-sized particles of calcium carbonate.

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.

Moderately coarse textured soil. Coarse sandy loam, 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).

Mounding. Filling the area for the septic tank absorption field with suitable soil material to the level above the high water table to meet local and state requirements.

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.

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 affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward 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). Formation of subsurface tunnels or pipelike cavities 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.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

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.

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.

Range condition. The present composition of the plant community on a range site in relation to the potential natural plant community for that site. Range condition is expressed as excellent, good, fair, or poor on the basis of how much the present plant community has departed from the potential.

Rangeland. Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are—

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

Relief. The elevations or inequalities of a land surface, considered collectively.

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Root zone. The part of the soil that can be penetrated by plant roots.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Seepage (in tables). The movement of water through the soil. Seepage 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.

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.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

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 refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which 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.

Subsidence. The sinking of an organic soil to a lower level after the lowering of the water table.

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.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from about 4 to 10 inches (10 to 25 centimeters).

Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, and EB horizons. It includes all subdivisions of these horizons.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

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

Thin layer (in tables). Otherwise suitable soil material 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.

Trace elements. Chemical elements, for example, 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.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. 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. 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.--TEMPERATURE AND PRECIPITATION

(Recorded at Lake City, Florida)

Month	Temperature			Normal total precipitation
	Normal monthly mean	Normal daily maximum	Normal daily minimum	
	°F	°F	°F	In
January-----	53.6	65.5	41.7	3.75
February----	55.5	67.8	43.2	3.89
March-------	61.9	74.6	49.1	4.24
April-------	68.2	81.2	55.2	3.46
May---------	74.2	86.8	61.7	4.64
June--------	78.9	90.3	67.5	6.71
July--------	80.8	91.4	70.2	6.77
August------	80.7	91.4	70.0	6.99
September---	78.1	88.4	67.8	5.68
October-----	69.6	81.1	58.0	2.35
November----	61.2	73.4	48.9	2.28
December----	55.1	67.2	43.1	3.48
Yearly:				
Average---	68.2	79.9	56.4	---
Total-----	---	---	---	54.24

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded at Lake City, Florida)

Freeze threshold temperature	Mean date of last spring occurrence	Mean date of first fall occurrence	Mean number of days between dates	Years of record, spring	Number of occurrences in spring	Years of record, fall	Number of occurrences in fall
°F							
32	Feb. 22	Dec. 1	282	29	28	30	25
28	Feb. 5	Dec. 17	315	29	24	30	17
24	Jan. 17	Dec. 25	343	29	14	30	7

TABLE 3.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
2	Albany fine sand, 0 to 5 percent slopes	6,122	3.9
3	Ocilla fine sand, 0 to 5 percent slopes	4,548	2.9
4	Mascotte sand	7,556	4.8
6	Plummer-Plummer, wet, sands	21,056	13.4
7	Surrency and Pantego soils, depressional	7,927	5.0
8	Surrency and Pantego soils, frequently flooded	1,989	1.3
10	Osier sand	355	0.2
12	Sapelo sand	25,798	16.4
14	Pamlico and Croatan mucks	8,637	5.5
16	Foxworth fine sand, 0 to 5 percent slopes	1,374	0.9
17	Blanton fine sand, 0 to 5 percent slopes	3,643	2.3
18	Lakeland sand, 0 to 5 percent slopes	795	0.5
20	Grifton and Elloree soils, frequently flooded	4,034	2.6
22	Chipley fine sand, 0 to 5 percent slopes	619	0.4
23	Pelham-Pelham, wet, fine sands	46,235	29.4
24	Starke mucky fine sand, depressional	807	0.5
25	Fluvaquents-Ousley association, occasionally flooded	3,166	2.0
28	Arents, moderately wet, 0 to 5 percent slopes	552	0.4
29	Dorovan muck, frequently flooded	1,605	1.0
30	Troup sand, 0 to 5 percent slopes	355	0.2
34	Goldhead fine sand	1,067	0.7
35	Wampee loamy fine sand, 5 to 12 percent slopes	1,751	1.1
37	Pamlico and Croatan mucks, frequently flooded	2,633	1.7
39	Blanton fine sand, 5 to 12 percent slopes	739	0.5
41	Bonneau fine sand, 6 to 10 percent slopes	383	0.2
43	Dorovan muck	3,457	2.2
	Bodies of water less than 40 acres in size	84	*
	Total	157,287	100.0

* Less than 0.1 percent.

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)

Soil name and map symbol	Land capability	Bahiagrass	Corn	Grass hay	Pecans	Soybeans	Watermelons
		AUM*	Bu	Tons	Cwt	Bu	Tons
2--------------- Albany	IIIw	7.0	65	7.0	5.0	25	12
3--------------- Ocilla	IIIw	8.0	75	7.0	5.0	30	14
4--------------- Mascotte	IVw	9.0	50	8.0	4.0	20	5
6:							
Plummer---------	IIIw	9.0	60	8.0	4.0	20	5
Plummer, wet---	Vw	---	---	---	---	---	---
7, 8------------ Surrency and Pantego	VIIw	---	---	---	---	---	---
10-------------- Osier	IIIw	7.0	60	6.0	---	20	5
12-------------- Sapelo	IVw	9.0	60	8.0	4.0	20	5
14-------------- Pamlico and Croatan	VIIw	---	---	---	---	---	---
16-------------- Foxworth	IIIs	6.0	50	6.0	4.0	20	10
17-------------- Blanton	IIIs	6.0	60	6.0	4.0	25	12
18-------------- Lakeland	IVs	5.0	55	6.0	---	25	12
20-------------- Grifton and Elloree	VIw	---	---	---	---	---	---
22-------------- Chipley	IIIs	7.0	50	8.0	---	20	5
23:							
Pelham----------	IIIw	9.0	50	8.0	4.0	20	5
Pelham, wet-----	Vw	---	---	---	---	---	---
24-------------- Starke	VIIw	---	---	---	---	---	---
25:							
Fluvaquents-----	Vw	---	---	---	---	---	---
Ousley----------	IIIw	---	---	---	---	---	---

See footnote at end of table.

TABLE 4.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Bahiagrass	Corn	Grass hay	Pecans	Soybeans	Watermelons
		AUM*	Bu	Tons	Cwt	Bu	Tons
28. Arents							
29-------------- Dorovan	VIIw	---	---	---	---	---	---
30-------------- Troup	IIIs	5.0	55	6.0	---	25	13
34-------------- Goldhead	IIIw	9.0	60	8.0	---	20	---
35-------------- Wampee	IVs	8.0	65	7.0	---	30	5
37-------------- Pamlico and Croatan	VIIw	---	---	---	---	---	---
39-------------- Blanton	IVs	5.0	50	5.0	3.5	20	---
41-------------- Bonneau	IIIs	7.5	80	7.0	5.0	25	---
43-------------- Dorovan	VIIw	---	---	---	---	---	---

* 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)

Soil name and map symbol	Ordination symbol	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Site index	Volume*	Site quality**	Productivity***	Trees to plant
							Ft³/ac/yr		Cd/ac/yr	
2------------------- Albany	11W	Moderate	Moderate	Moderate	Slash pine----------	85	113	62	1.3	Slash pine, loblolly pine, longleaf pine.
					Longleaf pine-------	80	---	---	---	
					Water oak-----------	---	---	---	---	
					Laurel oak----------	---	---	---	---	
3------------------- Ocilla	11W	Moderate	Moderate	Moderate	Slash pine----------	85	113	60	1.2	Slash pine, loblolly pine, longleaf pine.
4------------------- Mascotte	11W	Moderate	Moderate	Moderate	Slash pine----------	85	113	67	1.5	Slash pine, loblolly pine, longleaf pine.
6:										
Plummer-----------	11W	Severe	Severe	Severe	Slash pine----------	85	113	65	1.4	Slash pine, loblolly pine.
					Sweetgum------------	---	---	---	---	
					Water oak-----------	---	---	---	---	
Plummer, wet------	2W	Severe	Severe	Severe	Pondcypress---------	75	---	---	---	Slash pine****.
					Blackgum------------	---	---	---	---	
7:										
Surrency----------	2W	Severe	Severe	Severe	Pondcypress---------	75	---	---	---	*****
					Pond pine-----------	73	---	---	---	
					Sweetgum------------	---	---	---	---	
					Sweetbay------------	---	---	---	---	
					Red maple-----------	---	---	---	---	
					Swamp tupelo--------	---	---	---	---	
Pantego-----------	2W	Severe	Severe	Severe	Pondcypress---------	75	---	---	---	*****
					Pond pine-----------	73	---	---	---	
					Water tupelo--------	---	---	---	---	
					Red maple-----------	---	---	---	---	
					Sweetbay------------	---	---	---	---	
					Blackgum------------	---	---	---	---	
8:										
Surrency----------	7W	Severe	Severe	Severe	Baldcypress---------	108	---	---	---	*****
					Sweetgum------------	---	---	---	---	
					Blackgum------------	---	---	---	---	
					Swamp tupelo--------	---	---	---	---	

See footnotes at end of table.

TABLE 5.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Site index	Volume*	Site quality**	Productivity***	Trees to plant
							Ft^3/ac/yr		Cd/ac/yr	
8:										
Pantego	7W	Severe	Severe	Severe	Baldcypress	108	---	---	---	*****
					Pond pine	73	---	---	---	
					Red maple	---	---	---	---	
					Blackgum	---	---	---	---	
					Swamp tupelo	---	---	---	---	
					Sweetgum	---	---	---	---	
					Sweetbay	---	---	---	---	
10 Osier	11W	Severe	Severe	Severe	Slash pine	85	113	60	1.2	Slash pine.
					Blackgum	---	---	---	---	
					Water oak	---	---	---	---	
12 Sapelo	11W	Moderate	Moderate	Moderate	Slash pine	85	113	66	1.5	Slash pine, loblolly pine, longleaf pine.
14:										
Pamlico	2W	Severe	Severe	Severe	Pondcypress	75	---	---	---	*****
					Pond pine	---	---	---	---	
					Sweetbay	---	---	---	---	
					Swamp tupelo	---	---	---	---	
					Red maple	---	---	---	---	
Croatan	2W	Severe	Severe	Severe	Pondcypress	75	---	---	---	*****
					Swamp tupelo	---	---	---	---	
					Sweetbay	---	---	---	---	
					Red maple	---	---	---	---	
16 Foxworth	10S	Moderate	Moderate	Moderate	Slash pine	80	106	60	1.2	Slash pine, longleaf pine.
					Longleaf pine	---	---	---	---	
					Live oak	---	---	---	---	
					Laurel oak	---	---	---	---	
					Turkey oak	---	---	---	---	
					Bluejack oak	---	---	---	---	
17 Blanton	11S	Moderate	Moderate	Moderate	Slash pine	85	113	62	1.3	Slash pine, longleaf pine, loblolly pine.
					Longleaf pine	74	88	---	---	
					Bluejack oak	---	---	---	---	
					Turkey oak	---	---	---	---	

See footnotes at end of table.

