United States
Department of
Agriculture

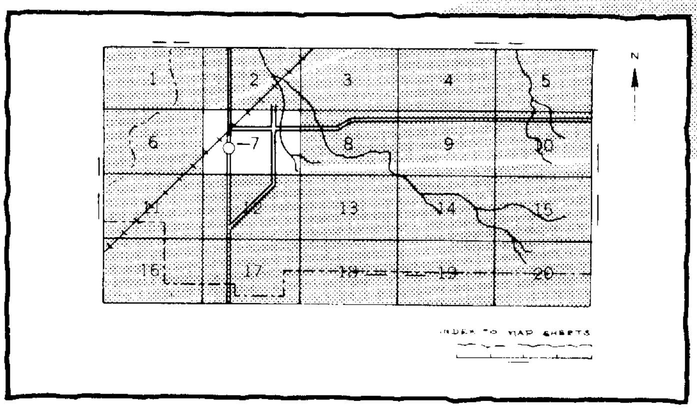
Soil
Conservation
Service

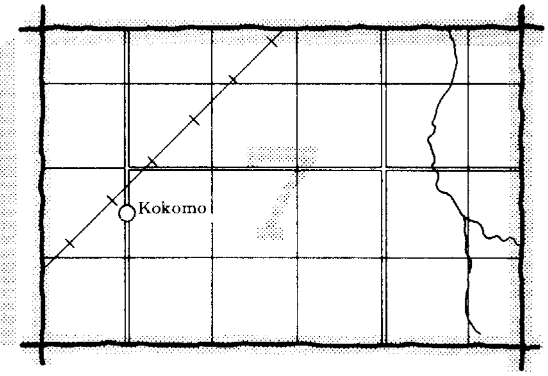
In cooperation with
University of Florida
Institute of Food and
Agricultural Sciences,
Agricultural Experiment
Stations and
Soil Science Department,
and Florida Department of
Agriculture and
Consumer Services

Soil Survey of Lee County, Florida

HOW TO USE

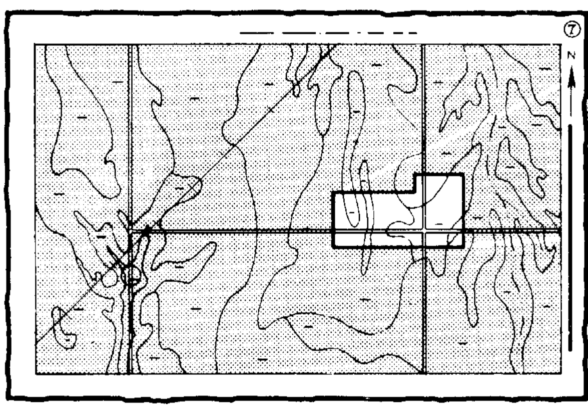
1. Locate your area of interest on the "Index to Map Sheets"

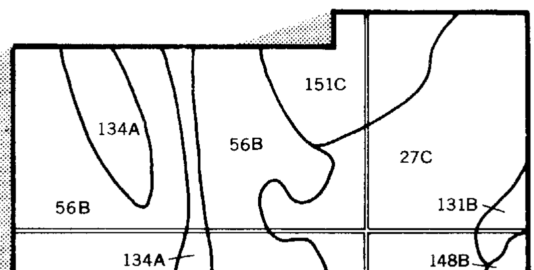




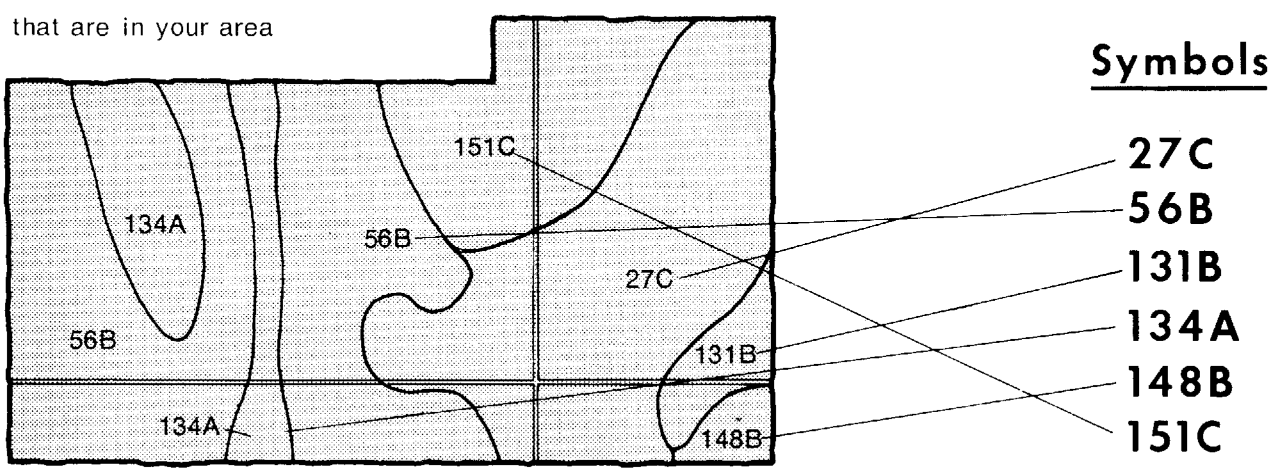
2. Note the number of the map sheet and turn to that sheet.

3. Locate your area of interest on the map sheet.



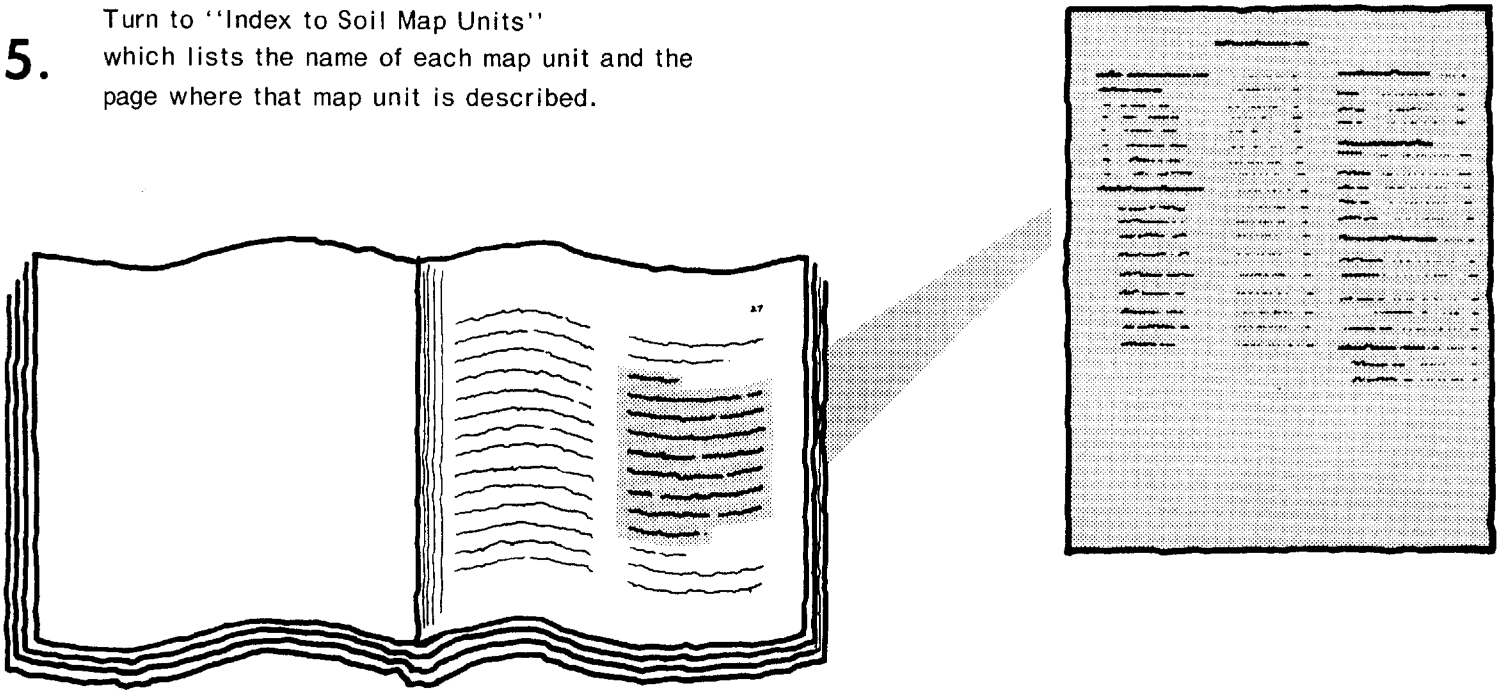


4. List the map unit symbols that are in your area

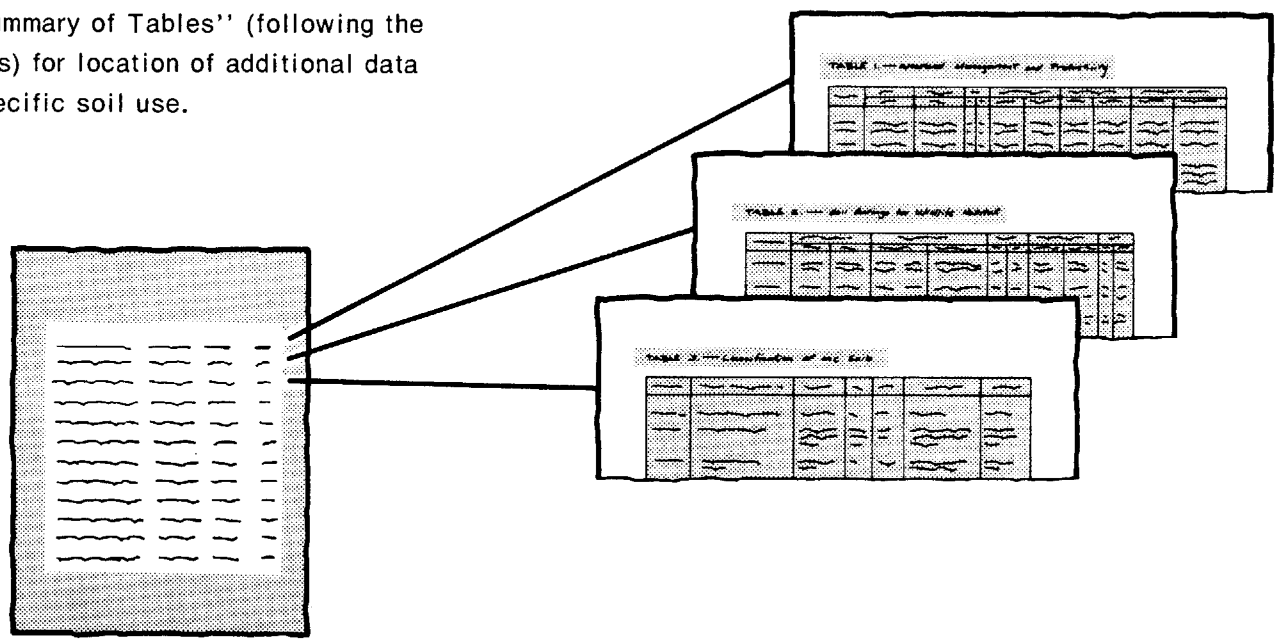


THIS SOIL SURVEY

5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.



6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; for specialists in wildlife management, waste disposal, or pollution control.

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. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was completed in 1981. Soil names and descriptions were approved in 1981. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1981. 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. It is part of the technical assistance furnished to the Lee Soil and Water Conservation District. The Lee County Board of Commissioners contributed financially to accelerate the completion of the fieldwork for this survey.

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.

Cover: A satellite photo of an area of Lee County. The white areas are developed or altered areas. The lighter gray land areas are undeveloped areas, and the darker gray land areas are wetlands. (*Satellite photo courtesy of the Lee County Department of Research and Information.*)

Contents

Soil Series

Issued December 1984

Index to Map Units

Summary of Tables

Foreword

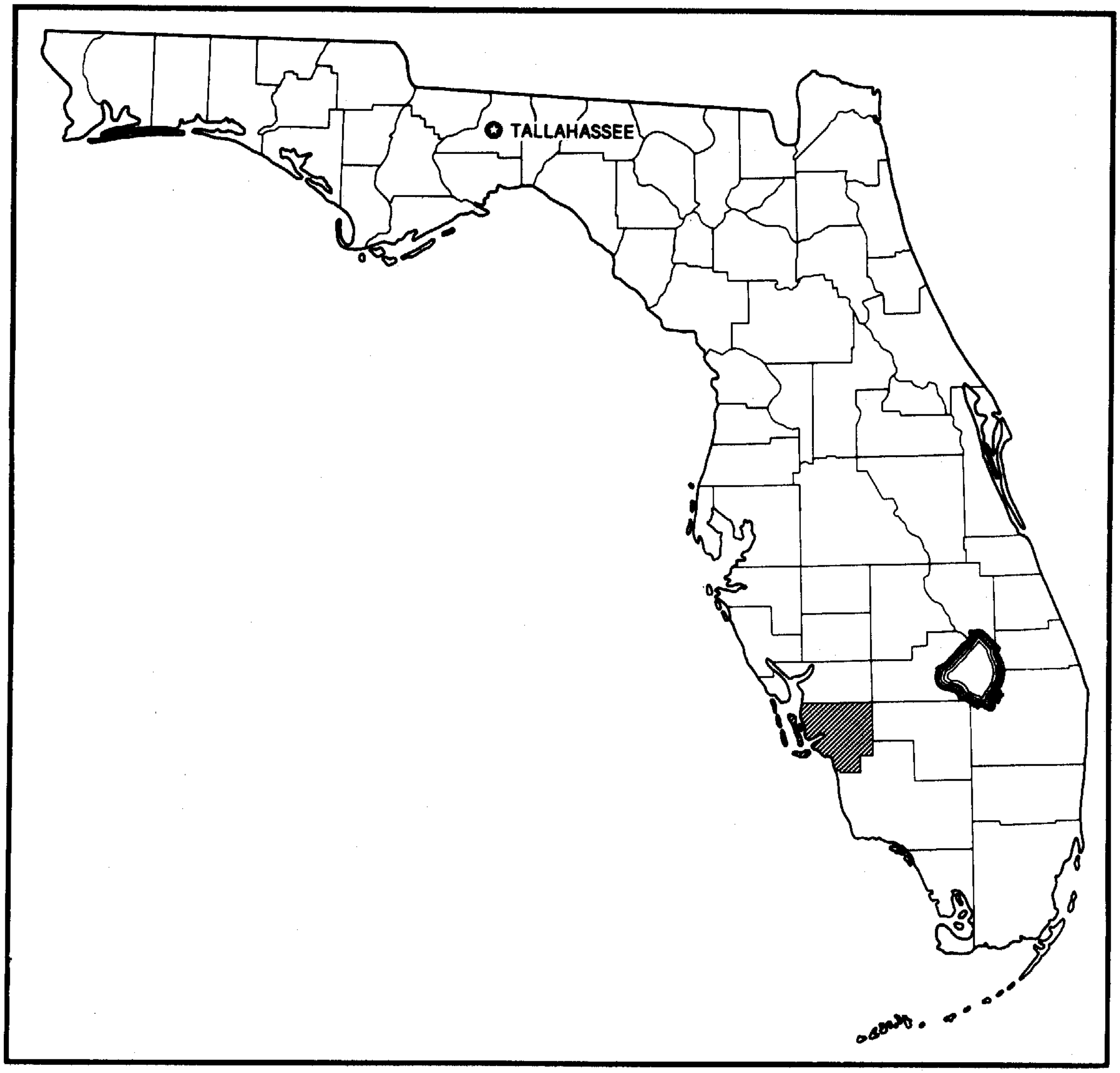
This soil survey contains information that can be used in land-planning programs in Lee County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of 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 insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

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

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

James W. Mitchell
State Conservationist
Soil Conservation Service



Location of Lee County in Florida.

Soil Survey of
Lee County, Florida

By Warren G. Henderson, Jr., Soil Conservation Service

Participating in the fieldwork were Lewis J. Carter, Allen L. Moore, Rebecca A. Stein, Carol A. Wettstein, and Howard Yamataki, Soil Conservation Service

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

LEE COUNTY is in the southwestern part of peninsular Florida. It is bordered on the north by Charlotte County, on the east by Hendry and Collier Counties, on the south by Collier County, and on the west by the Gulf of Mexico. The survey area covers 503,040 acres, or about 787 square miles. Fort Myers, the county seat, is in the north-central part of the county.

Tourism and construction are the largest nonagricultural industries in the county. The mild winter temperatures and beaches attract many people to the county annually.

General Nature of the County

In this section, environmental and cultural factors that affect the use and management of soils in Lee County are described. These factors are climate, history and development, water resources, and farming.

Climate

Table 1 gives data on temperature and precipitation for the survey area as recorded at Fort Myers *(8)*.

In winter the average temperature is 65 degrees F, and the average daily minimum temperature is 55 degrees. The lowest temperature on record, which occurred at Page Field in December 1962, is 26 degrees. In summer the average temperature is 81 degrees, and the average daily maximum temperature is 90 degrees. The highest recorded temperature, which occurred at Page Field in July 1942, is 101 degrees.

The total annual precipitation is 54 inches. Of this, 32 inches, or 60 percent, usually falls in June through September. In 2 years out of 10, the rainfall in June through September is less than 12 inches. The heaviest 1-day rainfall during the period of record was 10 inches at Page Field in October 1951. Thunderstorms occur on about 80 days each year. Most occur in late afternoon.

The average relative humidity in midafternoon is about 50 to 60 percent. Humidity is higher at night, and the average at dawn is about 80 percent.

History and Development

Ernest W. Hall, Edison Community College, prepared this section.

When Florida was discovered by Ponce de Leon in 1513, the Caloosa Indians inhabited what is now southwest Florida. The Caloosa Indians once controlled an area that extended from north of Charlotte Harbor south to Cape Sable and from the Gulf of Mexico to Lake Okeechobee.

Several early explorers visited the islands of Charlotte Harbor and other parts of what is now Charlotte County, including Ponce de Leon in 1513 and again in 1521, Panfilo de Naraez in 1528, Hernando de Soto in 1539, and Pedro Menendez de Aviles, founder of St. Augustine, in 1566. Pirates often frequented the islands and the coastline north and south of Caloosahatchee during the eighteenth century and the early part of the nineteenth century. Jose Gaspar, Black Caesar, Black Augustus, and Juan Gomez are mentioned in the folklore of Lee County.

Florida became an American Territory in 1821. By that time, the native tribes that inhabited Florida when the Spanish first arrived had become extinct. In their stead, migrating Creek Indians (known as Seminoles) from Georgia and Alabama had settled in Spanish Florida. The policy of the United States Government under Andrew Jackson was to remove all Indians east of the Mississippi River to western reservations. The Seminoles were scheduled for removal from Florida, but they resisted under the leadership of Osceola. This brought on the Second Seminole War (1835-42) and later the Third Seminole War (1855-58).

Prior to the Third Seminole War, Fort Myers was established on the ruins of abandoned Fort Harvie in February 1850. During the Civil War, Fort Myers was occupied by Union troops. It was at Fort Myers that the most southern land battle of the war was fought in February 1865.