TABLE 5.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Potential productivity: Site quality**	Potential productivity: Productivity***	Trees to plant
							Ft^3/ac/yr		Cd/ac/yr	
18----------------- Lakeland	9S	Moderate	Moderate	Slight	Slash pine---------- Longleaf pine------- Turkey oak---------- Bluejack oak-------- Post oak------------	75 --- --- --- ---	97 --- --- --- ---	55 --- --- --- ---	1.0 --- --- --- ---	Slash pine, longleaf pine, sand pine.
20:										
Grifton-----------	11W	Moderate	Severe	Severe	Slash pine---------- Loblolly pine------- Sweetgum------------ Baldcypress--------- Water oak----------- Red maple----------- Overcup oak--------- Swamp tupelo--------	85 --- --- --- --- --- --- ---	113 --- --- --- --- --- --- ---	65 --- --- --- --- --- --- ---	1.4 --- --- --- --- --- --- ---	Slash pine****, loblolly pine.
Elloree-----------	11W	Severe	Severe	Severe	Slash pine---------- Loblolly pine------- Sweetgum------------ Baldcypress--------- Water oak----------- Red maple----------- Overcup oak--------- Swamp tupelo--------	84 --- --- --- --- --- --- ---	113 --- --- --- --- --- --- ---	60 --- --- --- --- --- --- ---	1.2 --- --- --- --- --- --- ---	Slash pine, loblolly pine.
22----------------- Chipley	11S	Moderate	Slight	Moderate	Slash pine---------- Longleaf pine-------	85 70	113 79	65 ---	1.4 ---	Slash pine, loblolly pine, longleaf pine.
23:										
Pelham------------	11W	Severe	Severe	Severe	Slash pine---------- Longleaf pine------- Sweetgum------------ Blackgum------------ Water oak----------- Laurel oak----------	90 70 --- --- --- ---	121 79 --- --- --- ---	65 --- --- --- --- ---	1.4 --- --- --- --- ---	Slash pine, loblolly pine.

See footnotes at end of table.

TABLE 5.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Site index	Volume*	Site quality**	Productivity***	Trees to plant
							Ft^3/ac/yr		Cd/ac/yr	
23:										
Pelham, wet	11W	Severe	Severe	Severe	Slash pine	85	113	60	1.2	Slash pine****, loblolly pine.
					Loblolly pine	86	115	---	---	
					Sweetgum	---	---	---	---	
					Blackgum	---	---	---	---	
					Water oak	---	---	---	---	
					Pond pine	---	---	---	---	
					Pondcypress	---	---	---	---	
					Swamp tupelo	---	---	---	---	
24 Starke	2W	Severe	Severe	Severe	Pondcypress	75	---	---	---	*****
					Red maple	---	---	---	---	
					Pond pine	---	---	---	---	
					Swamp tupelo	---	---	---	---	
25:										
Fluvaquents	7W	Severe	Severe	Severe	Baldcypress	108	---	---	---	*****
					Red maple	---	---	---	---	
					Sweetbay	---	---	---	---	
					Swamp tupelo	---	---	---	---	
					Blackgum	---	---	---	---	
					Sweetgum	---	---	---	---	
Ousley	10W	Moderate	Moderate	Moderate	Slash pine	80	106	55	1.0	Slash pine, longleaf pine.
					Loblolly pine	80	104	---	---	
					Water oak	---	---	---	---	
29 Dorovan	7W	Severe	Severe	Severe	Baldcypress	108	---	---	---	*****
					Blackgum	---	---	---	---	
					Sweetbay	---	---	---	---	
					Green ash	---	---	---	---	
					Red maple	---	---	---	---	
					Swamp tupelo	---	---	---	---	
30 Troup	11S	Moderate	Moderate	Moderate	Slash pine	85	113	65	1.4	Slash pine, longleaf pine, loblolly pine.
					Live oak	---	---	---	---	
					Bluejack oak	---	---	---	---	
34 Goldhead	10W	Moderate	Severe	Moderate	Slash pine	80	106	60	1.2	Slash pine, longleaf pine, loblolly pine.
					Longleaf pine	65	---	---	---	
					Laurel oak	---	---	---	---	
					Water oak	---	---	---	---	
					Cabbage palm	---	---	---	---	
					Sweetgum	---	---	---	---	

See footnotes at end of table.

TABLE 5.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Potential productivity: Site quality**	Potential productivity: Productivity***	Trees to plant
							Ft³/ac/yr		Cd/ac/yr	
35 Wampee	10W	Moderate	Slight	Moderate	Slash pine	80	106	60	1.2	Slash pine, loblolly pine, longleaf pine.
					Sweetgum	---	---	---	---	
					Red maple	---	---	---	---	
					Laurel oak	---	---	---	---	
37: Pamlico	7W	Severe	Severe	Severe	Baldcypress	108	---	---	---	*****
					Pond pine	---	---	---	---	
					Swamp tupelo	---	---	---	---	
					Sweetbay	---	---	---	---	
Croatan	7W	Severe	Severe	Severe	Baldcypress	108	---	---	---	*****
					Loblolly pine	---	---	---	---	
					Sweetgum	---	---	---	---	
					Swamp tupelo	---	---	---	---	
					Blackgum	---	---	---	---	
					Pond pine	---	---	---	---	
39 Blanton	11S	Moderate	Moderate	Moderate	Slash pine	85	113	62	1.3	Slash pine, loblolly pine, longleaf pine.
					Longleaf pine	74	88	---	---	
					Bluejack oak	---	---	---	---	
					Turkey oak	---	---	---	---	
41 Bonneau	11S	Moderate	Moderate	Moderate	Slash pine	84	112	60	1.2	Slash pine, loblolly pine, longleaf pine.
					Longleaf pine	75	---	---	---	
					Laurel oak	---	---	---	---	
					Hickory	---	---	---	---	
43 Dorovan	2W	Severe	Severe	Severe	Pondcypress	75	---	---	---	*****
					Blackgum	---	---	---	---	
					Sweetbay	---	---	---	---	
					Black tupelo	---	---	---	---	
					Green ash	---	---	---	---	
					Red maple	---	---	---	---	
					Swamp tupelo	---	---	---	---	
					Pond pine	---	---	---	---	
					Sweetgum	---	---	---	---	

* Volume yields expressed as average yearly growth per acre based on 50-year average of corresponding site index (19).

** Site quality estimates for slash pine (base year 25) (3).

*** Productivity expressed as average annual cords per acre based on 25-year average of corresponding site quality.

**** Adequate surface drainage or bedding is needed to regenerate the forest stand through tree planting and to obtain potential productivity.

***** Reforestation generally is accomplished by natural regeneration because of severe management restrictions. Planting generally is not recommended.

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)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
2-------------------- Albany	Severe: wetness, too sandy.	Severe: too sandy.	Severe: too sandy, wetness.	Severe: too sandy.	Severe: droughty.
3-------------------- Ocilla	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: wetness, droughty, too sandy.
4-------------------- Mascotte	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness.
6:					
Plummer--------------	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
Plummer, wet---------	Severe: ponding, too sandy.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding, droughty.
7:					
Surrency-------------	Severe: ponding, too sandy.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding.
Pantego--------------	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
8:					
Surrency-------------	Severe: flooding, too sandy, wetness.	Severe: too sandy, wetness.	Severe: too sandy, flooding.	Severe: wetness, too sandy.	Severe: flooding, wetness.
Pantego--------------	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
10------------------- Osier	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
12------------------- Sapelo	Severe: too sandy, wetness.	Severe: too sandy, wetness.	Severe: too sandy, wetness.	Severe: too sandy, wetness.	Severe: droughty, wetness.
14:					
Pamlico--------------	Severe: flooding, ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess humus.

TABLE 6.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
14:					
Croatan	Severe: ponding, excess humus, flooding.	Severe: ponding, excess humus, too acid.	Severe: excess humus, ponding, too acid.	Severe: ponding, excess humus.	Severe: too acid, ponding, excess humus.
16 Foxworth	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty, too sandy.
17 Blanton	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
18 Lakeland	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty, too sandy.
20:					
Grifton	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
Elloree	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
22 Chipley	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
23:					
Pelham	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
Pelham, wet	Severe: too sandy, ponding.	Severe: too sandy, ponding.	Severe: too sandy, ponding.	Severe: too sandy, ponding.	Severe: ponding.
24 Starke	Severe: ponding.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding.
25:					
Fluvaquents	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
Ousley	Severe: flooding, too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
28 Arents	Severe: too sandy.	Severe: too sandy.	Moderate: slope, wetness.	Severe: too sandy.	Severe: droughty.
29 Dorovan	Severe: flooding, ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding, flooding.	Severe: ponding, excess humus.	Severe: ponding, flooding, excess humus.

TABLE 6.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
30-------------------- Troup	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty.
34-------------------- Goldhead	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
35-------------------- Wampee	Severe: wetness.	Moderate: slope, wetness, too sandy.	Severe: slope, wetness.	Moderate: wetness, too sandy.	Severe: droughty.
37:					
Pamlico--------------	Severe: flooding, ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding, flooding.	Severe: ponding, excess humus.	Severe: ponding, flooding, excess humus.
Croatan--------------	Severe: flooding, ponding, excess humus.	Severe: ponding, excess humus, too acid.	Severe: excess humus, ponding, flooding.	Severe: ponding, excess humus.	Severe: too acid, ponding, flooding.
39-------------------- Blanton	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Severe: droughty.
41-------------------- Bonneau	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Moderate: droughty, slope.
43-------------------- Dorovan	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, 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)

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba-ceous plants	Hardwood trees	Conif-erous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
2-------------------- Albany	Fair	Fair	Fair	Fair	Fair	Fair	Poor	Fair	Fair	Poor.
3-------------------- Ocilla	Fair	Fair	Good	Fair	Good	Fair	Fair	Fair	Good	Fair.
4-------------------- Mascotte	Poor	Fair	Fair	Poor	Fair	Poor	Fair	Fair	Fair	Poor.
6:										
Plummer------------	Poor	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair.
Plummer, wet-------	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
7, 8:										
Surrency-----------	Poor	Poor	Poor	Poor	Poor	Fair	Good	Poor	Poor	Fair.
Pantego------------	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
10------------------- Osier	Poor	Fair	Good	Fair	Fair	Fair	Good	Fair	Fair	Fair.
12------------------- Sapelo	Poor	Fair	Fair	Poor	Fair	Fair	Fair	Fair	Fair	Fair.
14:										
Pamlico------------	Very poor.	Very poor.	Poor	Poor	Poor	Good	Good	Very poor.	Poor	Good.
Croatan.										
16------------------- Foxworth	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
17------------------- Blanton	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
18------------------- Lakeland	Poor	Fair	Fair	Poor	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
20:										
Grifton------------	Very poor.	Very poor.	Poor	Fair	Poor	Good	Fair	Very poor.	Fair	Fair.
Elloree------------	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
22------------------- Chipley	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
23:										
Pelham-------------	Poor	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair.
Pelham, wet--------	Poor	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair.

TABLE 7.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
24----------------- Starke	Very poor.	Poor	Poor	Fair	Fair	Good	Good	Poor	Fair	Good.
25:										
Fluvaquents-------	Poor	Poor	Fair	Fair	Fair	Good	Fair	Poor	Fair	Fair.
Ousley------------	Poor	Fair	Good	Fair	Fair	Poor	Very poor.	Fair	Fair	Very poor.
28. Arents										
29----------------- Dorovan	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
30----------------- Troup	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
34----------------- Goldhead	Poor	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Poor.
35----------------- Wampee	Fair	Fair	Good	Good	Good	Fair	Poor	Fair	Good	Fair.
37:										
Pamlico-----------	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Croatan-----------	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
39----------------- Blanton	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
41----------------- Bonneau	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
43----------------- Dorovan	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.

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 but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
2: Albany	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Severe: droughty.
3: Ocilla	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, droughty, too sandy.
4: Mascotte	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
6:						
Plummer	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
Plummer, wet	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, droughty.
7:						
Surrency	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
Pantego	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
8:						
Surrency	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.
Pantego	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.
10: Osier	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
12: Sapelo	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: droughty, wetness.
14:						
Pamlico	Severe: cutbanks cave, excess humus, ponding.	Severe: flooding, ponding, low strength.	Severe: flooding, ponding.	Severe: flooding, ponding, low strength.	Severe: low strength, ponding.	Severe: ponding, excess humus.

TABLE 8.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
14:						
Croatan	Severe: excess humus, ponding.	Severe: subsides, flooding, ponding.	Severe: subsides, flooding, ponding.	Severe: subsides, flooding, ponding.	Severe: subsides, ponding.	Severe: too acid, ponding, excess humus.
16 Foxworth	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Slight	Moderate: droughty, too sandy.
17 Blanton	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Slight	Severe: droughty.
18 Lakeland	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Moderate: droughty, too sandy.
20:						
Grifton	Severe: wetness, cutbanks cave.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.
Elloree	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.
22 Chipley	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Severe: droughty.
23:						
Pelham	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Pelham, wet	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
24 Starke	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
25:						
Fluvaquents	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.
Ousley	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.	Severe: droughty.
28. Arents						
29 Dorovan	Severe: excess humus, ponding.	Severe: subsides, flooding, ponding.	Severe: subsides, flooding, ponding.	Severe: subsides, flooding, ponding.	Severe: subsides, ponding, flooding.	Severe: ponding, flooding, excess humus.

TABLE 8.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
30----------------- Troup	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Moderate: droughty.
34----------------- Goldhead	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
35----------------- Wampee	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, slope.	Moderate: wetness, slope.	Severe: droughty.
37:						
Pamlico----------	Severe: cutbanks cave, excess humus, ponding.	Severe: flooding, ponding, low strength.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, flooding, ponding.	Severe: ponding, flooding, excess humus.
Croatan----------	Severe: excess humus, ponding.	Severe: subsides, flooding, ponding.	Severe: subsides, flooding, ponding.	Severe: subsides, flooding, ponding.	Severe: subsides, ponding, flooding.	Severe: too acid, ponding, flooding.
39----------------- Blanton	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope, wetness.	Severe: slope.	Moderate: slope.	Severe: droughty.
41----------------- Bonneau	Severe: cutbanks cave.	Moderate: slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
43----------------- Dorovan	Severe: excess humus, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding.	Severe: subsides, ponding.	Severe: subsides, ponding.	Severe: ponding, excess humus.

TABLE 9.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
2------------------- Albany	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness, too sandy.	Severe: seepage, wetness.	Poor: too sandy, wetness.
3------------------- Ocilla	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness.	Severe: seepage, wetness.	Fair: wetness.
4------------------- Mascotte	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: wetness.	Severe: seepage, wetness.	Poor: wetness, thin layer.
6:					
Plummer------------	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: wetness, too sandy.	Severe: seepage, wetness.	Poor: too sandy, wetness.
Plummer, wet-------	Severe: ponding, poor filter.	Severe: seepage, ponding.	Severe: ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
7:					
Surrency-----------	Severe: ponding.	Severe: seepage, ponding.	Severe: ponding, too sandy.	Severe: seepage, ponding.	Poor: too sandy, ponding.
Pantego------------	Severe: ponding.	Severe: seepage, ponding.	Severe: ponding.	Severe: seepage, ponding.	Poor: ponding.
8:					
Surrency-----------	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, wetness, too sandy.	Severe: flooding, seepage, wetness.	Poor: too sandy, wetness.
Pantego------------	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
10------------------ Osier	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
12------------------ Sapelo	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.

TABLE 9.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
14:					
Pamlico	Severe: ponding, poor filter.	Severe: seepage, flooding, excess humus.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
Croatan	Severe: ponding, percs slowly.	Severe: seepage, excess humus, ponding.	Severe: ponding, too acid.	Severe: seepage, ponding.	Poor: ponding, thin layer.
16 Foxworth	Moderate*: wetness.	Severe: seepage.	Severe: seepage, wetness, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
17 Blanton	Moderate: wetness.	Severe: seepage.	Severe: too sandy.	Severe: seepage.	Poor: too sandy.
18 Lakeland	Slight*	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
20:					
Grifton	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.	Poor: wetness.
Elloree	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: seepage, flooding, wetness.	Poor: wetness.
22 Chipley	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: too sandy, seepage.
23:					
Pelham	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness.	Severe: wetness, seepage.	Poor: wetness.
Pelham, wet	Severe: ponding.	Severe: seepage, ponding.	Severe: ponding.	Severe: seepage, ponding.	Poor: ponding.
24 Starke	Severe: ponding, percs slowly.	Severe: seepage.	Severe: ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
25:					
Fluvaquents	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.

See footnote at end of table.

TABLE 9.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
25:					
Ousley	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy.
28. Arents					
29 Dorovan	Severe: subsides, flooding, ponding.	Severe: subsides, flooding, ponding.	Severe: flooding, seepage, ponding.	Severe: flooding, seepage, ponding.	Poor: ponding, excess humus.
30 Troup	Slight	Severe: seepage.	Severe: too sandy.	Severe: seepage.	Poor: seepage, too sandy.
34 Goldhead	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
35 Wampee	Severe: wetness, percs slowly.	Severe: seepage, slope, wetness.	Severe: wetness.	Severe: seepage, wetness.	Poor: wetness.
37:					
Pamlico	Severe: flooding, ponding, poor filter.	Severe: seepage, flooding, excess humus.	Severe: flooding, seepage, ponding.	Severe: flooding, seepage, ponding.	Poor: seepage, excess humus, ponding.
Croatan	Severe: flooding, ponding, percs slowly.	Severe: seepage, flooding, excess humus.	Severe: flooding, ponding, too acid.	Severe: flooding, seepage, ponding.	Poor: ponding, thin layer.
39 Blanton	Moderate: wetness, slope.	Severe: seepage, slope.	Severe: too sandy.	Severe: seepage.	Poor: too sandy.
41 Bonneau	Moderate: wetness.	Severe: seepage, slope.	Severe: wetness.	Severe: seepage.	Fair: slope.
43 Dorovan	Severe: subsides, ponding.	Severe: excess humus, ponding.	Severe: seepage, ponding, excess humus.	Severe: seepage, ponding.	Poor: ponding, excess humus.

* Because of poor filtration in the soil, a hazard of ground-water contamination is possible in areas that have many septic tanks.

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 but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
2 Albany	Fair: wetness.	Improbable: thin layer.	Improbable: excess fines.	Poor: too sandy.
3 Ocilla	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.
4 Mascotte	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
6:				
Plummer	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
Plummer, wet	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
7, 8:				
Surrency	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, wetness.
Pantego	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
10 Osier	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
12 Sapelo	Poor: wetness.	Improbable: excess fines.	Improbable: too sandy.	Poor: too sandy, wetness.
14:				
Pamlico	Poor: low strength, wetness.	Probable	Improbable: too sandy.	Poor: excess humus, wetness.
Croatan	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness, too acid.
16 Foxworth	Good	Probable	Improbable: too sandy.	Poor: too sandy.
17 Blanton	Good	Probable	Improbable: too sandy.	Poor: too sandy.
18 Lakeland	Good	Probable	Improbable: too sandy.	Poor: too sandy.

TABLE 10.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
20:				
Grifton	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Elloree	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, wetness.
22 Chipley	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
23:				
Pelham	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, wetness.
Pelham, wet	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, wetness.
24 Starke	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
25:				
Fluvaquents	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Ousley	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
28. Arents				
29 Dorovan	Poor: wetness.	Probable	Improbable: too sandy.	Poor: excess humus, wetness.
30 Troup	Good	Probable	Improbable: too sandy.	Poor: too sandy.
34 Goldhead	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
35 Wampee	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, small stones.
37:				
Pamlico	Poor: low strength, wetness.	Probable	Improbable: too sandy.	Poor: excess humus, wetness.
Croatan	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness, too acid.
39 Blanton	Good	Probable	Improbable: too sandy.	Poor: too sandy.

TABLE 10.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
41------------------- Bonneau	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.
43------------------- Dorovan	Poor: wetness.	Probable-------------	Improbable: too sandy.	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 "moderate" and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
2----------------- Albany	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy.	Wetness, droughty.
3----------------- Ocilla	Severe: seepage.	Severe: piping, wetness.	Severe: cutbanks cave.	Favorable------	Wetness, droughty, fast intake.	Wetness---------	Droughty.
4----------------- Mascotte	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Favorable------	Wetness, droughty, fast intake.	Wetness, soil blowing.	Wetness, droughty.
6:							
Plummer-----------	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy.	Wetness, droughty.
Plummer, wet------	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, cutbanks cave.	Ponding, droughty, fast intake.	Ponding, too sandy.	Wetness, droughty.
7:							
Surrency----------	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, cutbanks cave.	Ponding, droughty, fast intake.	Ponding, too sandy.	Wetness, droughty, rooting depth.
Pantego-----------	Moderate: seepage.	Severe: ponding, piping.	Moderate: slow refill.	Ponding---------	Ponding---------	Ponding---------	Wetness.
8:							
Surrency----------	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Flooding, cutbanks cave.	Droughty, fast intake, wetness.	Too sandy, wetness.	Wetness, droughty, rooting depth.
Pantego-----------	Moderate: seepage.	Severe: wetness.	Moderate: slow refill.	Flooding--------	Wetness, flooding.	Wetness---------	Wetness.