The first permanent settlers in Fort Myers arrived in 1866. In 1885, Fort Myers was incorporated as a town.

In 1887, Lee County was formed from the northern part of Monroe County. It was named in honor of Robert E. Lee. In 1923, Lee County was divided into three counties: Lee, Hendry, and Collier. When Lee County was formed in 1887, its population was about 1,000. In 1980, the population of Lee County was 205,266.

Cattle were the most important industry in the county for many years after 1887. Cattle were driven to Punta Rassa, where they were sold and shipped to Cuba and Key West.

The first bridge across the Caloosahatchee was built at Alva in 1903. Railroad service (the Atlantic Coast Line) to Fort Myers began in 1904. The first highway out of Lee County was completed in 1922. Today that highway is State Highway 31. The Tamiami Trail, linking Tampa and Miami, was completed in 1928.

Fort Myers, Cape Coral, and Sanibel are incorporated cities in the county.

The main industries in the county are tourism, construction, flower farming (gladioli and chrysanthemums), truck farming, cattle and citrus production, and service industries.

Water Resources

The Caloosahatchee River and its tributaries—the Orange River, Telegraph, Hickey, Bedman, Trout, Popash, and Daugherty Creeks—are potential sources of water for agricultural and industrial uses.

According to the Lee County Comprehensive Development Plan *(4)*, freshwater is one of the most vital natural resources. Rapid growth and development in Lee County has placed increasing pressure on this limited resource. Fresh potable water is a resource that must be managed and conserved if the county is to continue to develop.

There are ten major municipal, county, or county franchised utility companies that treat and distribute potable water in Lee County. Three utilities use brackish aquifer water and a desalination treatment. One company obtains freshwater from Charlotte County. By far the largest volume is controlled by the six remaining utilities, which use one or both of the county's main sources of freshwater: the Caloosahatchee River and the underground aquifers.

Saltwater intrusion and pollution are the major threats facing the two main freshwater sources. As more and more ground water is withdrawn, the possibility of saltwater contamination of the shallow aquifers increases.

The existing distribution system is reaching its maximum capacity. The deficiencies of the system and the low supply of water during the dry season create very low water pressure in many areas.

Farming

The soils and climate of Lee County are favorable for farming and agricultural industries. The most common vegetable crop in the survey area is tomatoes. Because tomatoes are susceptible to disease, native range or woodland is cleared each year for the crop. Other vegetables grown in the county are peppers, squash, and cucumbers.

The major fruits grown in the survey area are oranges, limes, avocado, mango, and watermelon. Other fruits grown in smaller quantity are grapefruit, strawberries, and cantaloup.

Livestock production consists mainly of beef cattle. A combination of native rangeland and improved pasture is used as a feed source with some supplemental feeding, especially during the dry winter months.

Many areas throughout the county that were once in native rangeland and some farm areas have been converted to urban land.

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 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 biologic activity.

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

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

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

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpreted the data from these analyses and tests as well as the field-observed characteristics and the soil properties in terms of expected behavior of the soils under different uses. Interpretations for all of the soils were field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and new interpretations sometimes are developed to meet local needs. Data were assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management were assembled from farm records and from field or plot experiments on the same kinds of soil.

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

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

Lee County was mapped concurrently with adjacent Charlotte County. All of the map units described in the section "Detailed Soil Map Units" occur in both counties. Some of the soil series described in the section "Soil Series and Their Morphology" have typical pedons that are located in Charlotte County. These pedons are considered to be typical of the soils in Lee County, however.

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 soils on the landscape.

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

General Soil Map Units

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

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

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

The soils in the survey area vary widely in their suitability or potential for major land uses. Table 2 shows the extent of the map units shown on the general soil map. It lists the suitability or potential of each, in relation to that of the other map units, for major land uses and shows soil properties that limit use. Soil suitability ratings are based on the practices commonly used in the survey area to overcome soil limitations. These ratings reflect the ease of overcoming the limitations. They also reflect the problems that will persist even if such practices are used.

Each map unit is rated for *community development, citrus, improved pasture, vegetables,* and *woodland.* Community development includes residential and industrial uses. Citrus includes fruits that generally require intensive management. Improved pasture includes grasses grown for livestock grazing. The vegetable crops are those grown extensively in the survey area. Woodland refers to areas of native or introduced trees.

Soils of the Flatwoods and Sloughs

The five general soil map units in this group consist of nearly level, poorly drained soils on flatwoods. Some soils in this unit are sandy to a depth of 80 inches, some are loamy at a depth of 20 to 40 inches, and some are loamy below a depth of 40 inches.

1. Immokalee-Pompano

Nearly level, poorly drained, deep soils that are sandy throughout; some have an organic-stained subsoil

This map unit occurs as five mapped areas. The largest is about 11 miles long and about 8 miles wide at the widest place. One of the other areas is about 5 1/2 miles long and about 2 miles wide at the widest place. These two areas are in the southeastern part of the county. Another mapped area is north of the San Carlos area. It is about 5 miles long and about 3 miles wide at the widest place. The other two mapped areas are in the western part of the county, south of the Caloosahatchee River. The areas are interspersed with depressions and marshes.

This map unit consists mainly of nearly level soils on flatwoods and in sloughs. The native vegetation is South Florida slash pine. The wetter areas have cypress. Sawpalmetto and pineland threeawn are common on the flatwoods (fig. 1). Maidencane is common in the sloughs.

This map unit makes up about 64,760 acres, or 13.0 percent of the land area of the county. It is about 30 percent Immokalee soils, 30 percent Pompano soils, and 40 percent soils of minor extent.

Immokalee soils are poorly drained. Typically, the surface layer is black sand about 4 inches thick. The subsurface layer is dark gray sand in the upper 5 inches and light gray sand in the lower 27 inches. The subsoil is sand about 33 inches thick. The upper 14 inches is black and firm, the next 5 inches is dark reddish brown, and the lower 14 inches is dark yellowish brown. The substratum is very pale brown sand to a depth of 80 inches or more.

Pompano soils are poorly drained and in the slough position. Typically, the surface layer is dark gray fine sand about 4 inches thick. The underlying sand layers extend to a depth of 80 inches or more and are light gray, very pale brown, and white.

Of minor extent in this map unit are Anclote, Valkaria, Oldsmar, Malabar, Pineda, Felda, Floridana, and Myakka soils.

The soils of this map unit are used mostly as cropland and rangeland. Some areas have been cleared and used for urban development.

2. Hallandale-Boca

Nearly level, poorly drained, shallow to moderately deep,

Figure 1.—An area of flatwoods on Immokalee sand. Pine, sawpalmetto, and several species of threeawn are the dominant vegetation.

sandy soils; some are sandy throughout and some have a loamy subsoil

This map unit occurs as six mapped areas. The largest, about 12 miles long and about 3 miles wide at the widest place, is in the west-central part of the county occupying areas along and northeast of U.S. Highway 41. Another mapped area is northeast of Estero and is about 3 miles long and 1 1/2 miles wide. A mapped area east of Estero is about 5 miles long and about 1 1/2 miles wide. Two mapped areas are south of Estero. The larger is about 6 miles long and 3 miles wide at the widest place, and the smaller is about 2 miles long and 3 miles wide. The areas are interspersed with depressions, sloughs, and drainageways.

This map unit consists mainly of nearly level soils on flatwoods. The native vegetation is South Florida slash pine. The wetter areas have cypress. Sawpalmetto and pineland threeawn are common on the flatwoods.

This map unit makes up about 43,550 acres, or 8.7 percent of the land area of the county. It is about 40 percent Hallandale soils, 30 percent Boca soils, and 30 percent soils of minor extent.

Hallandale soils are poorly drained. Typically, the surface layer is gray fine sand about 2 inches thick. The subsurface layer is light gray fine sand about 5 inches thick. The substratum is very pale brown fine sand about 5 inches thick. Hard, fractured limestone is at a depth of 12 inches.

Boca soils are poorly drained. Typically, the surface layer is gray fine sand about 3 inches thick. The subsurface layer is fine sand about 22 inches thick. The upper 11 inches is light gray and the lower 11 inches is very pale brown. The subsoil is gray fine sandy loam with brownish yellow mottles and calcareous nodules. A layer of fractured limestone is at a depth of 30 inches.

Of minor extent in this map unit are Wabasso, Oldsmar, Felda, and Pineda soils.

The soils of this map unit are used mostly for urban development. The areas in sawpalmetto and South Florida slash pine are used as wildlife habitat.

3. Immokalee-Myakka

Nearly level, poorly drained, deep, sandy soils that have a sandy, organic-stained subsoil

This map unit occurs as five mapped areas. The largest, about 14 miles long and 2 miles wide at the widest place, is in the north-central part of the county along the Caloosahatchee River. Other large areas are on Pine Island, which is in the western part of the county, and in the Spring Creek area, which is in the southern part of the county. The mapped area on Pine Island is about 12 miles long and 2 miles wide at the widest place. The mapped area in the Spring Creek area is about 10 miles long and 3 miles wide at the widest place. The areas are interspersed with a few depressions, drainageways, and slightly higher ridges.

This map unit consists mainly of nearly level soils on flatwoods. The native vegetation is South Florida slash pine. The wetter areas have willow and cypress. Waxmyrtle, sawpalmetto, and pineland threeawn are common on the flatwoods.

This map unit makes up about 53,110 acres, or 10.7 percent of the land area of the county. It is about 40 percent Immokalee soils, 35 percent Myakka soils, and 25 percent soils of minor extent.

Immokalee soils are poorly drained. Typically, the surface layer is black sand about 4 inches thick. The subsurface layer is dark gray sand in the upper 5 inches and light gray sand in the lower 27 inches. The subsoil is sand about 33 inches thick. The upper 14 inches is black and firm, the next 5 inches is dark reddish brown, and the lower 14 inches is dark yellowish brown. The substratum is very pale brown sand to a depth of 80 inches or more.

Myakka soils are poorly drained. Typically, the surface layer is very dark gray fine sand about 3 inches thick. The subsurface layer is fine sand about 23 inches thick. The upper 3 inches is gray, and the lower 20 inches is light gray. The subsoil is fine sand to a depth of 80 inches or more. The upper 4 inches is black and firm; the next 5 inches is dark reddish brown and friable; the next 17 inches is black and firm; the next 11 inches is dark reddish brown and friable; and the lower 17 inches is mixed black and dark reddish brown and friable.

Of minor extent in this map unit are Orsino, Satellite, Smyrna, Punta, and Oldsmar soils.

The soils of this map unit are used mostly for urban development. Some areas remain in sawpalmetto and South Florida slash pine.

4. Oldsmar-Malabar-Immokalee

Nearly level, poorly drained, deep, sandy soils; some have a sandy, organic-stained subsoil underlain by a loamy subsoil, some have just a loamy subsoil, and some have just a sandy organic-stained subsoil

This map unit occurs as five mapped areas. The largest, about 13 miles long and about 12 miles wide at the widest place, is in the east-central part of the county. Another large area is north of the Caloosahatchee River in the northeastern part of the county. It is about 3 miles long and 16 miles wide. The three smaller mapped areas are scattered throughout the county. The mapped areas are interspersed with depressions and drainageways.

This map unit consists mainly of nearly level soils on flatwoods and in sloughs on the flatwoods. The native vegetation is South Florida slash pine. The wetter areas have cypress. Sawpalmetto and pineland threeawn are common on the flatwoods. Maidencane is common in the sloughs.

This map unit makes up about 109,582 acres, or 22.0 percent of the land area of the county. It is about 25 percent Oldsmar soils, 20 percent Malabar soils, 10 percent Immokalee soils, and 45 percent soils of minor extent.

Oldsmar soils are poorly drained. Typically, the surface layer is black fine sand about 3 inches thick. The subsurface layer is gray and light gray fine sand about 39 inches thick. The upper part of the subsoil is very dark gray fine sand about 5 inches thick. The lower part of the subsoil is yellowish brown and mixed light brownish gray and brown sandy loam and fine sandy loam about 16 inches thick. Pale brown fine sand is below the subsoil and extends to a depth of 80 inches or more.

Malabar soils are poorly drained and in the slough position on the flatwoods. Typically, the surface layer is dark gray fine sand about 5 inches thick. The next 12 inches is light gray and very pale brown fine sand. Below this is a 16-inch layer of light yellowish brown fine sand with yellowish mottles and a 9-inch layer of brownish yellow fine sand. The subsoil is gray loamy fine sand about 9 inches thick with large yellowish brown mottles. The next 8 inches is gray fine sandy loam with large brownish yellow mottles. Below is light gray loamy fine sand with yellowish brown mottles to a depth of 80 inches or more.

Immokalee soils are poorly drained. Typically, the surface layer is black sand about 4 inches thick. The subsurface layer is dark gray sand in the upper 5 inches and light gray sand in the lower 27 inches. The subsoil is sand to a depth of 69 inches. The upper 14 inches is black and firm, the next 5 inches is dark reddish brown, and the lower 14 inches is dark yellowish brown. The substratum is very pale brown sand about 11 inches thick.

Of minor extent in this map unit are Pineda, EauGallie, Wabasso, Boca, Pompano, and Hallandale soils.

The soils of this map unit are used mostly as rangeland and wildlife habitat. Some areas have been cleared and are used for urban development.

5. Pineda-Boca-Wabasso

Nearly level, poorly drained, deep and moderately deep, sandy soils; some have a sandy subsoil, some have a loamy subsoil, and some have a sandy, organic-stained subsoil underlain by a loamy subsoil

This map unit occurs as three mapped areas. The largest is about 5 miles long and about 17 miles wide at the widest place. This area is in the northern part of the county on both sides of U.S. Highway 41. Another large area is in the northeastern part of the county. It is about 11 miles long and 7 miles wide at the widest place. One small area occurs southeast of Matlacha. It is about 2 miles long and 2 miles wide at the widest place. The mapped areas are interspersed with depressions.

This map unit consists mainly of nearly level soils on flatwoods and in sloughs. The native vegetation is South Florida slash pine. The wetter areas have cypress. Sawpalmetto and pineland threeawn are common on the flatwoods. Maidencane is common in the sloughs.

This map unit makes up about 79,300 acres, or 15.9 percent of the land area of the county. It is about 20 percent Pineda soils, 16 percent Boca soils, 15 percent Wabasso soils, and 49 percent soils of minor extent.

Pineda soils are poorly drained and in the slough position. Typically, the surface layer is black fine sand about 1 inch thick. The subsurface layer is very pale brown fine sand about 4 inches thick. The upper part of the subsoil is brownish yellow fine sand about 8 inches thick and strong brown fine sand about 10 inches thick. Between the upper and lower parts of the subsoil is 7 inches of light gray fine sand with brownish yellow mottles. The lower part of the subsoil to a depth of 54 inches is light brownish gray fine sandy loam with light gray sandy intrusions. The substratum is light gray fine sand to a depth of 80 inches or more.

Boca soils are poorly drained. Typically, the surface layer is grayish brown fine sand about 3 inches thick. The subsurface layer is light gray and very pale brown fine sand about 30 inches thick. The subsoil is gray sandy clay loam with yellowish brown and brownish yellow mottles. Hard, fractured limestone bedrock is at a depth of 38 inches.

Wabasso soils are poorly drained. Typically, the surface layer is dark gray sand about 6 inches thick. The subsurface layer is sand to a depth of 24 inches. The upper 11 inches is light brownish gray with dark grayish brown stains along root channels, and the lower 7 inches is white with dark grayish brown stains. The subsoil is about 38 inches thick. The upper 4 inches is dark brown sand with few iron concretions. The next 8 inches is brownish yellow sandy clay loam with light brownish gray, light gray, and reddish brown mottles. The lower 26 inches is light gray sandy clay loam with pale olive mottles and stains along root channels. Light gray fine sandy loam with olive mottles extends to a depth of 80 inches or more.

Of minor extent in this map unit are Malabar, Oldsmar, Hallandale, Felda, Copeland, and Chobee soils.

The soils of this map unit are used mostly for urban development. The uncleared areas are used as rangeland and wildlife habitat.

Soils of the Swamps and Sloughs

The one map unit in this group consists of nearly level, poorly drained soils. Some are moderately deep, loamy soils over limestone and others are loose sandy soil to a depth of 80 inches or more.

6. Isles-Boca-Pompano

Nearly level, poorly drained, deep and moderately deep, sandy soils; some have a loamy subsoil and some are sandy throughout

This map unit occurs as three mapped areas. The largest is about 8 miles long and about 5 miles wide. This area is in the southeastern part of the county. Another area occurs along the 6-mile cypress swamp, and the smallest is southeast of the 6-mile cypress area. The mapped areas are interspersed with slightly higher flatwoods.

This map unit consists mainly of nearly level soils in sloughs and depressions. The native vegetation consists of cypress in the depressions and South Florida slash pine, maidencane, and sparse sawpalmetto in the sloughs. Pineland threeawn is common on the higher positions in the sloughs.

This map unit makes up about 42,500 acres, or 8.5 percent of the land area of the county. It is about 20 percent Isles soils, 20 percent Boca soils, 15 percent Pompano soils, and 45 percent soils of minor extent.

Isles soils are poorly drained and are in the depressions. Typically, the surface layer is very dark gray fine sand about 5 inches thick. The subsurface layer is about 5 inches of light gray fine sand. Next is 11 inches of very pale brown fine sand with yellowish brown mottles. The subsoil is 26 inches of gray fine sandy loam with brownish yellow mottles and pockets of light brownish gray loamy sand. Limestone bedrock is at a depth of 47 inches.

Boca soils are poorly drained. Typically, the surface layer is grayish brown fine sand about 3 inches thick. The subsurface layer is light gray and very pale brown fine sand about 30 inches thick. The subsoil is gray sandy clay loam with yellowish brown and brownish yellow mottles. Hard, fractured limestone bedrock is at a depth of 38 inches.

Pompano soils are poorly drained and are in

Figure 2.—A red mangrove swamp in an area of Wulfert muck. Such swamps are common in tidal areas.

depressions. Typically, the surface layer is gray fine sand about 3 inches thick. The underlying fine sand layers extend to a depth of 80 inches or more and are light brownish gray in the upper 32 inches and light gray in the lower 45 inches.

Of minor extent in this map unit are Pineda, Malabar, Floridana, Anclote, Valkaria, Felda, Winder, and Immokalee soils.

The soils of this map unit are used mostly as wildlife habitat and rangeland.

Soils of the Tidal Areas and Barrier Islands

The three general soil map units in this group consist of nearly level, somewhat poorly drained to very poorly drained soils on tidal areas and the Barrier Islands. Some of the soils are sandy throughout with a mixture of shell fragments, some have a thin mucky surface layer that is less than 16 inches thick, and some are organic to a depth of more than 16 inches.

7. Wulfert-Kesson-Captiva

Nearly level, very poorly drained and poorly drained soils; some are organic and some are sandy throughout with varying proportions of shell fragments

This map unit occurs dominantly in areas along the Gulf coastal zones of the county. The largest area is about 7 miles long and about 1 mile wide at the widest place. This area is along the northern part of Sanibel Island. Other mapped areas occur in isolated areas in Pine Island Sound, Charlotte Harbor, and Matlacha Pass. These areas range from several acres to several hundred acres in size. The mapped areas are interspersed with an occasional sand or shell mound or ridge.