TABLE 11.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
10-----------------Osier	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy.	Wetness, droughty.
12-----------------Sapelo	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy.	Droughty, wetness.
14: Pamlico----------	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, subsides, cutbanks cave.	Ponding, soil blowing.	Ponding, too sandy, soil blowing.	Wetness.
Croatan----------	Severe: seepage.	Severe: piping, ponding.	Severe: slow refill.	Ponding, percs slowly, subsides.	Ponding, percs slowly, soil blowing.	Ponding, soil blowing.	Wetness, percs slowly.
16-----------------Foxworth	Severe: seepage.	Severe: seepage.	Severe: cutbanks cave.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.	Droughty.
17-----------------Blanton	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake.	Too sandy, soil blowing.	Droughty.
18-----------------Lakeland	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.	Droughty.
20: Grifton----------	Severe: seepage.	Severe: wetness.	Severe: cutbanks cave.	Flooding-------	Wetness, fast intake, flooding.	Wetness, soil blowing.	Wetness, soil blowing.
Elloree----------	Severe: seepage.	Severe: wetness, seepage, piping.	Severe: cutbanks cave.	Flooding-------	Wetness, fast intake, droughty.	Wetness--------	Wetness, droughty.
22-----------------Chipley	Severe: seepage.	Severe: seepage.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Droughty.

TABLE 11.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
23: Pelham	Severe: seepage.	Severe: piping, wetness.	Severe: cutbanks cave.	Favorable	Fast intake, wetness.	Wetness, soil blowing.	Wetness.
Pelham, wet	Severe: seepage.	Severe: piping, ponding.	Severe: cutbanks cave.	Ponding	Ponding, fast intake.	Ponding	Wetness.
24 Starke	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.
25: Fluvaquents	Moderate: seepage.	Severe: piping, wetness.	Severe: cutbanks cave.	Flooding, cutbanks cave.	Wetness, flooding.	Wetness	Wetness.
Ousley	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Flooding, cutbanks cave.	Wetness, droughty.	Wetness, too sandy.	Droughty.
28. Arents							
29 Dorovan	Moderate: seepage.	Severe: excess humus, ponding.	Severe: cutbanks cave.	Ponding, flooding, subsides.	Ponding, soil blowing, flooding.	Ponding, soil blowing.	Wetness.
30 Troup	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake.	Too sandy, soil blowing.	Droughty.
34 Goldhead	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty.
35 Wampee	Severe: seepage, slope.	Severe: wetness.	Severe: slow refill, cutbanks cave.	Slope	Slope, wetness, droughty.	Wetness, slope, droughty.	Wetness, slope, droughty.
37: Pamlico	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, flooding, subsides.	Ponding, flooding.	Ponding, too sandy.	Wetness.

TABLE 11.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
37:							
Croatan	Severe: seepage.	Severe: piping, ponding.	Severe: slow refill.	Percs slowly, flooding, subsides.	Ponding, percs slowly, soil blowing.	Ponding, soil blowing.	Wetness, percs slowly.
39 Blanton	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Slope, too sandy, soil blowing.	Slope, droughty.
41 Bonneau	Severe: slope, seepage.	Severe: thin layer.	Severe: cutbanks cave.	Deep to water	Droughty, fast intake, soil blowing.	Slope, soil blowing.	Slope, droughty.
43 Dorovan	Moderate: seepage.	Severe: excess humus, ponding.	Severe: cutbanks cave.	Ponding, subsides.	Ponding, soil blowing.	Ponding, soil blowing.	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)

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag-ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct					Pct	
2---------------- Albany	0-50	Fine sand, sand	SM, SP-SM	A-2	0	100	100	75-90	10-20	---	NP
	50-60	Sandy loam, fine sandy loam.	SM	A-2	0	100	100	75-92	22-30	---	NP
	60-80	Sandy clay loam, sandy loam, fine sandy loam.	SC, SM, SM-SC	A-2, A-4, A-6	0	97-100	95-100	70-100	20-50	<40	NP-17
3---------------- Ocilla	0-33	Fine sand, sand	SM, SP-SM	A-2, A-3	0	100	95-100	70-100	8-35	---	NP
	33-80	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
4---------------- Mascotte	0-19	Sand, fine sand	SP-SM	A-3, A-2-4	0	100	100	85-100	5-12	---	NP
	19-27	Fine sand, sand, loamy sand.	SP-SM, SM	A-3, A-2-4	0	100	100	85-100	8-15	---	NP
	27-35	Fine sand, sand	SP-SM	A-3, A-2-4	0	100	100	85-100	5-12	---	NP
	35-80	Sandy clay loam, sandy loam, fine sandy loam.	SC, SM-SC, SM	A-2, A-4, A-6	0	100	100	66-100	19-45	<38	NP-15
6: Plummer---------	0-56	Sand, fine sand	SM, SP-SM	A-2-4, A-3	0	100	100	75-90	5-20	---	NP
	56-80	Sandy loam, sandy clay loam, fine sandy loam.	SM, SC, SM-SC	A-2-4, A-2-6, A-4	0	100	97-100	76-96	20-48	<32	NP-10
Plummer, wet----	0-50	Sand, fine sand	SM, SP-SM	A-2-4, A-3	0	100	100	75-90	5-20	---	NP
	50-80	Sandy loam, sandy clay loam, fine sandy loam.	SM, SC, SM-SC	A-2-4, A-2-6, A-4	0	100	97-100	76-96	20-48	<32	NP-10
7: Surrency--------	0-9	Mucky fine sand, fine sand, sand.	SP-SM, SM, SM-SC	A-3, A-2-4	0	100	95-100	50-100	5-20	<20	NP-5
	9-30	Loamy sand, sand, fine sand.	SP-SM, SM	A-2-4	0	100	95-100	50-100	10-26	---	NP
	30-45	Sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2	0	100	95-100	75-100	22-35	<30	NP-10
	45-80	Sandy clay loam	SM, SC, SM-SC	A-2, A-4, A-6	0	100	95-100	80-100	30-44	<35	NP-15
Pantego---------	0-15	Mucky loamy sand, sandy loam, loam.	SM, SP-SM	A-2	0	100	95-100	60-90	12-30	---	NP
	15-32	Sandy loam, sandy clay loam, clay loam.	SC, SM, CL, ML	A-2, A-4, A-6	0	100	95-100	65-100	30-80	20-40	4-16
	32-64	Sandy clay, sandy clay loam, clay loam.	SC, CL	A-6, A-7	0	100	95-100	80-100	36-80	25-49	11-24

TABLE 12.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
8:											
Surrency--------	0-12	Mucky fine sand, fine sand, sand.	SP-SM, SM, SM-SC	A-3, A-2-4	0	100	95-100	50-100	5-20	<20	NP-5
	12-32	Loamy sand, sand, fine sand.	SP-SM, SM	A-2-4	0	100	95-100	50-100	10-26	---	NP
	32-67	Sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2	0	100	95-100	75-100	22-35	<30	NP-10
	67-80	Sandy clay loam	SM, SC, SM-SC	A-2, A-4, A-6	0	100	95-100	80-100	30-44	<35	NP-15
Pantego---------	0-16	Mucky loamy sand, sandy loam, loam.	SM, SP-SM	A-2	0	100	95-100	60-90	12-30	---	NP
	16-80	Sandy clay loam, sandy loam, clay loam.	SC, CL, SM-SC, CL-ML	A-4, A-6, A-2	0	100	95-100	65-100	30-80	20-40	4-16
10--------------- Osier	0-5	Sand-------------	SP-SM	A-2, A-3	0	100	98-100	60-98	5-12	---	NP
	5-80	Sand, fine sand	SP, SP-SM	A-1, A-3, A-2-4	0	100	90-100	40-98	2-10	---	NP
12--------------- Sapelo	0-15	Sand, fine sand	SM, SP, SP-SM	A-2, A-3	0	100	100	85-100	4-20	---	NP
	15-29	Fine sand, sand, loamy fine sand.	SM, SP-SM	A-2, A-3	0	100	100	80-100	8-20	---	NP
	29-50	Fine sand, sand	SM, SP, SP-SM	A-2, A-3	0	100	100	75-100	4-20	---	NP
	50-80	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
14:											
Pamlico---------	0-40	Muck-------------	PT	---	0	---	---	---	---	---	---
	40-80	Sand, fine sand, loamy sand.	SM, SP-SM	A-2, A-3	0	100	100	70-95	5-20	---	NP
Croatan---------	0-23	Muck-------------	PT	---	---	---	---	---	---	---	---
	23-30	Sandy loam, fine sandy loam, mucky sandy loam, loam.	SM, SC, SM-SC	A-2, A-4	0	100	100	60-85	30-49	<30	NP-10
	30-80	Sandy loam, fine sandy 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
16--------------- Foxworth	0-11	Fine sand, sand	SP-SM	A-3, A-2-4	0	100	100	60-100	5-12	---	NP
	11-80	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	50-100	1-12	---	NP
17--------------- Blanton	0-42	Fine sand, sand	SP-SM, SM	A-3, A-2-4	0	100	90-100	65-100	5-20	---	NP
	42-48	Sandy loam, loamy sand, loamy coarse sand.	SM	A-2-4	0	100	95-100	65-96	12-30	<25	NP-3
	48-80	Sandy clay loam, sandy loam, sandy clay.	SC, SM-SC, SM	A-4, A-2-4, A-2-6, A-6, A-7-6	0	100	95-100	69-100	25-50	12-45	3-22