This map unit consists mainly of nearly level, very poorly drained soils in tidal swamps and broad slough areas along the gulf coast. Natural vegetation on the tidal swamps is mangrove (fig. 2). Natural vegetation on the broad slough areas is sand cordgrass, leatherleaf fern, waxmyrtle, and numerous grasses.

This map unit makes up about 6,360 acres, or 1.3 percent of the land area of the county. It is about 40 percent Wulfert soils, 35 percent Kesson soils, 10 percent Captiva soils, and 15 percent soils of minor extent.

Wulfert soils are very poorly drained. Typically, the surface layer is muck that is dark reddish brown to a depth of 12 inches and dark brown to a depth of 36 inches. Beneath the muck is gray fine sand with light gray streaks and about 10 percent shell fragments.

Kesson soils are very poorly drained. Typically, the surface layer is about 6 inches of sand that contains shell fragments. The underlying layers are fine sand that contains shell fragments; they extend to a depth of 80 inches or more. In sequence, the upper 4 inches is pale brown, the next 3 inches is light brownish gray, the next 25 inches is light gray with dark gray streaks, and the lower 42 inches is white.

Captiva soils are poorly drained. Typically, the surface layer is black fine sand about 6 inches thick. The underlying layers are fine sand mixed with shell fragments to a depth of 80 inches or more. In sequence, the upper 9 inches is pale brown with light gray streaks, the next 11 inches is light gray with many pale brown mottles, the next 4 inches is light gray fine sand with about 30 percent multicolored shell fragments, and the lower 50 inches is light gray fine sand.

Of minor extent in this map unit are Canaveral, Peckish, and Estero soils and Isles muck.

Most areas of this map unit remain in natural vegetation. Some areas, particularly along the coast, have been altered for homesites or other urban purposes.

8. Peckish-Estero-Isles

Nearly level, very poorly drained, mucky soils; some have a sandy, organic-stained subsoils and some have a loamy subsoil

This map unit is along the mainland portions of the county and on Little Pine Island. Individual areas range from several acres to several thousand acres. The two largest areas are on Little Pine Island and in an area north of Fort Myers Beach. These areas range from 1 to 3 miles in width and 5 to 12 miles in length. The areas are interspersed with occasional, slightly higher ridges.

This map unit consists mainly of nearly level soils in tidal swamps and marshes along the gulf coast. Natural vegetation is mangrove in the tidal swamps and seashore saltgrass, batis, and sea-oxeye in the marshes.

This map unit makes up about 34,020 acres, or 6.8 percent of the land area of the county. It is about 35 percent Peckish soils, 17 percent Estero soils, 8 percent Isles soils, and 40 percent soils of minor extent.

Peckish soils are very poorly drained. Typically, the surface layer is mucky fine sand about 9 inches thick. The upper 4 inches is dark reddish brown, the next 2 inches is dark grayish brown, and the lower 3 inches is dark reddish brown. The subsurface layer is gray and light gray fine sand with light gray streaks in the upper part and light brownish gray and grayish brown mottles in the lower part. It is about 27 inches thick. The subsoil is fine sand about 12 inches thick. The upper 7 inches is dark grayish brown and very dark grayish brown and the lower 5 inches is brown and dark brown with dark grayish brown mottles. The substratum is brown fine sand with very dark grayish brown streaks.

Estero soils are very poorly drained. Typically, the surface layer is about 13 inches thick. The upper 5 inches is black muck, the next 3 inches is black fine sand, and the lower 5 inches is very dark gray fine sand. The subsurface layer is fine sand about 20 inches thick. The upper 6 inches is light brownish gray with few fine distinct yellowish red mottles; the lower 14 inches is grayish brown with few medium distinct yellowish red mottles. The subsoil is massive fine sand to a depth of about 50 inches. The upper 6 inches is black and dark grayish brown, the next 4 inches is black and dark reddish brown, and the lower 16 inches is dark brown and black fine sand. Grayish brown fine sand with few fine distinct black mottles extends to a depth of 80 inches or more.

Isles muck soils are very poorly drained. Typically, the surface layer is dark reddish brown muck about 5 inches thick. Next is 6 inches of very dark grayish brown mucky fine sand. The subsurface layer is grayish brown fine sand with brownish gray mottles and is 28 inches thick. The subsoil is 8 inches of grayish brown fine sandy loam with light olive brown mottles. Fractured limestone bedrock is at a depth of 47 inches.

Of minor extent in this map unit are Captiva, Kesson, and Wulfert soils.

Figure 3.—An area of Matlacha soils being prepared for homesites. The large boulders are usually transported away from the site.

Most areas of this map unit remain in natural vegetation. Some areas, particularly along the coast, have been altered for homesites or other urban purposes.

9. Canaveral-Captiva-Kesson

Nearly level, somewhat poorly drained to very poorly drained soils that are sandy throughout with a varying mixture of shell fragments

This map unit occurs as five mapped areas. The largest is about 11 miles long and 1 mile wide. This area is on Sanibel Island. The other larger areas are on North Captiva Island and Cayo Costa Island. The mapped area on North Captiva Island is about 3 miles long and about 1/4 mile wide at the widest place. The mapped area on Cayo Costa Island is about 4 miles long and about 1/2 mile wide at the widest place. A mapped area on Boca Grande is about 5 miles long and about 1/2 mile wide at the widest place. The areas are interspersed with a few depressions and tidal areas.

This map unit consists mainly of nearly level soils on the Barrier Islands. Natural vegetation consists of cabbage palm, seagrapes, sand cordgrass, and leatherleaf fern.

This map unit makes up about 13,780 acres, or 2.8 percent of the land area of the county. It is about 39 percent Canaveral soils, 18 percent Captiva soils, 18 percent Kesson soils, and 25 percent soils of minor extent.

Canaveral soils are somewhat poorly drained. Typically, the surface layer is black and dark gray fine sand mixed with shell fragments. It is about 15 inches thick. The underlying layers are fine sand mixed with shell fragments to a depth of 80 inches or more. They are light brownish gray and light gray.

Captiva soils are poorly drained. Typically, the surface layer is black fine sand about 6 inches thick. The underlying layers are fine sand mixed with shell fragments to a depth of 80 inches or more. In sequence, the upper 9 inches is pale brown with light gray streaks, the next 11 inches is light gray with many pale brown mottles, the next 4 inches is light gray fine sand with about 30 percent multicolored shell fragments, and the lower 50 inches is light gray fine sand.

Kesson soils are very poorly drained. Typically, the surface layer is about 6 inches of sand containing shell fragments. The underlying layers are fine sand that contain shell fragments; they extend to a depth of 80 inches or more. In sequence, the upper 4 inches is pale brown, the next 3 inches is light brownish gray, the next

25 inches is light gray with dark gray streaks, and the lower 42 inches is white.

Of minor extent in this map unit are Kesson and Wulfert soils and areas of Beaches.

Most areas of this map unit remain in natural vegetation. Some areas, particularly along the coast, are used for homesites or other urban purposes.

Soils of the Manmade Areas

The one general soil map unit in this group consists of nearly level, somewhat poorly drained soils that were formed by earthmoving operations in areas designated for urban development (fig. 3). The soils consist of mixed gravelly fine sand, lenses of loamy sand, and coated sandy fragments of former subsoil horizons with about 25 percent limestone and shell fragments.

10. Matlacha

Nearly level, somewhat poorly drained soils that are mostly mixed sands, shell fragments, and limestone fragments throughout

This map unit occurs as one mapped area in the county. The area is about 9 miles long and about 8 miles wide and is located in the Cape Coral area of the county.

This map unit consists mainly of nearly level soils that were formed as a result of earthmoving operations. Natural vegetation is rare; however, areas that have been allowed to remain vacant for an extended period contain South Florida slash pine and invading grasses and weeds.

This map unit makes up about 51,080 acres, or 10.3 percent of the land area of the county. Soils of minor extent make up about 25 percent of this unit.

Matlacha soils are somewhat poorly drained. Typically, the surface layer is about 35 inches of black, olive brown, grayish brown, dark brown, light brownish gray, very dark gray, and very pale brown mixed gravelly fine sand and sandy mineral material. The surface layer contains lenses of loamy sand and coated sandy fragments of former subsoil horizons with about 25 percent limestone and shell fragments. Below this to a depth of 80 inches or more is undisturbed fine sand. The upper 5 inches is dark gray and the lower 40 inches is light gray with common medium distinct dark grayish brown stains along root channels.

Of minor extent in this map unit are soils that contain finer textured material throughout the fill. Also included are small areas that contain boulders or more than 35 percent rock fragments larger than 3 inches throughout the fill. In addition, there are areas of similar soils with loamy material and limestone bedrock below the mixed fill material. Other inclusions are areas of fill that are less than 20 inches thick over undisturbed soils.

Most areas of this unit have been prepared for future urbanization. Many areas, particularly around the city of Cape Coral, are presently urbanized.

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. The map units are presented in numerical order. The numbers are not always in sequence, however; some of the numbers are not utilized as map unit symbols. 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, Boca fine sand, slough, is one of several phases in the Boca series.

Some map units are made up of two or more major soils. These map units are called soil complexes. A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Smyrna-Urban land complex is an example.

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

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

Table 3 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

2—Canaveral fine sand. This is a nearly level, moderately well drained and somewhat poorly drained soil on low ridges. Slopes are smooth to slightly convex and range from 0 to 2 percent.

Typically, the surface layer is black and dark gray fine sand mixed with shell fragments and is about 15 inches thick. The underlying layers are light brownish gray and light gray fine sand mixed with shell fragments to a depth of 80 inches or more.

Included with this soil in mapping are small areas of Captiva and Kesson soils. Included soils generally make up less than 10 percent of any mapped area.

In most years, under natural conditions, this soil has a water table at a depth of 18 to 40 inches for 2 to 6 months. The water table recedes to a depth of more than 40 inches during February through July.

The available water capacity is very low. Natural fertility is low. Permeability is very rapid.

Natural vegetation consists of cabbage palm, Brazilian pepper, seagrape, wild coffee, and an understory of vines and weeds.

This soil is not suitable for cultivated crops, and it has only fair suitability for pasture grasses. This soil is not generally used for rangeland.

The potential productivity for pine trees is moderate. Seedling mortality is the main management concern.

This soil has severe limitations for septic tank absorption fields, dwellings without basements, small commercial buildings, sanitary landfills, sewage lagoon areas, shallow excavations, and recreational uses. Excessive permeability can cause pollution of ground water in areas of septic tank absorption fields.

This Canaveral soil is in capability subclass VIs.

4—Canaveral-Urban land complex. This complex consists of Canaveral fine sand and areas of Urban land. The Canaveral soil and Urban land are so intermingled that they cannot be separated at the scale used for mapping.

About 50 to 70 percent of each area of the complex consists of nearly level Canaveral soils or areas of Canaveral soils that have been reworked or reshaped, but which still are recognizable as Canaveral soils. Typically, Canaveral soils have a surface layer of black and dark gray fine sand that is mixed with shell fragments. Beneath the surface layer, to a depth of 80 inches or more, are layers of light brownish gray and light gray fine sand mixed with shell fragments.

About 20 to 30 percent of each area is Urban land. This land is used for houses, streets, driveways, buildings, parking lots, and other related uses. Unoccupied areas are mostly in lawns, vacant lots, or playgrounds consisting of Canaveral soils.

Included in this complex, and making up about 10 to 20 percent of the map unit, are areas of Captiva soils.

Areas of the soils that have been modified by grading and shaping are not so extensive in the older communities as in the newer ones. Sandy material from drainage ditches is commonly used to fill low areas. In places, material is hauled in to fill low areas. In undrained areas, the water table is at a depth of 18 to 40 inches for a period of 2 to 6 months in most years. Drainage systems have been established in most areas, however, and the depth to the water table is dependent on the drainage system.

Present land use precludes the use of this complex for cultivated crops, citrus, or improved pasture.

This complex has not been assigned to a capability subclass.

5—Captiva fine sand. This is a nearly level, poorly drained soil in sloughs. Slopes are smooth to concave and range from 0 to 1 percent.

Typically, the surface layer is black fine sand about 6 inches thick. The underlying layers are fine sand mixed with shell fragments to a depth of 80 inches or more. The upper 9 inches is pale brown with light gray streaks, the next 11 inches is light gray with many pale brown mottles, the next 4 inches is light gray with about 30 percent multicolored shell fragments, and the lower 50 inches is light gray.

Included with this soil in mapping are small areas of Canaveral and Kesson soils. Also included are scattered areas of Captiva fine sand that is ponded and soils that are similar to Captiva soils but have more than 35 percent shell fragments larger than 2 millimeters between depths of 10 and 40 inches. Included soils make up about 5 to 10 percent of any mapped area.

In most years, under natural conditions, this soil has a water table within a depth of 10 inches for 1 to 2 months. The water table is at a depth of 10 to 40 inches for 10 months during most years. In some years, the soil is covered by standing water for several days.

The available water capacity is low. Permeability is very rapid.

Natural vegetation consists of cabbage palm, Brazilian pepper, sand cordgrass, leatherleaf fern, and waxmyrtle.

This soil is poorly suited to cultivated crops because of wetness and sandy texture. The number of adapted crops is limited unless very intensive management practices are followed. With good water control measures and soil improving measures, this soil can be made suitable for some vegetable crops. A water control system is needed to remove excess water in wet seasons and provide water through subsurface irrigation in dry seasons. Row crops should be rotated with close-growing, soil-improving crops. The rotation should include the soil-improving crops on the land three-fourths of the time. Seedbed preparation should include bedding of the rows. Fertilizer and lime should be added according to the need of the crops.

The soil is poorly suited to citrus. It is suitable for citrus only after a carefully designed water control system has been installed that will maintain the water table below a depth of 4 feet. The trees should be planted on beds and a vegetative cover maintained between the trees. Regular applications of fertilizer and lime are needed.

The soil is well suited to pasture. Pangolagrass, improved bahiagrass, and white clover grow well when they are well managed. Water control measures are needed to remove excess surface water after heavy rains. Regular applications of fertilizer and lime are needed, and grazing should be controlled to prevent overgrazing and weakening of the plants.

This soil has moderate potential productivity for pine trees, but only after a water control system is installed that will lower the water table. Equipment limitations, seedling mortality, and plant competition are the main management concerns. South Florida slash pine is the best tree to plant.

This soil has severe limitations for urban development because of the high water table.

This Captiva soil is in capability subclass IVw.

6—Hallandale fine sand. This is a nearly level, poorly drained soil on low, broad flatwoods areas. Slopes are smooth and range from 0 to 2 percent.

Typically, the surface layer is gray fine sand about 2 inches thick. The subsurface layer is light gray fine sand about 5 inches thick. The substratum is very pale brown fine sand about 5 inches thick. At a depth of 12 inches is fractured limestone bedrock that has solution holes extending to a depth of 25 inches. These solution holes contain mildly alkaline, loamy material.

Included with this soil in mapping are small areas of Boca soils and soils that have yellowish horizons or a brownish stain between the subsurface layer and limestone. Also included are scattered areas of rock outcrop, which are less than 1 acre, and soils that have hard calcareous material at a depth of less than 20 inches. Included soils generally make up about 5 to 10 percent of any mapped area.

In most years, under natural conditions, the water table is less than 10 inches below the surface for 1 to 3 months. It recedes below the limestone for about 7 months.

The available water capacity is low. Natural fertility is low. Permeability is moderate or moderately rapid.

Natural vegetation consists of sawpalmetto, pineland threeawn, bluestem, panicums, and South Florida slash pine.

This soil is poorly suited to cultivated crops because of wetness, shallow depth, and sandy texture. The number of adapted crops is limited unless good water control measures and soil improving measures are used. This soil can be made suitable for some vegetable crops by using a water control system that will remove excess water in wet seasons and provide water through subsurface irrigation in dry seasons. The presence of rock near the surface, however, makes construction of such a system difficult. Row crops should be rotated with close-growing, soil-improving crops. The rotation should include the soil-improving crops on the land three-fourths of the time. Seedbed preparation should include bedding of the rows. Fertilizer and lime should be added according to the need of the crops.

This soil is poorly suited to citrus. In those areas that are relatively free from freezing temperatures, it is suitable for citrus but only after a carefully designed water control system has been installed. The water control system should maintain the water table below a depth of 4 feet. The trees should be planted on beds and a vegetative cover maintained between the trees. Regular applications of fertilizer and lime are needed.

This soil is well suited to pasture. Pangolagrass, improved bahiagrass, and white clover grow well if they are well managed. Water control measures are needed to remove excess surface water after heavy rains. Regular applications of fertilizer and lime are needed, and grazing should be controlled to prevent overgrazing and weakening of the plants.

This soil has moderate potential productivity for slash pine. Equipment limitations, seedling mortality, windthrow hazard, and plant competition are the main management concerns.

This soil has moderate potential for desirable range plant production. The dominant forage is creeping bluestem, lopsided indiangrass, pineland threeawn, and chalky bluestem. Good management practices include deferred grazing and brush control. This Hallandale soil is in the South Florida Flatwoods range site.

This soil has severe limitations for urban uses because of shallowness to bedrock and wetness.

This Hallandale soil is in capability subclass IVw.

7—Matlacha-Urban land complex. This complex consists of nearly level Matlacha gravelly fine sand and areas of Urban land. The areas of the Matlacha soil and of Urban land are so intermingled that it was not practical to map them separately at the scale used for mapping. The mapped areas range from about 20 to 640 acres.

About 35 to 50 percent of each mapped area is Matlacha soil. About 20 to 30 percent is Urban land presently covered by houses and other buildings and by streets and other forms of pavement. There are canals in some of the areas.

Typically, the surface layer of the Matlacha soil is about 40 inches of light gray, gray, very pale brown, grayish brown, very dark grayish brown, and dark gray mixed gravelly fine sand and sandy material. The surface layer contains lenses of loamy sand and coated sandy fragments of a former subsoil and is about 25 percent coarse fragments of limestone and shell. Below the surface layer, to a depth of 80 inches or more, there is undisturbed fine sand. The upper 6 inches is dark gray and the rest is light gray with dark grayish brown stains and streaks along old root channels.

Included in mapping, and scattered throughout the survey area, are soils that are similar to the Matlacha soil, but they have heavy loamy material and soils that have boulders or are more than 35 percent shell or rock fragments larger than 3 inches. In addition, there are areas of similar soils that have a limestone ledge below the mixed fill material. Also included are areas of fill material that are less than 20 inches thick over undisturbed soils. The included soils make up about 10 to 15 percent of any mapped area.

The depth to the water table varies with the amount of fill material and the extent of artificial drainage. However, in most years, the water table is 24 to 36 inches below the surface of the fill material for 2 to 4 months. It is below a depth of 60 inches during extended dry periods.

The available water capacity is variable, but it is estimated to be low. Permeability is variable within short distances, but it is estimated to be moderately rapid or rapid in the fill material and rapid in the underlying material. Natural fertility is estimated to be low.

Most of the natural vegetation has been removed. The existing vegetation consists of scattered South Florida slash pine and various weeds.