TABLE 12.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
18----------------Lakeland	0-48	Sand, fine sand	SP-SM	A-3, A-2-4	0	90-100	90-100	60-100	5-12	---	NP
	48-80	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	90-100	90-100	50-100	1-12	---	NP
20: Grifton----------	0-10	Loamy fine sand, fine sand, sandy loam.	SM, SP-SM	A-2	0	100	95-100	60-100	12-35	<25	NP-4
	10-52	Sandy loam, sandy clay loam, sandy clay.	SC, CL	A-4, A-6, A-2-4, A-2-6	0	98-100	95-100	60-100	31-60	20-35	8-15
	52-65	Loamy sand, sandy loam.	SM, SP-SM	A-2, A-4	0	100	95-100	60-100	12-45	<30	NP-7
	65-80	Variable----------	---	---	---	---	---	---	---	---	---
Elloree----------	0-8	Fine sand---------	SM, SP-SM	A-2	0	100	98-100	75-100	10-25	---	NP
	8-23	Sand, fine sand, loamy sand.	SP-SM, SM	A-2, A-3	0	100	98-100	65-100	9-27	---	NP
	23-80	Loamy sand, sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2, A-4, A-6	0	100	98-100	60-100	15-45	<40	NP-18
22----------------Chipley	0-5	Fine sand---------	SP-SM	A-3, A-2-4	0	100	100	80-100	6-12	---	NP
	5-80	Sand, fine sand	SP-SM	A-3, A-2-4	0	100	100	80-100	6-12	---	NP
23: Pelham-----------	0-31	Fine sand, sand	SM, SP-SM	A-2	0	100	95-100	75-100	10-25	---	NP
	31-62	Sandy clay loam, sandy loam, fine sandy loam.	SM, SC, SM-SC	A-2, A-4, A-6	0	100	95-100	65-100	27-50	15-30	2-12
	62-80	Sandy clay loam, sandy loam, sandy clay.	SC, SM, ML, CL	A-2, A-4, A-6, A-7	0	100	95-100	65-100	27-65	20-45	3-20
Pelham, wet------	0-22	Fine sand---------	SM, SP-SM	A-2	0	100	95-100	75-90	10-25	---	NP
	22-48	Sandy clay loam, sandy loam.	SM, SC, SM-SC	A-2, A-4, A-6	0	100	95-100	65-90	27-50	15-30	2-12
	48-80	Sandy clay loam, loam, sandy clay.	SC, SM, ML, CL	A-2, A-4, A-6, A-7	0	100	95-100	65-90	27-65	15-45	3-20
24----------------Starke	0-7	Mucky fine sand, mucky loamy fine sand, fine sand, loamy sand.	SP-SM, SP, SM	A-3, A-2	0	95-100	92-100	85-98	3-15	---	NP
	7-46	Sand, fine sand, loamy sand, loamy fine sand.	SP, SP-SM, SM	A-3, A-2	0	95-100	92-100	85-98	3-15	---	NP
	46-80	Sandy loam, fine sandy loam, sandy clay loam.	SM-SC, SC	A-2, A-4, A-6	0	95-100	92-100	85-98	16-46	16-40	4-20
25: Fluvaquents------	0-80	Variable----------	---	---	---	---	---	---	---	---	---
Ousley-----------	0-24	Fine sand, sand	SP-SM, SM	A-2, A-3	0	100	100	70-100	5-25	---	NP
	24-80	Sand, fine sand	SP-SM, SM, SP	A-1, A-2, A-3	0	100	95-100	40-99	2-15	---	NP

TABLE 12.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag-ments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct					Pct	
28---------------Arents	0-80	Variable---------	---	---	---	---	---	---	---	---	---
29---------------Dorovan	0-80	Muck-------------	PT	---	0	---	---	---	---	---	---
30---------------Troup	0-50	Sand, fine sand	SM, SP-SM	A-2	0	95-100	90-100	50-75	10-30	---	NP
	50-80	Sandy clay loam, sandy loam, fine sandy loam.	SC, SM-SC, CL-ML, CL	A-4, A-2, A-6	0	95-100	90-100	60-90	24-55	19-40	4-20
34---------------Goldhead	0-9	Fine sand--------	SP, SP-SM	A-3	0	100	100	90-99	2-6	---	NP
	9-23	Sand, fine sand	SP, SP-SM	A-3	0	95-100	90-100	90-99	2-6	---	NP
	23-80	Fine sandy loam, 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	<40	NP-25
35---------------Wampee	0-6	Loamy fine sand	SP-SM, SM	A-2	0-3	90-100	80-100	70-98	10-30	---	NP
	6-29	Loamy fine sand, gravelly fine sand, loamy sand.	SM, SP-SM	A-3, A-2	0-3	80-100	68-98	65-95	5-30	---	NP
	29-50	Sandy clay loam, gravelly sandy clay loam, sandy loam.	SM-SC, SC	A-2, A-4, A-6	0-3	80-100	68-100	65-95	25-50	16-40	4-20
	50-69	Sandy clay, sandy loam, sandy clay loam.	CL, SC	A-2, A-4, A-6, A-7-6	0	95-100	90-100	80-100	30-55	27-50	8-26
	69-80	Variable---------	---	---	---	---	---	---	---	---	---
37:											
Pamlico---------	0-48	Muck-------------	PT	---	0	---	---	---	---	---	---
	48-80	Loamy sand, sand, loamy fine sand.	SM, SP-SM	A-2, A-3	0	100	100	70-95	5-20	---	NP
Croatan---------	0-38	Muck-------------	PT	---	---	---	---	---	---	---	---
	38-48	Sandy loam, fine sandy loam, mucky sandy loam, loam.	SM, SC, SM-SC	A-2, A-4	0	100	100	60-85	25-49	<30	NP-10
	48-80	Sandy loam, sandy clay loam, fine sandy loam.	CL, SM, ML, SC	A-4, A-6	0	100	100	75-100	36-95	<36	NP-15
39---------------Blanton	0-59	Fine sand, sand	SP-SM, SM	A-3, A-2-4	0	100	90-100	65-100	5-20	---	NP
	59-80	Sandy clay loam, sandy loam, sandy clay.	SC, SM-SC, SM	A-4, A-2-4, A-2-6, A-6, A-7-6	0	100	95-100	69-100	25-50	12-45	3-22

TABLE 12.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
41---------------- Bonneau	0-28	Fine sand, sand, loamy sand, loamy fine sand.	SM, SP-SM	A-2, A-3	0	100	100	60-95	8-20	---	NP
	28-48	Sandy loam, sandy clay loam, fine sandy loam.	SC, SM-SC	A-2, A-6, A-4	0	100	100	60-100	30-50	21-40	4-21
	48-80	Sandy loam, sandy clay loam, sandy clay.	CL, SC, SM-SC, CL-ML	A-4, A-6, A-2	0	100	100	60-95	25-60	20-40	4-18
43---------------- Dorovan	0-59	Muck--------------	PT	---	0	---	---	---	---	---	---
	59-72	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

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)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
2----------------- Albany	0-50	1-10	1.40-1.55	6.0-20	0.02-0.04	3.6-6.5	Low--------	0.10	5	1	1-2
	50-60	1-20	1.50-1.70	2.0-6.0	0.08-0.10	4.5-6.0	Low--------	0.20			
	60-80	13-35	1.55-1.65	0.6-2.0	0.10-0.16	4.5-6.0	Low--------	0.24			
3----------------- Ocilla	0-33	3-10	1.45-1.65	2.0-20	0.05-0.07	4.5-5.5	Low--------	0.10	5	1	1-2
	33-80	15-35	1.55-1.70	0.6-2.0	0.09-0.12	4.5-5.5	Low--------	0.24			
4----------------- Mascotte	0-19	1-8	1.20-1.60	6.0-20	0.03-0.08	3.6-5.5	Low--------	0.10	5	1	2-11
	19-27	2-12	1.35-1.60	0.6-2.0	0.10-0.15	3.6-5.5	Low--------	0.15			
	27-35	2-8	1.35-1.50	6.0-20	0.03-0.08	3.6-5.5	Low--------	0.15			
	35-80	14-35	1.45-1.80	0.6-2.0	0.10-0.15	3.6-5.5	Low--------	0.24			
6:											
Plummer----------	0-56	1-7	1.35-1.65	2.0-20	0.03-0.08	3.6-5.5	Low--------	0.10	5	1	1-3
	56-80	15-30	1.50-1.70	0.6-2.0	0.07-0.15	3.6-5.5	Low--------	0.15			
Plummer, wet-----	0-7	1-7	1.35-1.65	6.0-20	0.03-0.08	3.6-5.5	Low--------	0.10	5	8	1-10
	7-50	1-7	1.35-1.65	2.0-20	0.03-0.20	3.6-5.5	Low--------	0.10			
	50-80	15-30	1.50-1.70	0.6-2.0	0.07-0.15	3.6-5.5	Low--------	0.15			
7:											
Surrency---------	0-9	2-8	0.80-1.25	6.0-20	0.15-0.30	3.6-5.5	Low--------	0.10	5	8	10-20
	9-30	<10	1.50-1.65	2.0-20	0.05-0.10	3.6-5.5	Low--------	0.10			
	30-45	10-23	1.60-1.85	0.6-6.0	0.06-0.10	3.6-5.5	Low--------	0.15			
	45-80	22-35	1.65-1.85	0.6-2.0	0.10-0.15	3.6-5.5	Low--------	0.15			
Pantego----------	0-15	4-10	1.25-1.45	2.0-6.0	0.18-0.28	3.6-5.5	Low--------	0.10	5	8	10-15
	15-32	18-35	1.30-1.50	0.6-2.0	0.12-0.20	3.6-5.5	Low--------	0.28			
	32-64	20-40	1.30-1.60	0.6-2.0	0.15-0.20	3.6-5.5	Low--------	0.28			
8:											
Surrency---------	0-12	2-8	0.80-1.25	6.0-20	0.15-0.30	3.6-5.0	Low--------	0.10	5	8	10-20
	12-32	<10	1.50-1.65	2.0-20	0.05-0.10	3.6-5.0	Low--------	0.10			
	32-67	10-23	1.60-1.85	0.6-6.0	0.06-0.10	3.6-5.5	Low--------	0.15			
	67-80	22-35	1.65-1.85	0.6-2.0	0.10-0.15	3.6-5.5	Low--------	0.15			
Pantego----------	0-16	4-10	1.25-1.45	2.0-6.0	0.18-0.28	3.6-5.5	Low--------	0.10	5	8	10-15
	16-80	18-35	1.30-1.50	0.6-2.0	0.12-0.20	3.6-5.5	Low--------	0.28			
10---------------- Osier	0-5	1-10	1.35-1.60	6.0-20	0.03-0.10	3.6-6.0	Low--------	0.10	5	1	2-5
	5-80	2-5	1.40-1.60	>20	0.02-0.05	3.6-6.0	Low--------	0.05			
12---------------- Sapelo	0-15	2-5	1.40-1.65	6.0-20	0.03-0.07	3.6-5.5	Low--------	0.10	5	1	1-3
	15-29	3-7	1.35-1.60	0.6-2.0	0.10-0.15	3.6-5.5	Low--------	0.15			
	29-50	3-6	1.50-1.70	6.0-20	0.03-0.07	3.6-5.5	Low--------	0.17			
	50-80	10-30	1.55-1.75	0.6-2.0	0.12-0.17	3.6-5.5	Low--------	0.24			
14:											
Pamlico----------	0-40	---	0.20-0.65	0.6-6.0	0.24-0.40	<4.5	Low--------	-----	---	8	20-80
	40-80	5-10	1.60-1.75	6.0-20	0.02-0.10	3.6-5.5	Low--------	0.10			
Croatan----------	0-23	---	0.40-0.65	0.06-6.0	0.35-0.45	<4.5	Low--------	-----	---	8	25-60
	23-30	8-20	1.40-1.60	0.2-6.0	0.10-0.15	3.6-6.5	Low--------	0.17			
	30-80	10-35	1.40-1.60	0.2-2.0	0.12-0.20	3.6-6.5	Low--------	0.24			