Present land use precludes using this soil for agriculture. The soil is poorly suited to most plants unless topsoil is spread over the surface to form a suitable root zone.

The areas not presently covered by urban structures have moderate limitations for most kinds of building site development and severe limitations for sanitary facilities and recreational uses. The high water table and sandy surface are the major limitations. Unstable surface materials can severely limit shallow excavations, and the high water table severely limits dwellings with basements. In scattered areas, the fill material contains boulders or compacted sandy material that can interfere with the installation of underground utilities or the proper functioning of septic tank absorption fields.

This complex has not been assigned to a capability subclass.

8—Hallandale fine sand, tidal. This is a nearly level, poorly drained soil on the outer edges of tidal flats. Slopes are smooth to concave and range from 0 to 2 percent.

Typically, the surface layer is dark gray fine sand about 2 inches thick. The underlying layers are gray fine sand to a depth of 19 inches. Below is hard, fractured limestone bedrock with solution holes up to 26 inches deep that contain moderately alkaline loamy material.

Included with this soil in mapping are small areas of Rock outcrop. This inclusion makes up about 10 to 15 percent of any mapped area.

The water table fluctuates with the tide. This soil is subject to tidal flooding.

The available water capacity is low. Natural fertility is low. Permeability is moderately rapid.

Natural vegetation consists of seashore saltgrass, black mangrove, batis, and sea daisy.

This soil is not suitable for cultivated crops, pasture grasses, or woodland because of high salt content and tidal flooding.

This soil has moderate potential for range plant production. Saltwater marshes are on level sites where tidal flow of saltwater and brackish water have a significant effect on plant composition. When in good or excellent condition, the saltwater marsh is dominated by smooth cordgrass, marshhay cordgrass, seashore saltgrass, and other grasses and forbs. These grasses and forbs provide a high level of palatable forage for livestock grazing. Good grazing and burning management is required to maintain these sites in their most desirable condition. This Hallandale soil is in the Salt Water Marsh range site.

This soil has severe limitations for sanitary facilities, community development, and recreation even if areas are protected from tidal flooding. Mounding is needed for septic tank absorption fields.

This Hallandale soil is in capability subclass VIIIw.

9—EauGallie sand. This is a nearly level, poorly drained soil on flatwoods. Slopes are smooth to convex and less than 1 percent.

Typically, the surface layer is dark gray sand about 4 inches thick. The subsurface layer is sand that is gray in the upper 5 inches and light gray in the lower 13 inches. The subsoil and underlying material are sand, loamy sand, and sandy loam to a depth of 80 inches or more. The upper 5 inches is dark brown sand that is well coated with organic matter. The next 14 inches is dark brown loamy sand. The next 4 inches is pale brown loamy sand. The next 13 inches is light gray sand. The lower 22 inches is light gray sandy loam.

Included with this soil in mapping, and making up 10 to 15 percent of the map unit, are small areas of Malabar, Myakka, Oldsmar, and Wabasso soils.

In most years, under natural conditions, the water table is within 10 inches of the surface for 2 to 4 months. It is 10 to 40 inches below the surface for more than 6 months.

The available water capacity is very low in the surface and subsurface layers and medium in the subsoil.

Natural fertility is low. Permeability is rapid in the surface and subsurface layers and moderately slow or moderate in the subsoil.

A large part of the acreage is in natural vegetation: sawpalmetto, South Florida slash pine, chalky bluestem, pineland threeawn, and runner oak.

This soil is poorly suited to cultivated crops because of wetness and poor soil quality. The number of adapted crops is limited unless very intensive management practices are followed. With good water control measures and soil improving measures, this soil is well suited for some vegetable crops. A water control system is needed to remove excess water in wet seasons and provide water through subsurface irrigation in dry seasons. Row crops should be rotated with close-growing, soil-improving crops. The rotation should include the soil-improving crops on the land three-fourths of the time. Seedbed preparation should include bedding of the rows. Fertilizer and lime should be added according to the need of the crops.

This soil is poorly suited to citrus unless very intensive management is used. It is suitable for citrus only after a carefully designed water control system has been installed that will maintain the water table below a depth of 4 feet. The trees should be planted on beds and a vegetative cover maintained between the trees. Regular applications of fertilizer and lime are needed.

This soil is well suited to pasture. Pangolagrass, improved bahiagrass, and white clover grow well when they are well managed. Water control measures are needed to remove excess surface water after heavy rains. Regular applications of fertilizer and lime are needed. Controlling grazing will help to prevent overgrazing and weakening of the plants.

The soil has moderately high potential productivity for South Florida slash pine. Bedding of rows helps in establishing seedlings and in removing excess surface water.

This soil has moderate potential for desirable range plant production. The dominant forage is creeping bluestem, lopsided indiangrass, pineland threeawn, and chalky bluestem. Management practices should include deferred grazing and brush control. This EauGallie soil is in the South Florida Flatwoods range site.

The soil has severe limitations for most urban uses because of the high water table.

This EauGallie soil is in capability subclass IVw.

10—Pompano fine sand. This is a nearly level, poorly drained soil on sloughs. Slopes are smooth to concave and range from 0 to 1 percent.

Typically, the surface layer is dark gray fine sand about 4 inches thick. The underlying layers are light gray, very pale brown, or white fine sand and extend to a depth of 80 inches or more.

Included with this soil in mapping are small areas of Malabar, Anclote, and Valkaria soils. Also included are small areas of a soil that has limestone at a depth of 40 to 80 inches. The included soils make up about 10 to 15 percent of any mapped area.

In most years, under natural conditions, the water table is at a depth of less than 10 inches for 2 to 4 months and at a depth of 10 to 40 inches for about 6 months. It recedes to a depth of more than 40 inches for about 3 months. During periods of high rainfall, the soil is covered by slowly moving water for periods of about 7 to 30 days or more.

The available water capacity is very low. Natural fertility is low. Permeability is rapid.

Natural vegetation consists of pineland threeawn, scattered South Florida slash pine, bluestem, maidencane, and scattered sawpalmetto.

This soil is poorly suited to cultivated crops because of wetness and sandy texture. The kinds of crops that will grow on this soil are limited unless very intensive management practices are followed. With good water control measures and soil-improving measures, this soil can be made suitable for some vegetable crops. A water control system is needed to remove excess water in wet seasons and provide water through subsurface irrigation in dry seasons. Row crops should be rotated with close-growing, soil-improving crops. The rotation should keep the soil-improving crops on the land three-fourths of the time. Seedbed preparation should include bedding of the rows. Fertilizer and lime should be added according to the needs of the crops.

The soil is poorly suited to citrus. It is suitable for citrus only after a carefully designed water control system has been installed that will maintain the water table below a depth of 4 feet. The trees should be planted on beds and a vegetative cover maintained between the trees. Regular applications of fertilizer and lime are needed.

The soil is well suited to pasture. Pangolagrass, improved bahiagrasses, and white clover grow well when they are well managed. Water control measures are needed to remove excess surface water after heavy rains. Regular applications of fertilizer and lime are needed. Controlling grazing helps to prevent overgrazing and weakening of the plants.

The soil has moderately high potential productivity for South Florida slash pine.

This soil has high potential for desirable range plant production. The dominant forage consists of blue maidencane, chalky bluestem, and bluejoint panicum. Management practices should include deferred grazing. This Pompano soil is in the Slough range site.

The soil has severe limitations for urban and recreational uses because of the high water table.

This Pompano soil is in capability subclass IVw.

11—Myakka fine sand. This is a nearly level, poorly drained soil on broad flatwoods areas. Slopes are smooth to slightly concave and range from 0 to 2 percent.

Typically, the surface layer is very dark gray fine sand about 3 inches thick. The subsurface layer is fine sand about 23 inches thick. In the upper 3 inches it is gray, and in the lower 20 inches it is light gray. The subsoil is fine sand to a depth of 80 inches or more. The upper 4 inches is black and firm, the next 5 inches is dark reddish brown and friable, the next 17 inches is black and firm, the next 11 inches is dark reddish brown and friable, and the lower 17 inches is mixed black and dark reddish brown and friable.

Included with this soil in mapping are areas of EauGallie, Immokalee, Oldsmar, Smyran, and Wabasso soils. Also included are small areas of similar soils with subsoils low in organic matter content and less than 12 inches thick. Included soils make 10 to 15 percent of any mapped area.

In most years, under natural conditions, the water table is within 10 inches of the surface for 1 to 3 months and 10 to 40 inches below the surface for 2 to 6 months. It is more than 40 inches below the surface during extended dry periods.

The available water capacity is medium in the subsoil and very low in the surface and subsurface layers. Natural fertility is low. Permeability is rapid in the surface and subsurface layers and moderate to moderately rapid in the subsoil.

Natural vegetation consists of sawpalmetto, fetterbush, pineland threeawn, and South Florida slash pine.

This soil is poorly suited to cultivated crops because of wetness and poor soil quality. The number of adapted crops is limited unless very intensive management practices are followed. With good water control and soil improving measures, the soil can be made suitable for some vegetable crops. A water control system is needed to remove excess water in wet seasons and provide water through subsurface irrigation in dry seasons. Row crops should be rotated with close-growing, soil-improving crops. The rotation should keep the soil-improving crops on the land three-fourths of the time. Seedbed preparation should include bedding of the rows. Fertilizer and lime should be added according to the need of the crops.

This soil is poorly suited to citrus. Areas subject to frequent freezing in winter are not suitable. This soil is suitable for citrus only after a carefully designed water control system has been installed that will maintain the water table below a depth of 4 feet. The trees should be planted on beds and a vegetative cover maintained between the trees. Regular applications of fertilizer and lime are needed.

This soil is well suited to pasture. Pangolagrass, improved bahiagrass, and white clover grow well when they are well managed. Water control measures are needed to remove excess surface water after heavy rains. Regular applications of fertilizer and lime are needed. Controlling grazing helps to prevent overgrazing and weakening of the plants.

The soil has moderate potential productivity for South Florida slash pine. Bedding of rows helps in establishing seedlings and in removing excess surface water.

This soil has moderate potential for desirable range plant production. The dominant forage is creeping bluestem, lopsided indiangrass, pineland threeawn, and chalky bluestem. Management practices should include deferred grazing and brush control. This Myakka soil is in the South Florida Flatwoods range site.

The soil has severe limitations for urban development because of the high water table.

This Myakka soil is in capability subclass IVw.

12—Felda fine sand. This is a nearly level, poorly drained soil on broad, nearly level sloughs. Slopes are smooth to concave and range from 0 to 2 percent.

Typically, the surface layer is dark gray fine sand about 8 inches thick. The subsurface layer is light gray and light brownish gray fine sand about 14 inches thick. The subsoil is light gray loamy fine sand about 16 inches thick and is underlain by gray and light gray fine sand that extends to a depth of 80 inches or more.

Included with this soil in mapping are small areas of Boca, Malabar, Oldsmar, Pineda, and Wabasso soils. These inclusions rarely exceed 15 percent of any mapped area.

In most years, under natural conditions, this soil has a water table within 10 inches of the surface for 2 to 4 months. The water table is 10 to 40 inches below the surface for about 6 months. It is more than 40 inches below the surface for about 2 months. During periods of high rainfall, the soil is covered by a shallow layer of slowly moving water for periods of about 7 to 30 days or more.

The available water capacity is low in the surface and subsurface layers and medium in the subsoil. Natural fertility is low. Permeability is rapid in the surface and subsurface layers, moderate or moderately rapid in the subsoil, and rapid in the substratum.

Natural vegetation consists of cabbage palm, pineland threeawn, South Florida slash pine, waxmyrtle, and maidencane.

This soil is poorly suited to cultivated crops because of wetness. If a complete water control system is used, the soil is well suited to many fruit and vegetable crops. A complete water control system is one that removes excess water rapidly and provides a means of applying subsurface irrigation. Soil-improving crops are recommended. Seedbed preparation should include bedding. Fertilizer should be applied according to the needs of the crop.

With proper water control, the soil is well suited to citrus trees. A water control system that maintains good drainage to a depth of about 4 feet is needed. Bedding and planting the trees on the beds help provide good surface drainage. A good cover of close-growing vegetation is needed between the trees to protect the soil from blowing when the trees are young. The trees require regular applications of fertilizer and occasional liming.

This soil is well suited to pasture and hay. It is well suited to pangolagrass, bahiagrass, and clover. Excellent pastures of grass or of a grass-clover mixture can be grown with good management. Regular applications of fertilizer and controlled grazing are needed for highest yields.

The potential productivity for pine trees on this soil is moderately high. However, adequate water control is needed before the potential can be attained. Equipment limitations, seedling mortality, and plant competition are the main management concerns. South Florida slash pine is the best tree to plant.

This soil has high potential for range plant production. The dominant forage consists of blue maidencane, chalky bluestem, and bluejoint panicum. Management practices should include deferred grazing. This Felda soil is in the Slough range site.

This soil has severe limitations for urban uses because of the high water table.

This Felda soil is in capability subclass IIIw.

13—Boca fine sand. This is a nearly level, poorly drained soil on flatwoods. Slopes are smooth and range from 0 to 2 percent.

Typically, the surface layer is gray fine sand about 3 inches thick. The subsurface layer is fine sand about 22 inches thick. The upper 11 inches is light gray and the lower 11 inches is very pale brown. The subsoil, about 5 inches thick, is gray fine sandy loam with brownish yellow mottles and calcareous nodules. At a depth of 30 inches is a layer of fractured limestone.

Included with this soil in mapping are small areas of Hallandale, Wabasso, and Felda soils that have a yellowish horizon between the subsurface layer and subsoil. Also included are soils with limestone at a depth of 40 to 72 inches and small areas where the soil is better drained than is typical. Included soils make up about 15 percent of any mapped area.

In most years, under natural conditions, the water table is within 10 inches of the surface for 2 to 4 months. It recedes below the limestone for about 6 months.

The available water capacity is low in the surface and subsurface layers and medium in the subsoil. Natural fertility is low. Permeability is rapid in the surface and subsurface layers and moderate in the subsoil.

Natural vegetation consists of sawpalmetto, pineland threeawn, South Florida slash pine, and waxmyrtle.

This soil is poorly suited to cultivated crops because of wetness. If a complete water control system is installed and maintained, the soils are suitable for many fruit and vegetable crops. A complete water control system removes excess surface and internal water rapidly. It also provides a means of applying subsurface irrigation. Soil-improving crops are recommended. Other important management practices are good seedbed preparation, including bedding, and fertilizer applied according to the needs of the crop.

If this soil receives proper water control, it is well suited to citrus. Water control systems that maintain good drainage to a depth of about 4 feet are needed. Bedding and planting the trees on the beds help to provide good surface drainage. A good cover of close-growing vegetation between the trees helps to protect the soil from blowing in dry weather and from washing during rains. The trees require regular applications of fertilizer, but applications of lime are not needed.

The soil is well suited to improved pasture grasses. Bahiagrass and pangolagrass grow well if well managed. Water control measures are needed to remove excess surface water after heavy rains. Regular applications of fertilizer and lime are needed. Controlling grazing helps to prevent overgrazing and weakening of the plants.

The potential productivity for pine trees on this soil is high. However, water control is needed before the potential can be attained. Seedling mortality, equipment limitations, and plant competition are the main management concerns. South Florida slash pine is the best tree to plant.

This soil has moderate potential for range plant production. The dominant forage is creeping bluestem, lopsided indiangrass, pineland threeawn, and chalky bluestem. Management practices should include deferred grazing and brush control. This Boca soil is in the South Florida Flatwoods range site.

This soil has severe limitations for sanitary facilities, building site development, and recreational uses primarily because of the high water table.

This Boca soil is in capability subclass IIIw.

14—Valkaria fine sand. This is a nearly level, poorly drained soil on sloughs. Slopes are smooth to concave and range from 0 to 1 percent.

Typically, the surface layer is about 2 inches of dark grayish brown fine sand. The subsurface layer is 5 inches of very pale brown fine sand. The subsoil is loose fine sand to a depth of 80 inches or more. The upper 9 inches is yellow, the next 4 inches is brownish yellow, the next 6 inches is yellowish brown, and the lowermost 54 inches is pale yellow, yellow, brown, and very pale brown.

Included with this soil in mapping, and making up about 10 to 15 percent of the map unit, are small areas of Malabar, Pineda, and Pompano soils.

In most years, under natural conditions, the water table is at a depth of less than 10 inches for 1 to 3 months. It is at a depth of 10 to 40 inches for about 6 months and recedes to a depth of more than 40 inches for about 3 months. During periods of high rainfall, the soil is covered by slowly moving water for periods of about 7 to 30 days or more.

The available water capacity is low. Natural fertility is low. Permeability is rapid.

Natural vegetation consists of sparse sawpalmetto, South Florida slash pine, melaleuca, and maidencane.

This soil is poorly suited to cultivated crops because of wetness and sandy texture. The kinds of crops that can be grown on this soil are limited unless very extensive management practices are followed. With good water-control measures and soil-improving measures, the soil can be made suitable for some vegetable crops. A water control system is needed to remove excess water in wet seasons and provide water through subsurface irrigation in dry seasons. Row crops should be rotated with close-growing, soil-improving crops. The rotation should keep the soil-improving crops on the land three-fourths of the time. Seedbed preparation should include bedding of the rows. Fertilizer and lime should be added according to the need of the crops.

The soil is poorly suited to citrus. It is suitable for citrus only after a carefully designed water control system has been installed that will maintain the water table below a depth of 4 feet. The trees should be planted on beds and a vegetative cover maintained between the trees. Regular applications of fertilizer and lime are needed.

The soil is well suited to pasture. Pangolagrass, improved bahiagrass, and white clover grow well when they are well managed. Water control measures are needed to remove excess surface water after heavy rains. Regular applications of fertilizer and lime are needed. Controlling grazing helps to prevent overgrazing and weakening of the plants.

The soil has moderate potential productivity for South Florida slash pine. Equipment limitations, seedling mortality, and plant competition are major management concerns.

This soil has high potential for desirable range plant production. The dominant forage consists of blue maidencane, chalky bluestem, and bluejoint panicum. Management practices should include deferred grazing. This Valkaria soil is in the Slough range site.

The soil has severe limitations for urban development because of the high water table.

This Valkaria soil is in capability subclass IVw.

15—Estero muck. This is a nearly level, very poorly drained soil on broad tidal marsh areas. Slopes are smooth and range from 0 to 1 percent.

Typically, the surface layer is about 13 inches thick. The upper 5 inches is black muck, the next 3 inches is black fine sand, and the lower 5 inches is very dark gray fine sand. The subsurface layer is fine sand about 20 inches thick. The upper 6 inches is light brownish gray with few fine distinct yellowish red mottles. The lower 14 inches is grayish brown with few, medium, distinct yellowish red mottles. The subsoil is massive fine sand about 22 inches thick. The upper 6 inches is black and dark grayish brown, the next 4 inches is black and dark reddish brown, and the lowermost 12 inches is dark brown and black. Grayish brown fine sand with few fine distinct black mottles extends to a depth of 80 inches or more.

Included with this soil in mapping are small areas of Hallandale fine sand, tidal. Also included are soils that do not have a mucky surface layer.