TABLE 13.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permea-bility	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
16--------------- Foxworth	0-11	1-8	1.25-1.55	>20	0.02-0.10	4.5-6.0	Low--------	0.10	5	1	<1
	11-80	1-6	1.40-1.60	>20	0.02-0.08	4.5-6.0	Low--------	0.10			
17--------------- Blanton	0-42	1-7	1.30-1.60	6.0-20	0.03-0.07	4.5-6.0	Low--------	0.10	5	1	.5-1
	42-48	10-18	1.53-1.65	2.0-6.0	0.10-0.15	3.6-5.5	Low--------	0.15			
	48-80	12-40	1.60-1.70	0.6-2.0	0.10-0.15	3.6-5.5	Low--------	0.20			
18--------------- Lakeland	0-48	2-8	1.35-1.65	6.0-20	0.05-0.09	4.5-6.0	Low--------	0.10	5	1	<1
	48-80	1-6	1.50-1.60	6.0-20	0.02-0.08	4.5-6.0	Low--------	0.10			
20:											
Grifton---------	0-10	2-10	1.45-1.70	6.0-20	0.07-0.10	4.5-6.5	Low--------	0.17	5	8	2-4
	10-52	18-35	1.35-1.45	0.6-2.0	0.12-0.17	4.5-7.3	Low--------	0.24			
	52-65	2-18	1.45-1.70	2.0-20	0.07-0.14	5.6-8.4	Low--------	0.20			
	65-80	---	---	---	---	---	-----------	----			
Elloree---------	0-8	1-8	1.30-1.50	6.0-20	0.05-0.10	4.5-7.3	Low--------	0.10	5	8	1-4
	8-23	1-6	1.50-1.70	6.0-20	0.02-0.10	5.1-7.3	Low--------	0.10			
	23-80	5-25	1.30-1.50	2.0-6.0	0.10-0.17	5.1-8.4	Low--------	0.17			
22--------------- Chipley	0-5	1-5	1.35-1.45	6.0-20	0.05-0.10	3.6-6.0	Low--------	0.10	5	1	2-5
	5-80	1-7	1.45-1.60	6.0-20	0.03-0.08	4.5-6.5	Low--------	0.10			
23:											
Pelham----------	0-31	1-8	1.50-1.70	6.0-20	0.04-0.07	3.6-5.5	Low--------	0.10	5	1	1-2
	31-62	15-30	1.30-1.60	0.6-2.0	0.10-0.13	3.6-5.5	Low--------	0.24			
	62-80	15-40	1.30-1.60	0.6-2.0	0.10-0.16	3.6-5.5	Low--------	0.24			
Pelham, wet-----	0-22	1-8	1.50-1.70	6.0-20	0.04-0.07	4.5-5.5	Low--------	0.10	5	8	1-2
	22-48	15-30	1.30-1.60	0.6-2.0	0.10-0.13	4.5-5.5	Low--------	0.24			
	48-80	15-40	1.30-1.60	0.6-2.0	0.10-0.16	4.5-5.5	Low--------	0.24			
24--------------- Starke	0-7	2-10	1.15-1.45	2.0-6.0	0.15-0.25	3.6-6.0	Low--------	0.05	5	8	9-20
	7-46	2-10	1.50-1.65	6.0-20	0.05-0.10	3.6-6.0	Low--------	0.10			
	46-80	13-30	1.45-1.60	0.2-2.0	0.10-0.15	3.6-6.0	Low--------	0.20			
25:											
Fluvaquents-----	0-80	---	---	---	---	---	-----------	----	---	---	---
Ousley----------	0-24	1-3	1.35-1.45	6.0-20	0.05-0.10	4.5-5.5	Low--------	0.10	5	1	<.5
	24-80	1-2	1.45-1.60	6.0-20	0.02-0.06	4.5-5.5	Low--------	0.15			
28--------------- Arents	0-80	---	---	---	---	---	-----------	----	---	---	---
29--------------- Dorovan	0-25	---	0.25-0.40	0.6-2.0	0.20-0.25	3.6-4.4	-----------	----	---	8	20-80
	25-80	---	0.35-0.55	0.6-2.0	0.20-0.25	3.6-4.4	-----------	----			
30--------------- Troup	0-50	1-10	1.30-1.70	6.0-20	0.05-0.10	4.5-6.0	Low--------	0.10	5	1	<1
	50-80	15-35	1.40-1.60	0.6-2.0	0.10-0.13	4.5-5.5	Low--------	0.20			
34--------------- Goldhead	0-9	1-5	1.30-1.55	6.0-20	0.05-0.15	4.5-7.8	Low--------	0.10	5	1	1-4
	9-23	1-5	1.35-1.70	6.0-20	0.02-0.05	4.5-7.8	Low--------	0.10			
	23-80	13-34	1.45-1.80	0.2-0.6	0.10-0.20	4.5-8.4	Low--------	0.24			
35--------------- Wampee	0-6	4-15	1.40-1.60	2.0-20	0.05-0.10	4.5-7.3	Low--------	0.10	5	2	1-4
	6-29	2-15	1.40-1.60	2.0-20	0.02-0.10	4.5-6.5	Low--------	0.15			
	29-50	10-30	1.30-1.50	0.6-2.0	0.10-0.15	4.5-6.5	Low--------	0.20			
	50-69	18-45	1.20-1.40	0.2-0.6	0.10-0.20	4.5-6.5	Low--------	0.24			
	69-80	---	---	---	---	---	-----------	----			

TABLE 13.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Soil reaction	Shrink- swell potential	Erosion factors		Wind erodi- bility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
37:											
Pamlico---------	0-48	---	0.20-0.65	0.6-6.0	0.24-0.40	<4.5	Low--------	----	---	8	20-60
	48-80	5-10	1.60-1.75	6.0-20	0.10-0.20	3.6-5.5	Low--------	0.10			
Croatan---------	0-38	---	0.40-0.65	0.06-6.0	0.35-0.45	<4.5	Low--------	----	---	8	25-60
	38-48	8-20	1.40-1.60	0.2-6.0	0.10-0.15	3.6-6.5	Low--------	----			
	48-80	10-35	1.40-1.60	0.2-2.0	0.12-0.20	3.6-6.5	Low--------	----			
39--------------- Blanton	0-59	1-7	1.30-1.60	6.0-20	0.03-0.07	4.5-6.0	Low--------	0.10	5	1	.5-1
	59-80	12-40	1.60-1.70	0.6-2.0	0.10-0.15	4.5-5.5	Low--------	0.20			
41--------------- Bonneau	0-28	2-8	1.30-1.70	6.0-20	0.04-0.08	4.5-6.0	Low--------	0.15	5	1	.5-2
	28-48	18-35	1.40-1.60	0.6-2.0	0.10-0.15	4.5-5.5	Low--------	0.20			
	48-80	15-40	1.40-1.60	0.6-2.0	0.10-0.16	4.5-5.5	Low--------	0.20			
43--------------- Dorovan	0-4	---	0.25-0.40	0.6-2.0	0.20-0.25	3.6-4.4	-----------	----	---	8	20-80
	4-59	---	0.35-0.55	0.6-2.0	0.20-0.25	3.6-4.4	-----------	----			
	59-72	5-20	1.40-1.65	6.0-20	0.05-0.08	4.5-5.5	Low--------	----			

TABLE 14.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," "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)

Soil name and map symbol	Hydrologic group	Flooding		High water table		Subsidence		Risk of corrosion	
		Frequency	Duration	Depth	Kind	Initial	Total	Uncoated steel	Concrete
				Ft		In	In		
2------------- Albany	C	None-------	---	1.0-2.5	Apparent	---	---	High-----	High.
3------------- Ocilla	C	None-------	---	1.0-2.5	Apparent	---	---	High-----	Moderate.
4------------- Mascotte	B/D	None-------	---	0.5-1.5	Apparent	---	---	High-----	High.
6:									
Plummer-------	B/D	None-------	---	0.5-1.5	Apparent	---	---	Moderate	High.
Plummer, wet--	B/D	None-------	---	+.5-1.0	Apparent	---	---	Moderate	High.
7:									
Surrency------	D	None-------	---	+2-0	Apparent	---	---	High-----	High.
Pantego-------	D	None-------	---	+2-0	Apparent	---	---	High-----	High.
8:									
Surrency------	D	Frequent---	Very long.	0-1.0	Apparent	---	---	High-----	High.
Pantego-------	D	Frequent---	Very long.	0-1.0	Apparent	---	---	High-----	High.
10------------ Osier	A/D	None-------	---	0-1.0	Apparent	---	---	High-----	High.
12------------ Sapelo	B/D	None-------	---	0.5-1.5	Apparent	---	---	High-----	High.
14:									
Pamlico-------	D	Rare-------	---	+2-0	Apparent	4-20	10-36	High-----	High.
Croatan-------	D	Rare-------	---	+2-0	Apparent	4-10	18-24	High-----	High.
16------------ Foxworth	A	None-------	---	3.5-6.0	Apparent	---	---	Low------	High.
17------------ Blanton	A	None-------	---	4.0-6.0	Perched	---	---	High-----	High.
18------------ Lakeland	A	None-------	---	>6.0	---	---	---	Low------	Moderate.
20:									
Grifton-------	D	Frequent---	Brief to long.	0-1.0	Apparent	---	---	High-----	Low.
Elloree-------	D	Frequent---	Brief to long.	0-1.0	Apparent	---	---	High-----	Moderate.

TABLE 14.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding: Frequency	Flooding: Duration	High water table: Depth	High water table: Kind	Subsidence: Initial	Subsidence: Total	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
				Ft		In	In		
22: Chipley	C	None	---	2.0-3.0	Apparent	---	---	Low	High.
23:									
Pelham	B/D	None	---	0.5-1.5	Apparent	---	---	High	High.
Pelham, wet	B/D	None	---	+.5-1.0	Apparent	---	---	High	High.
24: Starke	D	None	---	+2-0	Apparent	---	---	High	High.
25:									
Fluvaquents	D	Common	Long or very long.	0-1.0	Apparent	---	---	High	Moderate.
Ousley	C	Occasional	Brief	1.5-3.0	Apparent	---	---	Low	High.
28. Arents									
29: Dorovan	D	Frequent	Very long.	+3-0	Apparent	6-12	51-80	High	High.
30: Troup	A	None	---	>6.0	---	---	---	Low	Moderate.
34: Goldhead	B/D	None	---	0.5-1.5	Apparent	---	---	High	Moderate.
35: Wampee	C	None	---	1.0-3.0	Apparent	---	---	High	Moderate.
37:									
Pamlico	D	Frequent	Very long.	+3-0	Apparent	4-12	10-29	High	High.
Croatan	D	Frequent	Very long.	+3-0	Apparent	4-10	18-24	High	High.
39: Blanton	A	None	---	4.0-6.0	Perched	---	---	High	High.
41: Bonneau	A	None	---	3.5-5.0	Apparent	---	---	Low	High.
43: Dorovan	D	None	---	+3-0	Apparent	6-12	51-80	High	High.