The water table fluctuates with the tide. The soil is subject to tidal flooding.

The available water capacity is low. Natural fertility is low. Permeability is moderately rapid.

Natural vegetation consists of seashore saltgrass, batis, oxeye daisy, black mangrove, and scattered red mangrove.

This soil has moderate potential for range plant production. Saltwater marshes are on level sites where tidal flow of saltwater and brackish water have a significant effect on plant composition. When in good or excellent condition, the saltwater marsh is dominated by smooth cordgrass, marshhay cordgrass, seashore saltgrass, and numerous other grasses and forbs. These grasses and forbs provide high levels of palatable forage for livestock grazing. Good grazing and burning management are required to maintain these sites in their most desirable condition. This Estero soil is in the Salt Water Marsh range site.

This soil is not suitable for cultivated crops, pasture grasses, citrus, or woodland because of the flood hazard and high salt content.

This soil has severe limitations for urban and recreational uses because of the flood hazard, high water table, and high salt content.

This Estero soil is in capability subclass VIIIw.

16—Peckish mucky fine sand. This is a nearly level, very poorly drained soil on broad tidal swamp areas. Slopes are smooth and range from 0 to 1 percent.

Typically, the surface layer is mucky fine sand about 9 inches thick. The upper 4 inches is dark reddish brown, the next 2 inches is dark grayish brown, and the lower 3 inches is dark reddish brown. The subsurface layer is gray and light gray fine sand with light gray streaks in the upper part and light brownish gray and grayish brown mottles in the lower part. It is about 27 inches thick. The subsoil is fine sand about 12 inches thick. The upper 7 inches is dark grayish brown and very dark grayish brown, and the lower 5 inches is brown and dark brown with very dark grayish brown mottles. The substratum is pale brown fine sand with very dark grayish brown streaks to a depth of 61 inches or more.

Included with this soil in mapping are small areas of Hallandale, Boca, and Estero soils. Also included are soils with loamy material and limestone below a depth of 40 inches. Included soils make up about 10 to 15 percent of any mapped area.

The water table fluctuates with the tide. The soil is subject to tidal flooding.

The available water capacity is high in the surface layer and medium or low in the other layers. Natural fertility is low. Permeability is rapid.

Natural vegetation consists of black mangrove, American mangrove, and batis.

This soil is not suitable for cultivated crops, pasture grasses, citrus, or woodland. It has severe limitations for urban and recreational uses because of the flooding, high water table, and sandy textures.

This Peckish soil is in capability subclass VIIIw.

17—Daytona sand. This is a nearly level to gently sloping, moderately well drained soil on low ridges on the flatwoods. Slopes are smooth to convex and are 0 to 5 percent.

Typically, the surface layer is dark gray sand about 4 inches thick. The subsurface layers are light gray and white sand about 39 inches thick. The subsoil is sand to a depth of 80 inches or more. The upper 7 inches is mixed black and dark reddish brown, and the lower 30 inches is dark brown.

Included with this soil in mapping are small areas of Immokalee, Myakka, Orsino, and Pompano soils. Also included are similar soils with a combined surface and subsurface layer that is more than 51 inches thick. All included soils except the Orsino soils are in lower positions on the landscape. Included soils make up less than 15 percent of any mapped area.

In most years, under natural conditions, the water table is at a depth of 24 to 40 inches for about 1 to 4 months. It is at a depth of 40 to 60 inches for 8 months.

The available water capacity is very low, except in the subsoil where it is medium. Natural fertility is low. Permeability is very rapid in the surface layer and moderately rapid in the subsoil.

The natural vegetation consists of oaks, sawpalmetto, South Florida slash pine, and gallberry.

This soil is not suitable for cultivated field crops.

This soil has fair suitability for pasture. Grasses, such as pangolagrass and bahiagrass, make fair yields under good management.

The soil has moderate potential productivity for South Florida slash pine. Sand pine is better suited than other trees. Seedling mortality, mobility of equipment, and plant competition are the major management problems.

This soil has low potential for desirable range plant production. The vegetative community consists of a dense, woody understory that includes sawpalmetto, Florida rosemary, and scrub oak. Although this site is seldom grazed by livestock, it does furnish winter protection. This Daytona soil is in the Sand Pine Scrub range site.

The soil has severe limitations for sanitary facilities because of the high water table and rapid permeability. The high water table and sandy texture cause some limitations for building sites.

This Daytona soil is in capability subclass VIs.

18—Matlacha gravelly fine sand, limestone substratum. This is a nearly level, somewhat poorly drained soil that formed as a result of earthmoving operations in areas that are underlain by limestone bedrock. Slopes are smooth to slightly convex and range from 0 to 2 percent.

Typically, the surface layer is about 23 inches of pale brown, brownish yellow, light yellowish brown, and light gray mixed gravelly fine sand and sand material. The surface layer contains lenses of loamy sand and coated sandy fragments of a former subsoil and is about 25 percent coarse fragments of limestone and shell. Extending to a depth of 48 inches is undisturbed soil material. The upper 5 inches is dark gray fine sand, the next 16 inches is light gray fine sand, and the lowermost 4 inches is light brownish gray fine sandy loam. Fractured limestone bedrock is at a depth of 48 inches. Thickness of the fill material over the natural soil ranges from about 20 to 43 inches.

Included with this soil in mapping are areas of Hallandale and Boca soils and soils that do not have a limestone substratum. Also included are areas where rock fragments make up more than 35 percent of the fill material, areas where the fill material is finer textured, and areas where the fill material is less than 20 inches thick. Also included are areas of Wabasso, limestone substratum, soils. The included soils make up about 15 to 20 percent of any mapped area.

The depth to the water table varies with the amount of fill material and the extent of artificial drainage. However, in most years, the water table is at a depth of 18 to 30 inches for 2 to 4 months. It is below the limestone during extended dry periods.

The available water capacity is low. Permeability is variable, but it is estimated to be moderately rapid to rapid in the fill material and rapid in the upper part of the underlying material. It is moderately slow in lower horizons. Natural fertility is estimated to be low.

Most of the natural vegetation has been removed. The existing vegetation consists of South Florida slash pine and various scattered weeds.

This soil is poorly suited to most plants unless topsoil is spread over the surface to form a suitable root zone.

This soil has moderate limitations for most building site development and severe limitations for sanitary facilities and recreational uses. The high water table and sandy surface textures are the major limitations. The depth to the limestone is the major problem for some uses, such as underground utilities or septic tank installation. Unstable surface materials can severely limit shallow excavations, and the high water table severely limits dwellings with basements.

This soil is in capability subclass VIs.

19—Gator muck. This is a nearly level, very poorly drained organic soil in freshwater marshes. Slopes range from 0 to 1 percent.

Typically, the surface layer is black muck about 8 inches thick. The underlying organic material extends to a depth of 29 inches. The upper 13 inches is very dark grayish brown, well decomposed organic material. The next 8 inches is dark brown, well decomposed organic material. Mineral material extends to a depth of 80 inches. The upper 3 inches is very dark gray fine sand. The next 2 inches is light brownish gray fine sand. The next 5 inches is dark gray fine sandy loam with light gray sand intrusions. The next 24 inches is gray fine sandy loam with calcium carbonate streaks. The next 5 inches is light gray loam with shell fragments. The lowermost 12 inches is gray fine sand.

Included with this soil in mapping are Terra Ceia soils and similar soils in which the muck is less than 16 inches thick. Also included are small areas where the organic matter is less decomposed. Included soils make up about 15 percent of any mapped area.

In most years, under natural conditions, the soil is covered with water for 3 to 6 months. The water table is 10 to 24 inches below the surface during extended dry periods.

The available water capacity is high. Natural fertility is moderate. Permeability is rapid in the organic material and sandy layers and moderate to rapid in the mineral layers.

Natural vegetation consists of sawgrass, sand cordgrass, and waxmyrtle.

This soil is not suitable for cultivation unless drained. With adequate water control, it is well suited to most vegetable crops and sugar cane. A well designed and maintained water control system should remove excess water during times when crops are on the land and keep the soils saturated at all other times. Fertilizers that contain phosphorus, potassium, and minor elements are needed. The soil needs regular applications of lime. Water-tolerant cover crops should be on the soil when row crops are not being grown.

Most improved grasses and clovers adapted to the area grow well on this soil if water is properly controlled. Pangolagrass, bahiagrass, and white clover grow well. Water control that maintains the water table near the surface prevents excessive oxidation of the organic horizons. Fertilizers high in potassium, phosphorus, and minor elements are needed. Grazing should be controlled to permit maximum yields.

This soil is not suitable for citrus.

This soil has moderate potential for desirable range plant production. The dominant forage is maidencane and cutgrass. Because the depth to the water table fluctuates throughout the year, a natural deferment from cattle grazing occurs. Although this rest period increases forage production, the periods of high water may reduce the grazing value of the site. This Gator soil is in the Fresh Water Marshes and Ponds range site.

This soil is not suitable for pine trees. It has severe limitations for urban and recreational development because of ponding.

This Gator soil is in capability subclass VIIw.

20—Terra Ceia muck. This is a nearly level, very poorly drained organic soil on freshwater marsh areas. Slopes range from 0 to 1 percent.

Typically, the surface layer is black, well decomposed organic material about 8 inches thick. The underlying organic material extends to a depth of 53 inches. The upper 27 inches is black, well decomposed organic material. The next 18 inches is very dark grayish brown, well decomposed organic material. Mineral material extends to a depth of 80 inches or more. The upper 3 inches is black mucky fine sand. The next 3 inches is light brownish gray fine sand. The lower 21 inches is dark gray and gray fine sandy loam.

Included with this soil in mapping are Gator soils and areas of similar soils in which the organic material is less than 16 inches thick. Also included are small areas where the organic material is more than 80 inches thick. Included soils make up about 15 percent of any mapped area.

In most years, under natural conditions, the soil is covered with water for 3 to 6 months. The water table is 10 to 24 inches below the surface during extended dry periods.

The available water capacity is medium. Natural fertility is moderate. Permeability is rapid.

Natural vegetation consists of sawgrass, sand cordgrass, and waxmyrtle.

This soil is poorly suited to cultivated crops because of wetness. In its natural condition it is not suitable for cultivation, but with adequate water control it is well suited to most vegetable crops and sugar cane. A well designed and maintained water control system is needed. The water control system should remove excess water when crops are on the land and keep the soil saturated with water at all other times. Fertilizers that contain phosphates, potash, and minor elements are needed. This soil needs high applications of lime. Water-tolerant cover crops should be kept on the soil when it is not in use for row crops.

Most improved grasses and clovers adapted to the area grow well on this soil if water is properly controlled. High yields of pangolagrass, bahiagrass, and white clover can be grown. Water control that maintains the water table near the surface prevents excessive oxidation of the organic horizons. Fertilizers high in potash, phosphorus, and minor elements are needed. Grazing should be controlled to permit maximum yields.

This soil is not suitable for citrus.

This soil has moderate potential for desirable range plant production. The dominant forage is maidencane and cutgrass. Since the depth of the water table fluctuates throughout the year, a natural deferment from cattle grazing occurs. Although this rest period increases forage production, the periods of high water may reduce the grazing value of the site. This Terra Ceia soil is in the Fresh Water Marshes and Ponds range site.

This soil is not suitable for pine trees. It has severe limitations for urban development and recreational uses because of the ponding and high organic matter content.

This Terra Ceia soil is in capability subclass IIIw.

22—Beaches. Beaches consist of narrow strips of nearly level, mixed sand and shell fragments along the Gulf of Mexico. These areas are covered with saltwater at daily high tides. The areas are subject to movement by the wind and tide and are bare of vegetation in most places. The only vegetation is salt-tolerant plants.

Beaches are geographically associated with Canaveral soils.

Beaches are used intensively for recreation during the entire year. Homes, condominiums, beach cottages, and motels have been built on the fringes of beaches in many places.

23—Wulfert muck. This is a nearly level, very poorly drained soil on broad tidal swamps. Slopes are smooth and range from 0 to 1 percent.

Typically, the surface layer is muck that is dark reddish brown to a depth of 12 inches and dark brown to a depth of 36 inches. Beneath the muck is gray fine sand with light gray streaks and about 10 percent shell fragments.

Included with this soil in mapping, and making up about 15 percent of the map unit, are small areas of Kesson soils and soils similar to Wulfert soils but with limestone at a depth of 20 to 40 inches.

The water table fluctuates with the tide. Areas are subject to tidal flooding.

The available water capacity is high in the organic horizons and low in the horizons below. Natural fertility is medium. Permeability is rapid.

Natural vegetation consists of American mangrove, black mangrove, and needlegrass.

This soil has moderate potential for range plant production. Saltwater marshes are on level sites where tidal flow of saltwater and brackish water have a significant effect on plant composition. When in good or excellent condition, the saltwater marsh is dominated by smooth cordgrass, marshhay cordgrass, seashore saltgrass, and numerous other grasses and forbs. These grasses and forbs provide high levels of palatable forage for livestock grazing. Good grazing and burning management is required to maintain these sites in their most desirable condition. This Wulfert soil is in the Salt Water Marsh range site.

This soil has severe limitations for urban development and recreational uses. It is not suitable for cultivated crops, pasture grasses, citrus, or woodland. The flood hazard and high salt and sulfur content are limitations to these uses.

This soil is in capability subclass VIIIw.

24—Kesson fine sand. This is a nearly level, very poorly drained soil in broad tidal swamps. Areas are subject to tidal flooding. Slopes are smooth and range from 0 to 1 percent.

Typically, the surface layer is about 6 inches of sand that contains shell fragments. The underlying layers are fine sand that contains shell fragments, and they extend to a depth of 80 inches or more. The upper 4 inches is pale brown, the next 3 inches is light brownish gray, the next 25 inches is light gray with dark gray streaks, and the lower 42 inches is white.

Included with this soil in mapping are areas of Captiva and Wulfert soils and soils that have organic surface layers. Also included are soils that have loamy material throughout. Included soils make up about 10 to 15 percent of any mapped area.

The water table fluctuates with the tide.

The available water capacity is low. Natural fertility is low. Permeability is moderately rapid or rapid.

Natural vegetation consists of black mangrove, batis, oxeye daisy, and American mangrove.

This soil has severe limitations for urban development, and it is poorly suited for cultivated crops, pasture grasses, citrus, and woodland because of the flood hazard and high salt and sulfur content.

This Kesson soil is in capability subclass VIIIw.

25—St. Augustine sand, organic substratum-Urban land complex. This map unit consists of nearly level St. Augustine sand, organic substratum, and areas of Urban land. The areas of the St. Augustine soil and of Urban land are so intermingled that it was not practical to map them separately at the scale used for mapping. The mapped areas range from about 10 to 100 acres.

About 50 to 65 percent of each mapped area is St. Augustine sand, organic substratum, and about 20 to 35 percent is Urban land that is covered by houses and other buildings and streets and other forms of pavement. The remainder of the mapped area consists of canals.

The St. Augustine soil is in marshes and mangrove swamps. It consists of gray to pale brown sand, with about 25 percent multicolored shell fragments, overlying organic layers. Slopes are smooth to slightly convex and range from 0 to 2 percent.

St. Augustine sand, organic substratum, does not have an orderly sequence of soil layers in the fill material above the organic substratum. The layers are a variable mixture of sands and multicolored shell fragments. Thickness of the fill material ranges from about 26 to 68 inches. Typically, the material is about 51 inches of mixed dark gray, dark grayish brown, grayish brown, and gray sand and about 25 percent multicolored shell fragments. Below that, to a depth of 80 inches or more, there is dark reddish brown compressed muck.

Included in this complex are small areas of Kesson soils and areas where the fill material is less than 20 inches thick over the organic substratum. Also included are areas where the fill material is high in salt content or contains fragments of a former subsoil. In several included areas there are no buildings or other urban structures. Inclusions make up less than 15 percent of most mapped areas.

The depth to the water table varies with the amount of fill material and the extent of artificial drainage within any mapped area. However, in most years, the water table is 24 to 48 inches below the surface of the fill material for 2 to 4 months. It is below a depth of 48 inches during extended dry periods.

The available water capacity is low in the fill material and high in the underlying organic material. Permeability is estimated to be rapid. Natural fertility is low.

Most of the natural vegetation has been removed. There are scattered weeds in vacant lots. The soil is poorly suited to most plants unless topsoil is spread over the surface to make a suitable root zone.

The soil has severe limitations for most kinds of community development and related uses. The underlying organic material can cause subsidence problems. The rapid permeability and high water table could cause pollution of canals or ground water in areas with septic tank absorption fields.

This complex was not assigned to a capability subclass.

26—Pineda fine sand. This is a nearly level, poorly drained soil on sloughs. Slopes are smooth to slightly concave and range from 0 to 1 percent.

Typically, the surface layer is black fine sand about 1 inch thick. The subsurface layer is very pale brown fine sand about 4 inches thick. The upper part of the subsoil is brownish yellow fine sand about 8 inches thick. The next 10 inches is strong brown fine sand. The next 6 inches is yellowish brown fine sand. The next 7 inches is light gray fine sand with brownish yellow mottles. The lower part of the subsoil is light brownish gray fine sandy loam with light gray sandy intrusions about 18 inches thick. The substratum is light gray fine sand to a depth of 80 inches or more.

Included with this soil in mapping are small areas of Wabasso, Valkaria, Felda, Hallandale, Boca, and Malabar soils. Also included are small areas of Pineda soils that are in higher positions on the landscape. Small areas of Pineda, depressional, soils are also included. Some areas of this soil are underlain by limestone or shell fragments at a depth of 60 inches or more. In a few places, a thin layer of very friable calcareous material is at a depth of 10 to 30 inches, and in other places a thin dark brown or black layer occurs at the base of the subsurface layer. Included soils make up about 10 to 15 percent of any mapped area.

In most years, under natural conditions, the water table is within 10 inches of the surface for 2 to 4 months. It is 10 to 40 inches below the surface for more than 6 months, and it recedes to more than 40 inches below the surface during extended dry periods. During periods of high rainfall, the soil is covered by a shallow layer of slowly moving water for periods of about 7 to 30 days or more (fig. 4).

The available water capacity is very low in the surface and subsurface layers and in the upper, sandy part of the subsoil and medium in the lower, loamy part of the subsoil. Natural fertility is low. Permeability is rapid in the surface and subsurface layers and the upper, sandy part of the subsoil and slow or very slow in the lower, loamy part of the subsoil.

Natural vegetation consists of pineland threeawn, panicums, sedges, maidencane, waxmyrtle, South Florida slash pine, and scattered clumps of sawpalmetto.

This soil has poor suitability for cultivated crops because of wetness. With a complete water control system, it is fairly suited to many fruit and vegetable crops. A complete water control system removes excess water rapidly and provides a means of applying subsurface irrigation. Good soil management includes crop rotations that keep the soil in close-growing cover crops at least two-thirds of the time. Seedbed preparation should include bedding. Fertilizers should be applied according to the needs of the crop.

With proper water control, the soil has fair suitability for citrus trees. Water control systems that maintain good drainage to a depth of about 4 feet are needed. Bedding and planting the trees on the beds helps to provide good surface drainage. A good cover of close-growing vegetation between the trees protects the soils from blowing when the trees are young. The trees require regular applications of fertilizers and occasional liming.