TABLE 15.--PHYSICAL ANALYSES OF SELECTED SOILS

Soil name and sample number*	Depth	Horizon	Particle-size distribution: Sand: 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
	In		Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Cm/hr	g/cm^3	Pct (wt)	Pct (wt)	Pct (wt)
Blanton fine sand:															
S85FL-125-003-1	0-9	Ap	0.1	4.1	18.8	51.9	15.7	90.6	6.3	3.1	8.4	1.54	11.5	6.3	1.8
-2	9-36	E1	0.1	3.6	19.5	53.4	15.7	92.3	5.3	2.4	23.4	1.58	7.8	4.0	1.0
-3	36-42	E2	0.1	4.3	18.4	54.0	15.7	92.5	5.3	2.2	19.5	1.61	6.5	3.2	0.9
-4	42-48	BE	0.1	3.6	16.3	52.6	15.8	88.4	5.1	6.5	14.2	1.62	8.5	5.0	2.1
-5	48-61	Bt	0.1	2.9	14.0	41.2	12.5	70.7	5.6	23.7	1.1	1.65	16.7	12.9	6.6
-6	61-74	Btg1	0.0	2.2	13.7	35.8	9.4	61.1	3.6	35.3	0.5	1.61	20.7	18.7	12.4
-7	74-80	Btg2	0.1	2.7	14.9	38.0	6.6	62.3	2.2	35.5	0.1	1.68	20.8	19.2	14.1
Bonneau fine sand:															
S86FL-125-009-1	0-8	Ap	0.2	3.9	19.3	50.7	14.0	88.1	5.4	6.5	5.9	1.54	11.4	7.5	3.4
-2	8-15	E1	0.1	3.4	18.2	48.2	15.0	84.9	6.5	8.6	23.0	1.44	10.6	7.4	3.6
-3	15-28	E2	0.2	3.8	17.9	47.7	14.0	83.6	5.3	1.1	10.5	1.55	11.5	8.3	4.2
-4	28-34	Bt1	0.8	4.7	16.7	42.1	13.7	78.0	5.9	16.1	3.2	1.61	15.1	11.6	6.3
-5	34-48	Bt2	0.3	2.1	18.1	31.2	5.8	57.5	9.0	33.5	2.5	1.27	26.3	22.7	14.9
-6	48-63	Btg1	0.1	3.2	22.0	29.1	5.8	60.2	9.5	30.3	0.8	1.27	30.2	25.3	11.7
-7	63-80	Btg2	0.0	3.0	29.8	34.5	1.8	69.1	4.7	26.2	0.4	1.43	33.5	30.7	10.1
Goldhead sand:															
S86FL-125-011-1	0-9	Ap	0.4	5.0	18.7	48.5	19.3	91.9	3.5	4.6	9.1	1.53	12.5	9.4	2.6
-2	9-17	Eg1	0.3	4.7	17.3	49.0	19.6	90.0	6.1	3.0	6.8	1.67	7.0	5.2	1.6
-3	17-23	Eg2	0.3	5.0	17.8	49.9	19.2	92.2	5.6	2.2	12.4	1.64	6.4	5.0	1.1
-4	23-42	Btg1	0.4	4.6	15.8	44.5	16.5	81.8	6.1	12.1	1.3	1.86	10.2	9.2	4.2
-5	42-66	Btg2	0.3	4.6	16.6	39.8	14.5	75.8	5.3	18.9	0.3	1.80	15.8	15.3	7.3
-6	66-80	Btg3	0.3	4.2	18.9	43.0	8.9	75.3	6.0	18.7	0.1	1.81	17.7	17.1	6.4
Plummer sand:															
S85FL-125-005-1	0-9	Ap	0.3	5.9	31.8	43.5	13.1	94.6	4.3	1.1	14.5	1.64	7.4	3.5	1.4
-2	9-27	Eg1	0.3	6.8	32.5	42.0	12.5	94.1	4.5	1.4	16.0	1.67	6.4	3.4	0.9
-3	27-35	Eg2	0.3	7.1	30.6	42.9	13.4	94.3	4.2	1.5	23.0	1.65	5.1	2.5	0.6
-4	35-56	Eg3	0.4	7.1	27.8	45.1	15.3	95.7	2.7	1.6	19.7	1.67	5.1	2.8	0.4
-5	56-61	BEg	0.4	6.2	25.4	39.5	12.3	83.8	5.4	10.8	0.2	1.88	10.3	7.7	3.5
-6	61-69	Btg1	0.3	5.5	27.5	30.8	8.2	72.3	4.1	23.6	0.3	1.80	14.3	12.0	5.8
-7	69-80	Btg2	0.5	7.5	34.3	24.5	4.3	71.1	2.3	26.6	0.2	1.73	18.4	16.6	9.9
Sapelo sand:															
S85FL-125-006-1	0-8	Ap	0.2	5.3	32.2	44.8	13.0	95.5	3.7	0.8	23.0	1.44	11.3	6.4	1.8
-2	8-15	E	0.2	5.6	31.8	44.2	12.6	94.4	4.4	1.2	15.1	1.64	4.8	2.8	0.4
-3	15-21	Bh1	0.4	6.1	29.5	43.9	13.2	93.1	5.4	1.5	17.1	1.56	10.7	7.3	1.4
-4	21-29	Bh2	0.4	6.5	28.8	43.2	13.0	91.9	5.5	2.6	35.2	1.50	10.4	6.7	1.2
-5	29-50	E'	0.4	6.3	29.2	45.9	13.6	95.4	3.5	1.1	14.8	1.67	5.7	2.9	0.3
-6	50-60	Btg1	0.3	4.9	24.1	36.3	10.5	76.1	6.3	17.6	0.1	1.85	13.4	10.6	5.1
-7	60-80	Btg2	0.2	4.0	26.8	34.4	7.6	73.0	3.9	23.1	0.1	1.63	21.8	20.1	12.4

See footnotes at end of table.

TABLE 15.--PHYSICAL ANALYSES OF SELECTED SOILS--Continued

Soil name and sample number*	Depth	Horizon	Particle-size distribution: Sand: 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
	In		Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Cm/hr	g/cm^3	----Pct (wt)-----		
Wampee loamy fine sand:															
S86FL-125-007-1	0-6	Ap	0.5	4.8	17.0	47.5	16.4	86.2	7.0	6.8	19.4	1.40	17.6	11.4	3.1
-2	6-13	AE	0.8	5.1	16.4	47.8	17.2	87.8	7.9	4.8	24.3	1.83	10.6	7.0	3.7
-3	13-24	E	0.8	5.2	17.6	47.6	17.6	88.8	6.2	5.0	16.4	1.61	10.1	7.0	2.5
-4	24-29	BE	1.2	6.2	19.0	44.1	14.6	85.1	6.6	8.3	15.0	1.56	11.3	8.4	4.4
-5	29-50	Btg1	2.0	8.6	21.2	28.9	10.3	71.0	9.0	20.0	0.3	1.53	20.7	18.2	12.7
-6	50-69	Btg2	0.7	6.0	14.8	23.6	6.4	51.5	8.5	40.0	1.6	1.43	28.6	25.6	18.1
-7	69-80	Cg	0.1	1.6	5.5	18.2	13.7	39.1	11.2	49.7	0.3	1.33	37.7	35.5	22.1

* All of the soils are the typical pedon for the series in this survey area. For the location of the sample site, see the series description in the section "Soil Series and Their Morphology."

** Some of this data is slightly outside of the properties given in table 13. The original parameters have not been changed at this time because of the small amount of data available.

TABLE 16.--CHEMICAL ANALYSES OF SELECTED SOILS

(Absence of an entry indicates information was 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)	$CaCl_2$ 0.01M (1:2)	KCl 1N (1:1)	Pyrophosphate extractable: C	Fe	Al	Citrate-dithionite extractable: Fe	Al
	In		Milliequivalents/100 grams of soil							Pct	Pct	Mmhos/cm				Pct	Pct	Pct	Pct	Pct
Blanton fine sand:																				
S85FL-125-003-1	0-9	Ap	2.20	0.19	0.06	0.11	2.56	7.29	9.85	26	1.24	0.04	5.1	4.8	4.7	---	---	---	---	---
-2	9-36	E1	0.14	0.06	0.05	0.01	0.26	2.25	2.51	10	0.15	0.02	5.2	4.9	4.9	---	---	---	---	---
-3	36-42	E2	0.11	0.06	0.04	0.00	0.21	1.20	1.41	15	0.07	0.01	4.9	4.8	4.9	---	---	---	---	---
-4	42-48	BE	0.35	0.27	0.05	0.03	0.70	2.26	2.96	24	0.09	0.03	4.7	4.4	4.4	---	---	---	---	---
-5	48-61	Bt	1.04	0.99	0.07	0.03	2.13	7.13	9.26	23	0.07	0.02	4.6	4.2	4.2	---	---	---	0.68	0.18
-6	61-74	Btg1	0.49	0.82	0.09	0.02	1.42	6.90	8.32	17	0.09	0.01	4.2	4.0	3.9	---	---	---	0.82	0.18
-7	74-80	Btg2	0.23	0.57	0.07	0.01	0.88	6.40	7.28	12	0.06	0.01	4.0	4.0	3.8	---	---	---	---	---
Bonneau fine sand:																				
S86FL-125-009-1	0-8	Ap	1.10	0.14	0.03	0.17	1.44	8.42	9.86	15	1.03	0.03	5.4	4.7	4.5	---	---	---	---	---
-2	8-15	E1	0.75	0.13	0.02	0.07	0.97	6.99	7.96	12	0.52	0.02	5.5	4.7	4.5	---	---	---	---	---
-3	15-28	E2	0.86	0.32	0.03	0.03	1.24	5.02	6.26	20	0.33	0.02	4.4	4.7	4.5	---	---	---	---	---
-4	28-34	Bt1	1.32	0.99	0.02	0.03	2.34	6.22	8.56	27	0.23	0.02	5.5	4.6	4.5	---	---	---	---	---
-5	34-48	Bt2	1.57	1.52	0.03	0.05	3.17	10.63	13.80	23	0.16	0.03	5.0	4.1	4.0	---	---	---	1.00	0.16
-6	48-63	Btg1	0.85	1.19	0.04	0.05	2.13	10.13	12.26	17	0.12	0.03	4.9	4.0	3.9	---	---	---	0.44	0.10
-7	63-80	Btg2	0.50	0.86	0.03	0.04	1.43	7.42	8.85	16	0.09	0.03	4.9	4.0	3.9	---	---	---	---	---
Goldhead sand:																				
S86FL-125-011-1	0-9	Ap	5.37	0.99	0.13	0.39	6.88	2.75	9.63	71	0.97	0.39	5.8	5.9	5.3	---	---	---	---	---
-2	9-17	Eg1	0.83	0.20	0.08	0.12	1.23	3.23	4.46	28	0.03	0.12	5.9	5.6	5.6	---	---	---	---	---
-3	17-23	Eg2	0.14	0.07	0.05	0.01	0.27	2.34	2.61	10	0.13	0.06	5.6	5.1	4.9	---	---	---	---	---
-4	23-42	Btg1	0.91	0.58	0.11	0.02	1.62	5.75	7.37	22	0.08	0.15	5.1	4.7	4.6	---	---	---	0.18	0.10
-5	42-66	Btg2	3.00	1.98	0.06	0.03	4.98	5.98	10.96	45	0.05	0.10	5.3	4.8	4.7	---	---	---	0.70	0.12
-6	66-80	Btg3	3.15	2.06	0.13	0.04	5.38	4.98	10.36	52	0.05	0.10	5.3	4.9	4.7	---	---	---	0.12	0.12
Plummer sand:																				
S85FL-125-005-1	0-9	Ap	2.02	0.14	0.04	0.03	2.23	2.56	4.79	47	0.54	0.02	5.6	5.1	5.4	---	---	---	---	---
-2	9-27	Eg1	0.18	0.02	0.04	0.00	0.24	2.43	2.67	9	0.25	0.02	5.6	5.0	4.8	---	---	---	---	---
-3	27-35	Eg2	0.08	0.01	0.04	0.00	0.13	0.88	1.01	13	0.10	0.01	5.5	5.0	4.9	---	---	---	---	---
-4	35-56	Eg3	0.06	0.01	0.03	0.02	0.12	0.26	0.38	32	0.07	0.01	5.7	5.1	5.1	---	---	---	---	---
-5	56-61	BEg	0.35	0.06	0.05	0.27	0.73	3.00	3.73	20	0.07	0.02	5.0	4.3	4.5	---	---	---	---	---
-6	61-69	Btg1	0.37	0.12	0.05	0.09	0.63	6.73	7.36	9	0.08	0.03	4.5	4.0	4.0	---	---	---	0.56	0.18
-7	69-80	Btg2	0.33	0.11	0.04	0.09	0.57	6.53	7.10	8	0.05	0.02	4.4	3.9	3.4	---	---	---	0.30	0.10
Sapelo sand:																				
S85FL-125-006-1	0-8	Ap	1.97	0.15	0.04	0.02	2.18	3.04	5.22	42	1.04	0.04	4.9	4.5	4.7	---	---	---	---	---
-2	8-15	E	0.39	0.03	0.04	0.00	0.46	0.90	1.36	34	0.17	0.01	5.1	4.4	4.5	---	---	---	---	---
-3	15-21	Bh1	0.57	0.04	0.05	0.01	0.67	9.88	10.55	6	1.01	0.00	4.3	3.8	3.8	0.89	0.01	0.15	0.12	0.12
-4	21-29	Bh2	0.37	0.02	0.06	0.02	0.47	8.36	8.83	5	0.84	0.02	4.3	4.2	4.0	0.74	0.01	0.19	0.02	0.18
-5	29-50	E'	0.06	0.02	0.04	0.00	0.12	0.81	0.93	13	0.08	0.01	5.0	4.8	4.9	---	---	---	---	---
-6	50-60	Btg1	0.09	0.11	0.07	0.09	0.36	6.95	7.31	5	0.12	0.03	4.2	4.0	4.2	---	---	---	0.42	0.12
-7	60-80	Btg2	0.12	0.20	0.06	0.03	0.41	5.97	6.38	6	0.06	0.01	3.9	3.9	3.9	---	---	---	0.32	0.12

See footnote at end of table.

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: $CaCl_2$ 0.01M (1:2)	pH: KCl 1N (1:1)	Pyrophosphate extractable: C	Pyrophosphate extractable: Fe	Pyrophosphate extractable: Al	Citrate-dithionite extractable: Fe	Citrate-dithionite extractable: Al
	In		----Milliequivalents/100 grams of soil-----							Pct	Pct	Mmhos/cm				Pct	Pct	Pct	Pct	Pct
Wampee loamy fine sand:																				
S86FL-125-007-1	0-6	Ap	3.80	0.66	0.09	0.34	4.89	7.67	12.56	39	1.71	0.14	6.4	5.2	5.2	---	---	---	---	---
-2	6-13	AE	1.01	0.27	0.03	0.05	1.36	5.72	7.08	19	0.66	0.04	6.2	5.3	4.9	---	---	---	---	---
-3	13-24	E	0.63	0.23	0.03	0.02	0.91	2.88	3.79	24	0.25	0.02	6.4	5.2	4.7	---	---	---	---	---
-4	24-29	BE	0.98	0.58	0.05	0.05	1.66	3.66	5.32	31	0.18	0.02	6.1	5.0	4.5	---	---	---	---	---
-5	29-50	Btg1	2.00	1.44	0.07	0.11	3.62	10.34	13.96	26	0.21	0.02	5.9	4.5	4.1	---	---	---	0.44	0.06
-6	50-69	Btg2	1.62	1.44	0.10	0.05	3.21	11.23	14.44	22	0.12	0.03	5.0	4.0	3.6	---	---	---	0.04	0.06
-7	69-80	Cg	6.95	6.58	0.20	0.42	14.15	18.33	32.48	44	0.14	0.03	5.1	3.9	3.7	---	---	---	---	---

* All of the soils are the typical pedon for the series in this survey area. For the location of the sample site, see the series description in the section "Soil Series and Their Morphology."

TABLE 17.--CLAY MINERALOGY OF SELECTED SOILS

Soil name and sample number*	Depth	Horizon	Percentage of clay minerals			
			Montmo-rillonite	14-angstrom intergrade	Kaolinite	Quartz
	In					
Blanton fine sand:						
S85FL-125-003-1	0-9	Ap	0	45	36	19
-5	48-61	Bt	0	36	56	8
-7	74-80	Btg2	0	10	85	5
Bonneau fine sand:						
S86FL-125-009-1	0-8	Ap	0	28	53	19
-5	34-48	Bt2	0	14	75	11
-7	63-80	Btg2	0	10	80	10
Goldhead sand:						
S86FL-125-011-1	0-9	Ap	17	34	20	29
-4	23-42	Btg1	17	36	26	21
-6	66-80	Btg3	0	9	73	18
Plummer sand:						
S85FL-125-005-1	0-9	Ap	0	44	24	32
-6	61-69	Btg1	0	27	65	8
-7	69-80	Btg2	0	17	75	8
Sapelo sand:						
S86FL-125-006-1	0-8	Ap	0	37	20	43
-3	15-21	Bh1	0	33	20	47
-6	50-60	Btg1	0	40	47	13
-7	60-80	Btg2	0	16	75	9
Wampee loamy fine sand:						
S86FL-125-007-1	0-6	Ap	0	36	35	29
-5	29-50	Btg1	0	11	77	12
-7	69-80	Cg	0	12	67	21

* All of the soils are the typical pedon for the series in this survey area. For the location of the sample site, see the series description in the section "Soil Series and Their Morphology."

TABLE 18.--ENGINEERING INDEX TEST DATA

(Tests performed by the Florida Department of Transportation (FDOT) in cooperation with the U.S. Department of Transportation, 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 the location of pedons sampled. NP means nonplastic)

Soil name, report number, horizon, and depth in inches	Classification: AASHTO	Classification: Unified	Mechanical analysis: Percentage passing sieve--: No. 4	No. 10	No. 40	No. 200	Percentage smaller than--: .05 mm	.02 mm	.005 mm	.002 mm	Liquid limit	Plasticity index	Moisture density: Maximum dry density	Optimum moisture
											Pct		Lb/cu ft	Pct
Blanton fine sand:														
(S85FL-125-003)														
E1 ----- 9-36	A-2-4(0)	SP-SM	100	100	92	12	10	7	5	4	---	NP	113.4	10.0
Btg1 ----- 61-74	A-7-6(2)	SC	100	100	96	40	38	36	35	35	41	18	107.5	17.3
Bonneau fine sand:														
(S86FL-125-009)														
Bt2 ----- 34-48	A-6(1)	SC	100	100	90	36	35	31	26	25	36	16	99.5	20.5
Goldhead sand:														
(S86FL-125-011)														
Btg2 ----- 42-66	A-2-4(0)	SM	100	100	92	29	25	23	21	20	---	NP	119.5	11.9
Plummer sand:														
(S85FL-125-005)														
Eg3 ----- 35-56	A-3(0)	SP-SM	100	100	86	9	7	3	2	2	---	NP	113.4	9.8
Btg2 ----- 69-80	A-2-6(0)	SC	100	100	87	30	30	29	29	28	32	12	108.9	15.1
Sapelo sand:														
(S85FL-125-006)														
Btg2 ----- 60-80	A-2-6(2)	SC	100	100	92	35	35	33	31	29	34	20	104.7	15.5
Wampee loamy fine sand:														
(S86FL-125-007)														
Btg1 ----- 29-50	A-2-6(1)	SC	100	100	83	32	29	26	23	21	30	15	109.2	15.9

TABLE 19.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Albany	Loamy, siliceous, thermic Grossarenic Paleudults
Arents	Arents
Blanton	Loamy, siliceous, thermic Grossarenic Paleudults
Bonneau	Loamy, siliceous, thermic Arenic Paleudults
Chipley	Thermic, coated Aquic Quartzipsamments
Croatan	Loamy, siliceous, dysic, thermic Terric Medisaprists
Dorovan	Dysic, thermic Typic Medisaprists
Elloree	Loamy, siliceous, thermic Arenic Ochraqualfs
Fluvaquents	Fluvaquents
Foxworth	Thermic, coated Typic Quartzipsamments
Goldhead	Loamy, siliceous, thermic Arenic Ochraqualfs
Grifton	Fine-loamy, siliceous, thermic Typic Ochraqualfs
Lakeland	Thermic, coated Typic Quartzipsamments
Mascotte	Sandy, siliceous, thermic Ultic Haplaquods
Ocilla	Loamy, siliceous, thermic Aquic Arenic Paleudults
Osier	Siliceous, thermic Typic Psammaquents
Ousley	Thermic, uncoated Aquic Quartzipsamments
Pamlico	Sandy or sandy-skeletal, siliceous, dysic, thermic Terric Medisaprists
Pantego	Fine-loamy, siliceous, thermic Umbric Paleaquults
Pelham	Loamy, siliceous, thermic Arenic Paleaquults
Plummer	Loamy, siliceous, thermic Grossarenic Paleaquults
Sapelo	Sandy, siliceous, thermic Ultic Haplaquods
Starke	Loamy, siliceous, thermic Grossarenic Paleaquults
Surrency	Loamy, siliceous, thermic Arenic Umbric Paleaquults
Troup	Loamy, siliceous, thermic Grossarenic Kandiudults
Wampee	Loamy, siliceous, thermic Aquic Arenic Hapludalfs

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