This soil is well suited to pasture and hay crops with proper water control. It is well suited to pangolagrass, bahiagrasses, and clovers. Excellent pastures of grass or grass-clover mixtures can be grown with good management. Regular applications of fertilizer and controlled grazing help to produce highest yields.

The potential productivity for pine trees is moderately high. Seedling mortality, equipment limitations, and plant competition are the main management concerns. A water control system is needed to obtain the potential. South Florida slash pine is the best tree to plant.

This soil has high potential for desirable range plant production. The dominant forage consists of blue maidencane, chalky bluestem, and bluejoint panicum. Management practices should include deferred grazing. This Pineda soil is in the Slough range site.

This soil has severe limitations for urban development primarily because of the high water table.

This Pineda soil is in capability subclass IIIw.

27—Pompano fine sand, depressional. This is a nearly level, poorly drained soil in depressions (fig. 5). Slopes are concave and less than 1 percent.

Typically, the surface layer is gray fine sand about 3 inches thick. The substratum is fine sand to a depth of 80 inches or more. The upper 32 inches is light brownish gray with few, fine, faint yellowish brown mottles. The lower 45 inches is light gray.

Included with this soil in mapping, and making up 5 to 10 percent of the map unit, are small areas of Myakka, Anclote, Malabar, and Valkaria soils.

In most years, under natural conditions, the water table is within 10 inches of the surface for 2 to 4 months and stands above the surface for about 3 months. It is 10 to 40 inches below the surface for more than 5 months.

The available water capacity is low. Natural fertility is low. Permeability is rapid.

A large part of the acreage is in natural vegetation: St.-Johnswort and waxmyrtle.

This soil is not suited to cultivated crops, improved pasture, woodland, or citrus because of prolonged ponding.

This soil has moderate potential for desirable range plant production. The dominant forage is maidencane and cutgrass. Since the depth of the water table fluctuates throughout the year, a natural deferment from cattle grazing occurs. Although this rest period increases forage production, the periods of high water can reduce the grazing value of the site. This Pompano soil is in the Fresh Water Marshes and Ponds range site.

In its natural state, this soil has severe limitations for septic tank absorption fields, dwellings without basements, small commercial buildings, and local roads and streets.

This Pompano soil is in capability subclass VIIw.

28—Immokalee sand. This is a nearly level, poorly drained soil in flatwoods areas. Slopes are smooth to convex and range from 0 to 2 percent.

Figure 4.—An area of Pineda fine sand in a slough. During the rainy season, slowly moving water covers the surface in most undisturbed areas for about 7 to 30 days.

Typically, the surface layer is black sand about 4 inches thick. The subsurface layer is dark gray sand in the upper 5 inches and light gray sand in the lower 27 inches. The subsoil is sand to a depth of 69 inches. The upper 14 inches is black and firm, the next 5 inches is dark reddish brown, and the lower 14 inches is dark yellowish brown. The substratum is very pale brown sand to a depth of 80 inches or more.

Included with this soil in mapping are EauGallie, Myakka, Oldsmar, Smyrna, and Wabasso soils. Also included are small areas of soils with a subsoil that is low in organic matter content and less than 12 inches

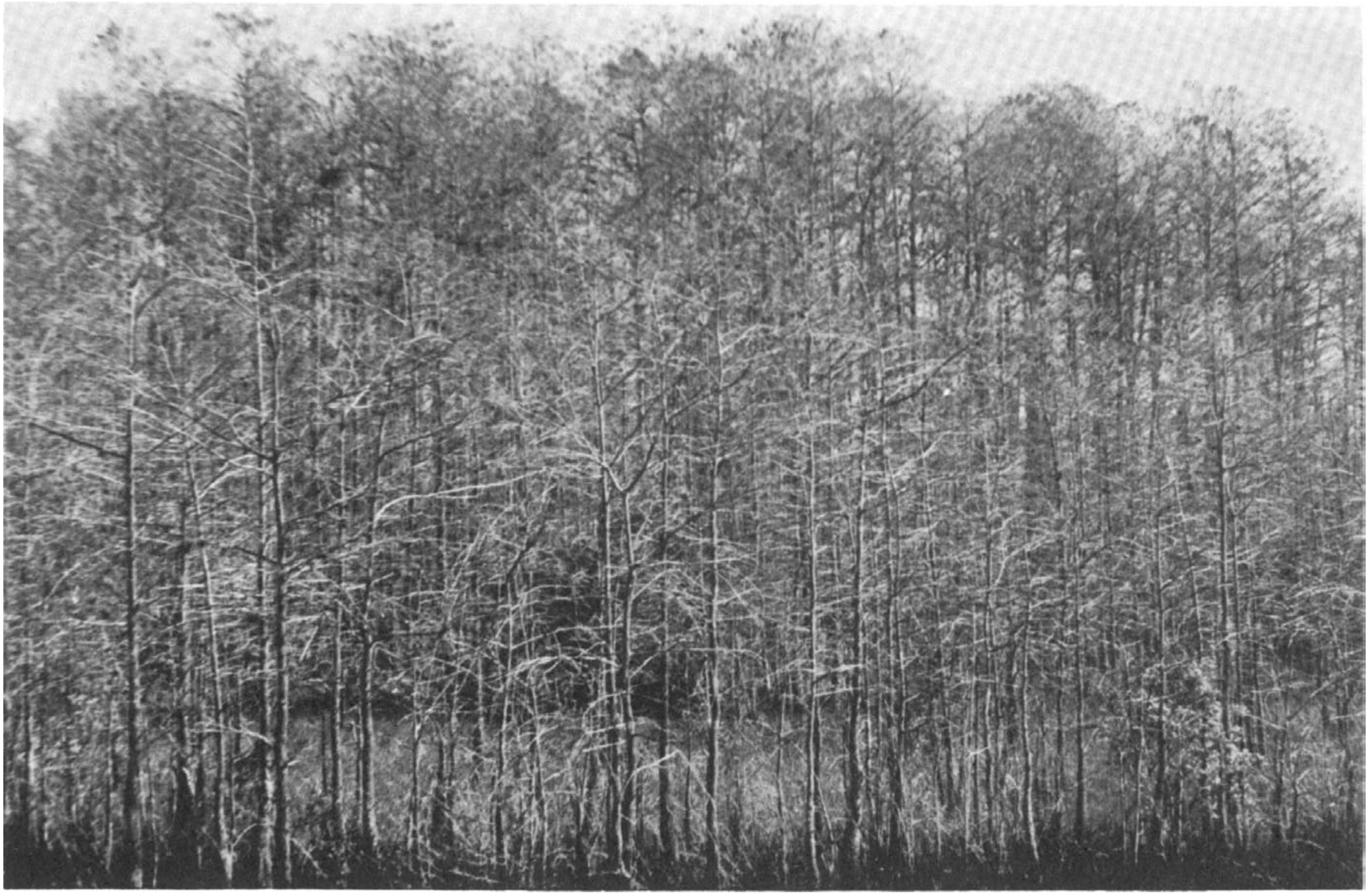


Figure 5.—Cypress swamp in an area of Pompano fine sand, depressional, during the dry spring months.

thick. Included soils make up less than 15 percent of any mapped area.

In most years, under natural conditions, the water table is within 10 inches of the surface for 1 to 3 months and 10 to 40 inches below the surface for 2 to 6 months. It recedes to a depth of more than 40 inches during extended dry periods.

The available water capacity is medium in the subsoil and very low in the surface and subsurface layers. Natural fertility is low. Permeability is rapid in the surface and subsurface layers and moderate or moderately rapid in the subsoil.

Natural vegetation consists of sawpalmetto, fetterbush, pineland threeawn, and South Florida slash pine.

This soil is poorly suited to cultivated crops because of wetness and poor soil quality. The number of adapted crops is limited unless very intensive management practices are followed. With good water control and soil-improving measures, this soil can be made suitable for some vegetable crops. A water control system is needed to remove excess water in wet seasons and provide water through subsurface irrigation in dry seasons. Row crops should be rotated with close-growing, soil-improving crops. The rotation should include the soil-improving crops on the land three-fourths of the time. Seedbed preparation should include bedding of the rows. Fertilizer and lime should be added according to the need of the crops.

This soil is poorly suited to citrus unless very intensive management is used. Areas subject to frequent freezing in winter are not suitable. This soil is suitable for citrus only after a carefully designed water control system has been installed that will maintain the water table below a depth of 4 feet.

This soil is well suited to pastures. Pangolagrass, improved bahiagrass, and white clover grow well when they are well managed. Water control measures are needed to remove excess surface water after heavy rains. Regular applications of fertilizer and lime are needed. Controlling grazing helps to prevent overgrazing and weakening of the plants.

The potential productivity is moderate for South Florida slash pine. Bedding of rows helps in establishing seedlings and in removing excess surface water. The trees should be planted on beds and a vegetative cover maintained between the trees. Regular applications of fertilizer and lime are needed.

This soil has moderate potential for desirable range plant production. The dominant forage is creeping bluestem, lopsided indiangrass, pineland threeawn, and chalky bluestem. Management practices should include deferred grazing and brush control. This Immokalee soil is in the South Florida Flatwoods range site.

This soil has severe limitations for urban development because of the high water table.

This Immokalee soil is in capability subclass IVw.

29—Punta fine sand. This is a nearly level, poorly drained soil that occurs on slightly elevated landscapes on flatwoods. Slopes are smooth and range from 1 to 2 percent.

Typically, the surface layer is dark gray fine sand about 4 inches thick. The subsurface layer is 53 inches thick. The upper part is light brownish gray fine sand about 7 inches thick, and the lower part is white fine sand about 46 inches thick. The subsoil is black fine sand with streaks of light gray and white fine sand extending into the upper part.

In most years, under natural conditions, the water table is within 10 inches of the surface for 1 to 3 months. It is 10 to 40 inches below the surface for 2 to 6 months. During extended dry periods the water table recedes to a depth of more than 40 inches.

Natural fertility is low. The available water capacity is low. Permeability is rapid in the surface and subsurface layers and moderate in the subsoil.

Included with this soil in mapping are Immokalee, Myakka, and Smyrna soils. Also included are small areas of soils with a subsoil layer that is firm to hard. This soil makes up less than 10 percent of any mapped area.

Most areas of this soil are in natural vegetation of sawpalmetto, South Florida slash pine, pineland threeawn, waxmyrtle, and some scrub oak. Some areas of this soil have been cleared for pasture.

The suitability for cultivated crops is poor because of wetness and high acidity. Very intense management practices must be followed to obtain good results for a limited number of adapted crops. With adequate water-control measures and soil-improving measures, these soils can be made suitable for some vegetable crops.

The suitability for pasture is good if proper management practices are applied. Pangolagrass, improved bahiagrass, and white clover grow well under well managed conditions. Water control is needed to remove excess surface water.

With proper water control, the soil is good for citrus trees. Water control systems that maintain good drainage to a depth of about 4 feet deep are needed. Bedding and planting the trees on the beds helps to provide good surface drainage. A good cover of close-growing vegetation between the trees protects the soils from blowing when the trees are young. The trees require regular applications of fertilizers and occasional liming.

The production potential for South Florida slash pine on this soil is moderate. However, adequate water control is needed before the potential can be attained. Equipment limitations, seedling mortality, and plant competition are the main management concerns.

This soil has moderate potential for desirable range plant production. The dominant forage is creeping bluestem, lopsided indiangrass, pineland threeawn, and chalky bluestem. Management practices should include deferred grazing and brush control. This Punta soil is in the South Florida Flatwoods range site.

This soil has severe limitations for urban development because of the high water table and sandy texture.

This Punta soil is in capability subclass IVw.

33—Oldsmar sand. This is a nearly level, poorly drained soil on low, broad flatwoods areas. Slopes are smooth to slightly convex and range from 0 to 2 percent.

Typically, the surface layer is black sand about 3 inches thick. The subsurface layer is gray and light gray sand about 39 inches thick. The upper part of the subsoil is very dark gray sand about 5 inches thick. The lower part of the subsoil is yellowish brown and mixed light brownish gray and brown fine sandy loam about 11 inches thick. Pale brown sand extends to a depth of 80 inches or more.

Included with this soil in mapping are small areas of Wabasso, Immokalee, and EauGallie soils. Some areas also have limestone at a depth of 70 to 80 inches below the surface. Included soils make up about 10 to 15 percent of any mapped area.

In most years, under natural conditions, the water table is at a depth of less than 10 inches for 1 to 3 months. It is at a depth of 10 to 40 inches for more than 6 months, and it recedes to a depth of more than 40 inches during extended dry periods.

The available water capacity is low in the surface layer and medium in the subsoil. Natural fertility is low. Permeability is rapid in the surface and subsurface layers, moderate in the upper part of the subsoil, and slow or very slow in the lower part of the subsoil.

Natural vegetation consists of sawpalmetto (fig. 6), South Florida slash pine, pineland threeawn, and meadowbeauty.

This soil is poorly suited to cultivated crops primarily because of wetness. The number of adapted crops is limited unless very intensive management practices are followed. With good water-control measures and soil-

Figure 6.—Dense sawpalmetto in an area of Oldsmar sand.

improving measures, the soil can be made well suited for some vegetable crops. A water control system is needed to remove excess water in wet seasons and provide water through subsurface irrigation in dry seasons. Row crops should be rotated with close-growing, soil-improving crops. The rotation should include the soil-improving crops on the land three-fourths of the time. Seedbed preparation should include bedding of the rows.

Fertilizer and lime should be added according to the need of the crops.

The soil is poorly suited to citrus unless very intensive management is used. It is suitable for citrus only after a carefully designed water control system has been installed that will maintain the water table below a depth of 4 feet. The trees should be planted on beds and a vegetative cover maintained between the trees. Regular applications of fertilizer and lime are needed.

The soil is well suited to pasture. Pangolagrass, improved bahiagrass, and white clover grow well when they are well managed. Water control measures are needed to remove excess surface water after heavy rains. Regular applications of fertilizer and lime are needed, and grazing should be controlled to prevent overgrazing and weakening of the plants.

This soil has a moderately high potential productivity for South Florida slash pine. Bedding of rows helps in establishing seedlings and in removing excess surface water.

This soil has moderate potential for desirable range plant production. The dominant forage is creeping bluestem, lopsided indiangrass, pineland threeawn, and chalky bluestem. Management practices should include deferred grazing and brush control. This Oldsmar soil is in the South Florida Flatwoods range site.

This soil has severe limitations for urban development because of the high water table.

This Oldsmar soil is in capability subclass IVw.

34—Malabar fine sand. This is a nearly level, poorly drained soil on sloughs. Slopes are smooth to concave and range from 0 to 1 percent.

Typically, the surface layer is dark gray fine sand about 5 inches thick. The next 12 inches is light gray and very pale brown fine sand. Below this is a 16-inch layer of light yellowish brown fine sand with yellow mottles and a 9-inch layer of brownish yellow fine sand. The subsoil layer is gray loamy fine sand about 9 inches thick with large yellowish brown mottles. The next 8 inches is gray fine sandy loam with large brownish yellow mottles. Below is light gray loamy fine sand with yellowish brown mottles to a depth of 80 inches or more. Some areas in the central-southeastern part of the county have limestone at a depth of 70 to 80 inches.

Included with this soil in mapping are small areas of Oldsmar, Pineda, Pompano, and Valkaria soils and scattered areas of Malabar soils with limestone at a depth of 60 to 80 inches. In addition, there are scattered areas on slightly higher positions that contain a thin marl layer at a depth of less than 40 inches. Included soils make up about 10 to 15 percent of any mapped area.

In most years, under natural conditions, the water table is at a depth of less than 10 inches for 2 to 4 months. It is at a depth of 10 to 40 inches for more than 6 months, and it recedes to a depth of more than 40 inches during extended dry periods. During periods of high rainfall, the soil is covered by a shallow layer of slowly moving water for periods of about 7 to 30 days or more.

The available water capacity is low in the surface and subsurface layers and the upper part of the subsoil and medium in the lower part of the subsoil. Natural fertility is low. Permeability is rapid in the surface and subsurface layers and the upper part of the subsoil and slow or very slow in the lower part of the subsoil.

Natural vegetation consists of pineland threeawn, waxmyrtle, scattered sawpalmetto, maidencane, panicums, and South Florida slash pine.

This soil is poorly suited to cultivated crops because of wetness and poor soil quality. The number of adapted crops is limited unless very intensive management practices are followed. With good water-control measures and soil-improving measures, the soil can be made well suited for some vegetable crops.

A water control system is needed to remove excess water in wet seasons and provide water through subsurface irrigation in dry seasons. Row crops should be rotated with close-growing, soil-improving crops. The rotation should include the soil-improving crops on the land three-fourths of the time. Seedbed preparation should include bedding of the rows. Fertilizer and lime should be added according to the need of the crops.

This soil is poorly suited to citrus unless very intensive management is used. It is suitable for citrus only after a carefully designed water control system has been installed that will maintain the water table below a depth of 4 feet. The trees should be planted on beds and a vegetative cover maintained between the trees. Regular applications of fertilizer and lime are needed.

This soil is well suited to pasture. Pangolagrass, improved bahiagrass, and white clover grow well if they are well managed. Water control measures are needed to remove excess surface water after heavy rains. Regular applications of fertilizer and lime are needed. Controlling grazing helps to prevent overgrazing and weakening of the plants.

Under a high level management, this soil has moderately high potential productivity for South Florida slash pine. Bedding of the rows is needed to elevate the seedlings above the surface water. Drainage is also needed to remove excess surface water.

This soil has moderate potential for desirable range plant production. The dominant forage is creeping bluestem, lopsided indiangrass, pineland threeawn, and chalky bluestem. Management practices should include deferred grazing and brush control. This Malabar soil is in the Slough range site.

This soil has severe limitations for urban development because of the high water table.

This Malabar soil is in capability subclass IVw.

35—Wabasso sand. This is a nearly level, poorly drained soil on flatwoods. Slopes are smooth to slightly convex and range from 0 to 2 percent.

Typically, the surface layer is dark gray sand about 6 inches thick. The subsurface layer is sand to a depth of 24 inches. The upper 11 inches is light brownish gray with dark grayish brown stains along root channels, and the lower 7 inches is light gray with dark grayish brown stains. The subsoil is about 38 inches thick. The upper 4 inches is dark brown sand with few iron concretions. The next 8 inches is brownish yellow sandy clay loam with light brownish gray, light gray, and reddish brown mottles. The lower 26 inches is light gray sandy clay loam with pale olive and olive mottles and stains along root channels. Below is light gray fine sandy loam with olive mottles extending to a depth of 80 inches or more.

Included with this soil in mapping are small areas of Boca, EauGallie, Hallandale, Felda, Myakka, and Oldsmar soils. Also included are soils, similar to this Wabasso soil, with a surface layer that is more than 8 inches thick. Included soils make up about 10 to 15 percent of any mapped area.

In most years, under natural conditions, the water table is less than 10 inches below the surface for 2 to 4 months. It is 10 to 40 inches below the surface for more than 6 months. It recedes to a depth of more than 40 inches during extended dry periods.

The available water capacity is low in the surface and subsurface layers and medium in the subsoil. Natural fertility is low. Permeability is rapid in the surface and subsurface layers, moderate in the upper part of the subsoil, and slow or very slow in the lower part of the subsoil.

Natural vegetation consists of sawpalmetto, South Florida slash pine, pineland threeawn, cabbage palm, and bluestem.

This soil is poorly suited to cultivated crops because of wetness. The number of adapted crops is very limited unless intensive water control measures are used. With a water control system that is designed to remove excess water in wet seasons and provide subsurface irrigation in dry seasons, the soil is well suited to many kinds of flower and vegetable crops. Good management, in addition to water control, includes crop rotation that keeps close-growing, soil-improving crops on the land at least two-thirds of the time. Fertilizer and lime should be added according to the need of the crop.

This soil is poorly suited to citrus trees because of wetness. With good drainage it is moderately suited to oranges and grapefruit. Drainage should be adequate to remove excess water from the soil rapidly to a depth of about 4 feet after heavy rains. The trees should be planted on beds. A cover of close-growing vegetation between the trees protects the soil from blowing when it is dry and from washing during heavy rains. The trees require regular applications of fertilizer and occasional applications of lime. Highest yields require irrigation through the water control system or by sprinklers in seasons of low rainfall.

This soil is well suited to pasture and hay. Pangolagrass, bahiagrass, and clover are well adapted and grow well if they are well managed. They require simple drainage to remove excess surface water in times of high rainfall. They also require regular use of fertilizers and lime. Carefully controlling grazing helps to maintain healthy plants for highest yields.

The potential productivity for South Florida slash pine is moderately high. Bedding of rows helps in establishing seedlings and in removing excess surface water.

This soil has moderate potential for desirable range plant production. The dominant forage is creeping bluestem, lopsided indiangrass, pineland threeawn, and chalky bluestem. Management practices should include deferred grazing and brush control. This Wabasso soil is in the South Florida Flatwoods range site.

This soil has severe limitations for urban development because of the high water table.

This Wabasso soil is in capability subclass IIIw.

36—Immokalee-Urban land complex. This map unit consists of nearly level Immokalee fine sand and areas of Urban land. The areas of the Immokalee soil and of Urban land are so intermingled that it was not practical to map them separately at the scale used for mapping.

About 55 to 75 percent of each mapped area consists of nearly level Immokalee soil or Immokalee soil that has been reworked or reshaped. Typically, the surface layer is very dark gray fine sand about 6 inches thick. The subsurface layer is light gray fine sand about 31 inches thick. The subsoil is fine sand about 33 inches thick. The upper 4 inches is black and friable, the next 6 inches is dark reddish brown, and the lower 23 inches is dark brown. The substratum is brown fine sand that extends to a depth of more than 80 inches.

About 15 to 50 percent of each mapped area is Urban land. Houses, streets, driveways, buildings, and parking lots cover the surface.

Areas that have been modified by grading and shaping are not as extensive in the older communities as in the newer ones. Most areas have drainage ditches that alter the depth to the seasonal high water table. In undrained areas, the water table is within 10 inches of the surface for 1 to 4 months in most years. It recedes to more than 40 inches below the surface during the dry seasons.

Myakka, Pompano, and Smyrna soils make up as much as 15 percent of the land not covered by urban facilities. In a few areas, Urban land makes up as much as 70 percent of the areas or as little as 10 percent.

Present land use precludes the use of this complex for cultivated crops, citrus, or improved pasture.

This complex was not assigned to a capability subclass.

37—Satellite fine sand. This is a nearly level, somewhat poorly drained soil on low knolls and ridges. Slopes are smooth to convex and range from 0 to 2 percent.

Typically, the surface layer is gray fine sand about 3 inches thick. The substratum extends to a depth of 80 inches or more and is white and light gray fine sand.

Included with this soil in mapping are small areas of Immokalee, Myakka, Daytona, and Pompano soils.

Included soils generally make up less than 15 percent of any mapped area.

In most years, under natural conditions, this soil has a water table at a depth of 18 to 40 inches for 2 to 6 months and at a depth of 40 to 72 inches for 6 months or more.

The available water capacity is very low. Natural fertility is low. Permeability is very rapid.

Natural vegetation consists of Florida rosemary, sand liveoak, sawpalmetto, South Florida slash pine, and pineland threeawn.

This soil is not suitable for most cultivated crops, but with intensive management a few specialty crops can be grown. The adapted crops are limited unless intensive management practices are followed.

The suitability for citrus is poor. Planting the trees on beds helps to lower the effective depth of the water table. Irrigation during periods of low rainfall helps to insure good yields.

The suitability for growing improved pasture grasses is fair. Bahiagrass and pangolagrass will grow if well managed. Regular applications of fertilizer and lime are needed, and grazing should be controlled to prevent overgrazing and weakening of the plants.

This soil has moderate potential productivity for pine trees. South Florida slash pine is the best tree to plant. Seedling mortality is the main management concern.

This soil has low potential for desirable range plant production. The vegetative community consists of a dense woody understory including sawpalmetto, Florida rosemary, and scrub oak. Although this site is seldom grazed by livestock, it does furnish winter protection. This Satellite soil is in the Sand Pine Scrub range site.

This soil has severe limitations for sanitary facilities, dwellings with and without basements, small commercial buildings, and recreational uses. Proper water control measures and surface stabilization are needed if the soil is used as recreational areas. Mounding is needed for septic tank absorption fields. The very rapid permeability can cause pollution of ground water in areas of septic tank absorption fields.

This Satellite soil is in capability subclass VIs.

38—Isles fine sand, slough. This is a nearly level, poorly drained soil on sloughs. Slopes are smooth to slightly concave and range from 0 to 1 percent.

Typically, the surface layer is very dark gray fine sand about 6 inches thick. The subsurface layer is fine sand to a depth of 33 inches. The upper 8 inches is light brownish gray, the next 8 inches is pale brown, and the lower 11 inches is very pale brown. The subsoil extends to a depth of 51 inches. The upper 4 inches is brown sandy clay loam with yellowish brown mottles. The lower 14 inches is fine sandy loam with yellowish brown mottles and pockets of sandy clay loam. Fractured limestone bedrock is at a depth of 51 inches.

Included with this soil in mapping, and making up about 15 to 20 percent of the map unit, are areas of Boca, Malabar, Oldsmar, Pineda, and Wabasso soils.

In most years, under natural conditions, the water table is within 10 inches of the surface for 1 to 3 months and 10 to 40 inches below the surface for about 9 months. During periods of high rainfall, the soil is covered by a shallow layer of slowly moving water for about 1 to 7 or more days. Many mapped areas of this soil in the Port Charlotte area have artificial drainage, which has altered the normal depth of the seasonal high water table and the movement of water on the surface.

The available water capacity is low in the surface and subsurface layers and medium in the subsoil. Natural fertility is low. Permeability is rapid in the surface and subsurface layers and moderate in the subsoil.

Natural vegetation consists of cabbage palm, water oak, and maidencane.

This soil is poorly suited to cultivated crops because of wetness. With a complete water control system, it is well suited to many fruit and vegetable crops. A complete water control system should remove excess water rapidly and provide a means of applying subsurface irrigation. Soil-improving crops are recommended. Seedbed preparation should include bedding. Fertilizers should be applied according to the needs of the crop.

With proper water control, the soil is well suited to citrus. Water control systems that maintain good drainage to a depth of about 4 feet are needed. Bedding and planting the trees on the beds helps to provide good surface drainage. A good cover of close-growing vegetation between the trees helps to protect the soil from blowing when the trees are young. The trees require regular applications of fertilizers and occasional liming.

This soil is well suited to pasture and hay crops. It is well suited to pangolagrass, bahiagrass, and clover. Excellent pastures of grass or grass-clover mixtures can be grown with good management. Regular applications of fertilizers and controlled grazing are needed for highest yields.

The potential productivity for pine trees is moderate. However, adequate water control is needed before the potential can be attained. Equipment limitations, seedling mortality, and plant competition are the main management concerns. South Florida slash pine is the best tree to plant.

This soil has high potential for desirable range plant production. The dominant forage consists of blue maidencane, chalky bluestem, and bluejoint panicum. Management practices should include deferred grazing. This Isles soil is in the Slough range site.

This soil has severe limitations for urban development because of the high water table.

This Isles soil is in capability subclass IVw.

39—Isles fine sand, depressional. This is a nearly level, very poorly drained soil in depressions. Slopes are smooth to concave and less than 1 percent.

Typically, the surface layer is very dark gray fine sand about 5 inches thick. The subsurface layer is about 5 inches of light gray fine sand. Next is 11 inches of very pale brown fine sand with yellowish brown mottles. The subsoil is 26 inches of gray fine sandy loam with brownish yellow mottles and pockets of light brownish gray loamy sand. Limestone bedrock is at a depth of 47 inches.

Included with this soil in mapping, and making up about 20 percent of the map unit, are small areas of Felda, Pineda, Pompano, and Malabar soils; soils similar to the Isles soil but with a loamy sand subsoil underlain by limestone at a depth of 40 to 72 inches; and soils similar to the Isles soil but with limestone at a depth of less than 40 inches.

In most years, under natural conditions, the water table is above the surface for 3 to 6 months. It is within a depth of 10 to 40 inches for 2 to 4 months. The water table recedes to a depth of more than 40 inches during extended dry periods.

The available water capacity is low. Permeability is rapid in the surface and subsurface layers and moderate in the subsoil. Natural fertility is low.

Natural vegetation consists of cabbage palm, cypress, fern, water oak, melaleuca, and popash.

This soil has moderate potential for desirable range plant production. The dominant forage is maidencane and cutgrass. Since the depth of the water table fluctuates throughout the year, a natural deferment from cattle grazing occurs. Although this rest period increases forage production, the periods of high water can reduce the grazing value of the site. This Isles soil is in the Fresh Water Marshes and Ponds range site.

Because of ponding, this soil has severe limitations for urban and recreational uses, and it is not suitable for crops, trees, or improved pasture. The suitability for crops or pasture is poor because of the lack of suitable drainage outlets. Areas of this soil provide excellent habitat for wading birds and other wetland wildlife.

This Isles soil is in capability subclass VIIw.

40—Anclote sand, depressional. This is a nearly level, very poorly drained soil in isolated depressions. Slopes are smooth to concave and less than 1 percent.

Typically, the surface layer is about 22 inches thick. The upper 8 inches is black sand, and the lower 14 inches is black sand with common light gray pockets and streaks throughout. The substratum is sand to a depth of 80 inches or more. The upper 18 inches is light brownish gray, and the lower 40 inches is light gray.

Included with this soil in mapping are small areas of Pompano and Floridana soils. Included soils make up about 10 to 15 percent of any mapped area.

In most years, under natural conditions, the soil is ponded for more than 6 months.

The available water capacity is medium in the surface layer and low in the substratum. Natural fertility is medium. Permeability is rapid.

A large part of the acreage is in natural vegetation consisting of cypress, leatherleaf fern, waxmyrtle, pickerelweed, and greenbrier.

In its natural state, this soil is not suitable for crops, trees, or improved pasture. The very low suitability for crops, pasture, and the severe limitations for urban and recreational development are due to the lack of suitable drainage outlets in most places, which makes an adequate drainage system difficult to establish. Areas of this soil provide excellent habitat for wading birds and other wetland wildlife.

This soil has moderate potential for desirable range plant production. The dominant forage is maidencane and cutgrass. Since the depth of the water table fluctuates throughout the year, a natural deferment from cattle grazing occurs. Although this rest period increases forage production, the periods of high water may reduce the grazing value of the site. This Anclote soil is in the Fresh Water Marshes and Ponds range site.

This Anclote soil is in capability subclass VIIw.

41—Valkaria fine sand, depressional. This is a nearly level, poorly drained soil in depressions. Slopes are concave and less than 1 percent.

Typically, the surface layer is dark gray fine sand about 1 inch thick. The subsurface layer is about 4 inches of light gray fine sand. The subsoil is fine sand about 33 inches thick. The upper 4 inches is brownish yellow, the next 16 inches is yellow, and the lower 13 inches is light yellowish brown. The substratum is pale brown fine sand with few fine faint brown mottles to a depth of 80 inches or more.

Included with this soil in mapping are small areas of Anclote, Malabar, and Pompano soils. Inclusions make up about 5 to 8 percent of each mapped area.

In most years, under natural conditions, the water table is within 10 inches of the surface for about 6 months, and the soil is ponded for about 3 months. The water table is 10 to 40 inches below the surface most of the rest of the year, except in extended dry periods.

The available water capacity is very low. Permeability is rapid. Natural fertility is very low.

Native vegetation consists of scrub willow, scattered cypress, and water-tolerant grasses.

This soil has moderate potential for desirable range plant production. The dominant forage is maidencane and cutgrass. Since the depth of the water table fluctuates throughout the year, a natural deferment from cattle grazing occurs. Although this rest period increases forage production, the periods of high water may reduce the grazing value of the site. This Valkaria soil is in the Fresh Water Marshes and Ponds range site.

Because of ponding, this soil has severe limitations for urban development and recreational uses, and it is not suitable for crops, trees, or improved pasture. It is not suitable for crops or pasture because of the lack of suitable drainage outlets in most places. This makes an adequate drainage system difficult to establish. Areas of this soil provide excellent habitat for wading birds and other wetland wildlife.

This Valkaria soil is in capability subclass VIIw.

42—Wabasso sand, limestone substratum. This is a nearly level, poorly drained soil on broad flatwoods. Slopes range from 0 to 2 percent.

Typically, the surface layer is black sand about 3 inches thick. The subsurface layer is sand about 16 inches thick. The upper 10 inches is gray, and the lower 6 inches is light gray. The subsoil is about 32 inches thick. The upper 2 inches is dark brown sand that is well coated with organic matter. The next 2 inches is dark reddish brown friable sand. The next 14 inches is brown loose sand with dark brown streaks along root channels. The lower 14 inches is light brownish gray, firm fine sandy loam with light olive brown mottles. A hard, fractured limestone ledge and boulders are at a depth of 51 inches.

Included with this soil in mapping are small areas of Boca, Myakka, Oldsmar, and Wabasso soils on similar landscape positions. Also included are similar soils with limestone at a depth of less than 40 inches or at a depth of more than 60 inches. In addition there are similar soils that have iron-cemented sandstone in the subsoil. Included soils make up about 15 percent of any mapped area.

In most years, under natural conditions, the water table is within 10 inches of the surface for 1 to 3 months. It is 10 to 40 inches below the surface for 2 to 4 months. It is below the limestone during extended dry periods.

The available water capacity is low in the surface and subsurface layers and the upper part of the subsoil and medium in the lower part of the subsoil. Natural fertility is low. Permeability is rapid in the surface and subsurface layers and the upper part of the subsoil. It is slow in the lower part of the subsoil.

Natural vegetation consists of sawpalmetto, South Florida slash pine, dwarf huckleberry, cabbage palm, gallberry, and pineland threeawn.

This soil is poorly suited to cultivated crops because of wetness. The number of adapted crops is very limited unless intensive water control measures are used. With a water control system that is designed to remove excess water in wet seasons and provide subsurface irrigation in dry seasons, these soils are well suited to many kinds of flower and vegetable crops. Good management, in addition to water control, includes crop rotation that keeps close-growing, soil-improving crops on the land at least two-thirds of the time. Fertilizer and lime should be added according to the need of the crop.

This soil is poorly suited to citrus trees because of wetness. With good drainage it is moderately suited to oranges and grapefruit. Drainage should be adequate to remove excess water from the soil rapidly to a depth of about 4 feet after heavy rains. The trees should be planted on beds. A cover of close-growing vegetation between the trees is needed to protect the soil from blowing when it is dry and from washing during heavy rains. The trees require regular applications of fertilizer and occasional applications of lime. Highest yields require irrigation through the water control system or by sprinklers in seasons of low rainfall.

This soil is well suited to pasture and hay. Pangolagrass, bahiagrass, and clover are well adapted and grow well if they are well managed. They require simple drainage to remove excess surface water in times of high rainfall. They also require regular use of fertilizers and lime. Grazing should be carefully controlled to maintain healthy plants for highest yields.

The potential productivity is moderately high for South Florida slash pine. Bedding of rows helps in establishing seedlings and in removing excess surface water.

This soil has moderate potential for desirable range plant production. The dominant forage is creeping bluestem, lopsided indiangrass, pineland threeawn, and chalky bluestem. Management practices should include deferred grazing and brush control. This Wabasso soil is in the South Florida Flatwoods range site.

This soil has severe limitations for urban development because of the high water table.

This Wabasso soil is in capability subclass IIIw.

43—Smyrna fine sand. This is a nearly level, poorly drained soil on flatwoods. Slopes are smooth to slightly concave and range from 0 to 2 percent.

Typically, the surface layer is black fine sand about 4 inches thick. The subsurface layer is light gray fine sand about 9 inches thick. The subsoil is fine sand about 9 inches thick. The upper 2 inches is very dark grayish brown, the next 3 inches is dark brown, and the lower 4 inches is mixed dark brown and brown. Below the subsoil, mottled light gray, pale brown, and white fine sand extends to a depth of 80 inches or more.

Included with this soil in mapping, and making up about 15 percent of any mapped area, are EauGallie, Immokalee, Myakka, and Oldsmar soils. Also included are soils that differ from the Smyrna soil by having a thin loamy sand horizon in the substratum.

In most years, under natural conditions, the water table is within 10 inches of the surface for 1 to 3 months. It is 10 to 40 inches below the surface for 2 to 6 months. It recedes to a depth of more than 40 inches during extended dry periods.

The available water capacity is very low in the surface and subsurface layers and medium in the subsoil.

Natural fertility is low. Permeability is rapid in the surface and subsurface layers and moderate to moderately rapid in the subsoil.

Natural vegetation consists of sawpalmetto, South Florida slash pine, waxmyrtle, inkberry, dwarf huckleberry, and pineland threeawn.

This soil is poorly suited to cultivated crops because of wetness and poor soil quality. The number of adapted crops is limited unless very intensive management practices are followed. With good water-control and soil-improving measures, the soil can be made suitable for some vegetable crops. A water control system is needed to remove excess water in wet seasons and provide water through subsurface irrigation in dry seasons. Row crops should be rotated with close-growing, soil-improving crops. The rotation should keep the soil-improving crops on the land three-fourths of the time. Seedbed preparation should include bedding of the rows. Fertilizer and lime should be added according to the need of the crops.

This soil is poorly suited to citrus unless very intensive management is used. Areas subject to frequent freezing in winter are not suitable. These soils are suitable for citrus only after a carefully designed water control system has been installed that will maintain the water table below 4 feet. The trees should be planted on beds and a vegetative cover maintained between the trees. Regular applications of fertilizers and lime are needed.

This soil is well suited to pasture. Pangolagrass, improved bahiagrass, and white clover grow well if they are well managed. Water-control measures are needed to remove excess surface water after heavy rains. Regular applications of fertilizer and lime are needed, and grazing should be controlled to prevent overgrazing and weakening of the plants.

The soil has moderately high potential productivity for South Florida slash pine. Bedding of rows helps in establishing seedlings and in removing excess surface water.

This soil has moderate potential for desirable range plant production. The dominant forage is creeping bluestem, lopsided indiangrass, pineland threeawn, and chalky bluestem. Management practices should include deferred grazing and brush control. This Smyrna soil is in the South Florida Flatwoods range site.

The soil has severe limitations for urban development because of the high water table.

This Smyrna soil is in capability subclass IVw.

44—Malabar fine sand, depressional. This is a nearly level, poorly drained soil in depressions. Slopes are concave and are less than 1 percent.

Typically, the surface layer is 4 inches thick. The upper 1 inch is black fine sand that is high in organic matter content. The lower 3 inches is dark gray fine sand. The subsurface layer is sand to a depth of 44 inches. The upper 3 inches is very pale brown. The next 11 inches is yellow, iron-coated sand grains. The next 10 inches is very pale brown with common coatings of iron on the sand grains. The lower 16 inches is light gray. The subsoil is 23 inches of olive gray sandy loam with dark bluish gray mottles. Sandy loam with marl and shell fragments underlies the subsoil.

Included with this soil in mapping are small areas of Felda, Pineda, Pompano, and Valkaria soils. Also included are small areas of similar soils with limestone at a depth of more than 60 inches. Included soils make up about 10 to 15 percent of any mapped area.

In most years, under natural conditions, the soil is ponded for about 4 to 6 months or more. The water table is 10 to 40 inches below the surface for 4 to 6 months.

The available water capacity is low in the surface and subsurface layers and medium in the subsoil. Natural fertility is low. Permeability is rapid in the surface and subsurface layers and slow or very slow in the subsoil.

Natural vegetation consists of baldcypress, waxmyrtle, St.-Johnswort, and water-tolerant grasses.

This soil has moderate potential for desirable range plant production. The dominant forage is maidencane and cutgrass. Since the depth of the water table fluctuates throughout the year, a natural deferment from cattle grazing occurs. Although this rest period increases forage production, the periods of high water may reduce the grazing value of the site. This Malabar soil is in the Fresh Water Marshes and Ponds range site.

This soil is not suited to cultivated crops, improved pasture, or citrus, and it has severe limitations for urban and recreational uses because of prolonged ponding.

This Malabar soil is in capability subclass VIIw.

45—Copeland sandy loam, depressional. This is a low, nearly level, very poorly drained soil in depressions. Slopes are concave and less than 1 percent.

Typically, the surface layer is about 8 inches of very dark gray sandy loam. The subsoil is very dark gray sandy loam about 12 inches thick. It is underlain by 8 inches of light brownish gray sandy clay loam with soft calcium carbonate throughout. Fractured limestone bedrock is at a depth of 28 inches.

Included with this soil in mapping are small areas of Chobee, Anclote, Boca, Felda, Floridana, and Pompano soils. In addition, soils similar to Copeland soils but with a mixture of fine sand and shell fragments to a depth of 60 inches or more are included. Areas with limestone at a depth of more than 40 inches are also included. Included soils generally make up less than 15 percent of any mapped area.

Under natural conditions, the water table is above the surface for 3 to 6 months. It is 10 to 40 inches below the surface for about 3 to 6 months.

The available water capacity is medium. Natural fertility is medium. Permeability is rapid in the surface layer and moderate in the subsoil.

Natural vegetation is cypress, waxmyrtle, cabbage palm, fern, redroot, and other water-tolerant plants.

This soil has moderate potential for desirable range plant production. The dominant forage is maidencane and cutgrass. The depth to the water table fluctuates throughout the year. A high water table naturally defers grazing. Although this rest period increases forage production, the periods of high water levels may reduce the grazing value of the site. This Copeland soil is in the Fresh Water Marshes and Ponds range site.

In its natural state, this soil is not suitable for crops, trees, or improved pasture. The suitability for crops or pasture is poor because of the lack of suitable drainage outlets in most places, which makes an adequate drainage system difficult to establish. Areas of this soil provide excellent habitat for wading birds and other wetland wildlife.

This soil has severe limitations for urban development because of the high water table.

This Copeland soil is in capability subclass VIIw.

48—St. Augustine sand. This is a nearly level, somewhat poorly drained soil that was formed by earthmoving operations. Most areas are former sloughs and depressions or other low areas that have been filled with sandy material. Slopes are smooth to slightly convex and range from 0 to 2 percent.

This soil has no definite horizonation because of mixing during reworking of the fill material. Typically, the upper 30 inches consists of mixed very dark grayish brown, very dark gray, dark gray, and gray sand with a few lenses of silt loam; it is about 20 percent multicolored shell fragments less than 3 inches in diameter. Below this to a depth of 80 inches or more there is undisturbed fine sand. The upper 10 inches is dark grayish brown with about 15 percent multicolored shell fragments. The lower 40 inches is light gray with about 30 percent multicolored shell fragments.

Included with this soil in mapping are areas where the fill material is underlain by organic soils and other areas where the fill material is less than 20 inches thick. Also included are areas that contain lenses or pockets of organic material throughout the fill. In addition, there are small scattered areas where the fill material is more than 35 percent shells or shell fragments. Several areas with some urban development have been included.

The depth to the water table varies with the amount of fill material and the extent of artificial drainage. However, in most years, the water table is 24 to 36 inches below the surface of the fill material for 2 to 4 months. It is below a depth of 60 inches during extended dry periods.

The available water capacity is low. Permeability is estimated to be rapid. Natural fertility is low.

Most of the natural vegetation has been removed. The present vegetation consists of cabbage palm and various scattered weeds.

This soil is poorly suited to most plants unless topsoil is spread over the surface to make a suitable root zone.

This soil has severe limitations for most urban and recreational uses. The sandy nature of the fill material, the high water table, and rapid permeability can cause pollution of ground water in areas with septic tank absorption fields.

This St. Augustine soil is in capability subclass VIIs.

49—Felda fine sand, depressional. This is a nearly level, poorly drained soil in depressions. Slopes are concave and less than 1 percent.

Typically, the surface layer is gray fine sand about 4 inches thick. The subsurface layers extend to a depth of 35 inches. The upper 13 inches is grayish brown fine sand and the lower 18 inches is light gray fine sand with yellowish brown mottles. The subsoil is about 17 inches thick. The upper 6 inches is gray sandy loam and the lower 11 inches is sandy clay loam with many yellowish brown and strong brown mottles. Below this is light gray fine sand to a depth of 80 inches or more.

Included with this soil in mapping are small areas of Anclote, Boca, Malabar, Pineda, Pompano, Winder, and Floridana soils. Included soils make up about 10 to 15 percent of any mapped area.

In most years, under natural conditions, the soil is ponded for about 3 to 6 months or more. The water table is within a depth of 10 to 40 inches for 4 to 6 months.

The available water capacity is low in the surface and subsurface layers and medium in the subsoil. Natural fertility is low. Permeability is rapid in the surface and subsurface layers and moderate or moderately rapid in the subsoil.

Natural vegetation consists of baldcypress, waxmyrtle, and water-tolerant grasses and weeds.

This soil has moderate potential for desirable range plant production. The dominant forage is maidencane and cutgrass. The fluctuating water table naturally defers grazing when it is high or ponded. Although this rest period increases forage production, the periods of high water may reduce the grazing value of the site. This Felda soil is in the Fresh Water Marshes and Ponds range site.

This soil is not suited to cultivated crops, improved pasture, or citrus because of prolonged ponding.

This soil has severe limitations for urban and recreational uses because of prolonged ponding.

This Felda soil is in capability subclass VIIw.

50—Oldsmar fine sand, limestone substratum. This is a nearly level, poorly drained soil in the flatwoods. Slopes are smooth to slightly convex and range from 0 to 2 percent.

Typically, the surface layer is dark gray fine sand about 8 inches thick. The subsurface layer is fine sand to a depth of 34 inches. The upper 14 inches is light brownish gray, and the lower 12 inches is white with grayish brown stains along root channels. The subsoil is about 26 inches thick. The upper 8 inches is dark reddish brown fine sand. The next 7 inches is dark brown fine sand with dark reddish brown fragments. The lower 11 inches is olive sandy clay loam with olive mottles and olive, black, and grayish stains along root channels. Hard, fractured limestone is at a depth of 60 inches.

Included with this soil in mapping are small areas of Wabasso, Oldsmar, and Immokalee soils. Also included are soils similar to this Oldsmar soil but with limestone at a depth of 40 to 60 inches. Included soils make up about 10 to 15 percent of any mapped area.

In most years, under natural conditions, the water table is within 10 inches of the surface for 2 to 4 months and 10 to 40 inches below the surface for more than 6 months. It recedes to more than 40 inches below the surface during extended dry periods.

The available capacity is low in the surface and subsurface layers and medium in the subsoil. Natural fertility is low. Permeability is rapid in the surface and subsurface layers, moderately slow in the upper part of the subsoil, and slow or very slow in the lower part of the subsoil.

In uncleared areas, the natural vegetation consists of sawpalmetto, South Florida slash pine, inkberry, and pineland threeawn.

This soil has moderately high potential productivity for South Florida slash pine. Bedding of rows helps in establishing seedlings and removing excess water.

This soil has high potential for desirable range plant production. The dominant forage is creeping bluestem, chalky bluestem, and blue maidencane. Management practices should include deferred grazing and brush control. This Oldsmar soil is in the Cabbage Palm Flatwoods range site.

This soil has severe limitations for urban development because of the high water table.

This Oldsmar soil is in capability subclass IVw.

51—Floridana sand, depressional. This is a nearly level, very poorly drained soil in depressions. Slopes are concave and less than 1 percent.

Typically, the surface layer is black sand about 22 inches thick. The subsurface layer is light brownish gray sand about 17 inches thick. The subsoil is olive gray fine sandy loam to a depth of 54 inches. Below the subsoil there is light brownish gray sand with pockets of olive gray loamy sand.

Included with this soil in mapping are small areas of Anclote, Felda, and Winder soils. Also included are soils similar to the Floridana soil but with a black surface layer thicker than 24 inches or with the upper boundary of the subsoil below a depth of 40 inches. Included soils make up about 10 to 15 percent of any mapped area.

In most years, under natural conditions, the water table is above the surface for 3 to 6 months. It is 10 to 40 inches below the surface during extended dry periods.

The available capacity is medium in the surface layer and subsoil and low in the subsurface layer. Natural fertility is medium. Permeability is rapid in the surface and subsurface layers and slow or very slow in the subsoil.

Natural vegetation is St.-Johnswort, pickerelweed, cypress, sedges, weeds, and other water tolerant plants.

This soil has moderate potential for desirable range plant production. The dominant forage is maidencane and cutgrass. Since the depth of the water table fluctuates throughout the year, a natural deferment from cattle grazing occurs. Although this rest period increases forage production, the periods of high water levels may reduce the grazing value of the site. This Floridana soil is in the Fresh Water Marshes and Ponds range site.

This soil is not suited to cultivated crops, improved pasture, or citrus because of prolonged ponding.

The soil has severe limitations for urban and recreational uses because of prolonged ponding.

This Floridana soil is in capability subclass VIIw.

53—Myakka fine sand, depressional. This is a nearly level, poorly drained soil in depressions. Slopes are smooth to concave and are less than 1 percent.

Typically, the surface layer is black fine sand about 3 inches thick. The subsurface layer is fine sand about 26 inches thick. The upper 4 inches is light gray, and the lower 22 inches is light brownish gray. The subsoil is fine sand about 17 inches thick. The upper 6 inches is dark brown with grayish brown streaks, and the sand grains are well coated with organic matter. The lower 11 inches is very dark brown with many well coated sand grains. Below this, extending to a depth of 80 inches or more, is brown fine sand.

Included with this soil in mapping are small areas of Anclote, Floridana, Immokalee, Oldsmar, Pompano, Valkaria, and Wabasso soils. Also included are areas of soils that are similar to Myakka soils but that have weakly expressed sandy subsoil horizons within 51 inches of the surface or that have a black surface layer more than 10 inches thick. Included soils make up about 10 percent of any mapped area.

In most years, under natural conditions, the soil is ponded for about 3 to 6 months. The water table is 10 to 40 inches below the surface for about 3 to 6 months.

The available water capacity is very low in the surface and subsurface layers and medium in the subsoil. Natural fertility is low. Permeability is rapid in the surface and subsurface layers and moderate to moderately rapid in the subsoil.

Natural vegetation consists of scattered cypress, melaleuca, St.-Johnswort, sedges, maidencane, sand cordgrass, and waxmyrtle.

This soil has moderate potential for range. The dominant forage plants are maidencane and cutgrass. Since the depth of the water table fluctuates, areas of this soil cannot be grazed during part of the year. Although this rest period increases forage production, the periods of high water can reduce the grazing value of the site. This Myakka soil is in the Fresh Water Marshes and Ponds range site.

Because of ponding, this soil is not suitable for crops, trees, or improved pasture, and it has severe limitations for urban and recreational uses. The soil lacks suitable drainage outlets in most places, which makes an adequate drainage system difficult to establish. Areas of this soil provide excellent habitat for wading birds and wetland wildlife.

This Myakka soil is in capability subclass VIIw.

55—Cocoa fine sand. This is a nearly level to gently sloping, moderately well drained soil on ridges. Slopes are smooth to slightly convex and range from 0 to 2 percent.

Typically, the surface layer is brown fine sand about 3 inches thick. The subsurface layer is reddish yellow fine sand about 10 inches thick. The next layer is yellowish red fine sand about 4 inches thick. The next 10 inches is reddish yellow fine sand, and below this is 4 inches of strong brown fine sand. Fractured limestone bedrock is at a depth of 31 inches.

Included with this soil in mapping are small areas of Boca and Hallandale soils and soils that are similar to Cocoa soils but that have a loamy subsoil below a depth of 40 inches. Also included are small areas of soils that are similar but that have a loamy subsoil and limestone within 40 inches of the surface and sandy soils that do not have a clay increase and have limestone at a depth of 10 to 40 inches. Included soils make up about 15 percent of any mapped area.

In most years, under natural conditions, the water table is within 24 inches of the surface for 1 to 2 months and 24 to 40 inches below the surface for 1 to 2 months. It recedes to more than 40 inches below the surface during extended dry periods.

The available water capacity is low. Natural fertility is low. Permeability is rapid.

Natural vegetation consists of bluejack oak, South Florida slash pine, sawpalmetto, bluestem, and pineland threeawn.

This soil is poorly suited to cultivated crops because of poor soil quality and depth to limestone. The number of adapted crops is limited unless management is very intensive.

This soil is poorly suited to citrus unless management is very intensive. It is suitable for citrus only after a carefully designed water control system has been installed that will maintain the water table below a depth of 4 feet. The trees should be planted on beds and a vegetative cover maintained between the trees. Regular applications of fertilizer and lime are needed.

This soil is moderately suited to pastures. Pangolagrass and bahiagrass grow well if they are well managed. Regular applications of fertilizer and lime are needed. Controlling grazing helps to prevent overgrazing and weakening of the plants.

The potential productivity is moderately high for South Florida slash pine. Seedling mortality and equipment limitations are the main restrictions.

This soil has moderately low potential for range. The dominant forage plants are creeping bluestem, indiangrass, and hairy panicum. The quantity and quality of native forage are low because of low natural fertility. As a result, cattle do not readily utilize this site if other sites are available. Management practices have little effect on native forage production. This Cocoa soil is in the Longleaf Pine-Turkey Oak Hills range site.

This soil has severe limitations for most sanitary facilities and moderate limitations for most kinds of building site development and recreational uses because of high water table and moderate depth to bedrock.

This Cocoa soil is in capability subclass IVs.

56—Isles muck. This is a nearly level, very poorly drained soil in tidal swamps. Slopes are smooth and range from 0 to 1 percent.

Typically, the upper part of the surface layer is dark reddish brown muck about 5 inches thick. Next is 6 inches of very dark grayish brown mucky fine sand. The subsurface layer is grayish brown fine sand with brownish gray mottles to a depth of 39 inches. The subsoil is 8 inches of grayish brown fine sandy loam with light olive brown mottles. Fractured limestone bedrock is at a depth of 47 inches.

Included with this soil in mapping are small areas of Boca, Kesson, and Wulfert soils. Also included are areas of sulfidic soils that are loamy throughout and have limestone at a depth of less than 40 inches. In addition are areas of soils that are similar to Isles soils but that are sandy throughout or that have limestone at a depth of less than 40 inches. Included soils make up about 15 percent of any mapped area.

The water table fluctuates with the tide. This soil is subject to tidal flooding.

The available water capacity is low in the surface and subsurface layers and medium in the subsoil. Natural fertility is low. Permeability is rapid in the surface and subsurface layers and moderate in the subsoil.

Natural vegetation consists of red and black mangrove, batis, and sea purslane.

This soil has moderate potential for range. Saltwater marshes are on level sites where tidal flow of salt and brackish water have a significant effect on plant composition. When in good or excellent condition, the saltwater marsh is dominated by smooth cordgrass, marshhay cordgrass, seashore saltgrass, and numerous other grasses and forbs. These grasses and forbs provide a high level of palatable forage for livestock grazing. Good grazing management and burning are required to maintain these sites in their most desirable condition. This Isles soil is in the Salt Water Marsh range site.

This soil has severe limitations for urban and recreational uses, and it is not suitable for cultivated crops, pasture grasses, citrus, or woodland because of the tidal flooding and high content of sodium and sulfur.

This Isles soil is in capability subclass VIIIw.

57—Boca fine sand, tidal. This is a nearly level, poorly drained, saline soil that is subject to tidal flooding. It is in coastal tidal areas. Some areas are now artificially drained and are subjected to tidal flooding only on rare occasions. Slopes are concave and less than 1 percent.

Typically, the surface layer is dark grayish brown fine sand about 5 inches thick. The subsurface layer is 12 inches of light gray fine sand with very dark gray and dark gray mottles. The subsoil is about 15 inches thick. The upper 9 inches is very dark grayish brown fine sand with dark gray and brown mottles, and the lower 6 inches is gray fine sandy loam with dark yellowish brown and yellowish brown mottles and iron concretions in the lower 4 inches. A hard, fractured limestone ledge and boulders are at a depth of 32 inches.

Included with this soil in mapping are small areas of Boca, Hallandale, and Wabasso soils in similar positions and Isles soils in slightly lower positions. Included soils make up about 15 percent of any mapped area.

In most years, under natural conditions, the water table is within 10 inches of the surface for more than 6 months.

The available water capacity is low in the surface and subsurface layers and the upper part of the subsoil and medium or high in the lower part of the subsoil. Natural fertility is very low because of the excess sodium throughout the profile. Permeability is rapid in the surface and subsurface layers and the upper part of the subsoil and moderate in the lower part of the subsoil.

Most of the acreage of this map unit remains in natural vegetation of buttonbush, sea daisy, seashore saltgrass, saltwort, scattered black and white mangrove, Brazilian pepper, and scattered cabbage palm. Some areas have been cleared and are being converted to residential and recreational uses.

This soil is not suitable for cultivation because of excess salts.

This soil has moderate potential for range. Saltwater marshes are on level sites where tidal flow of saltwater and brackish water have a significant effect on plant composition. When in good or excellent condition, the saltwater marsh is dominated by smooth cordgrass, marshhay cordgrass, seashore saltgrass, and numerous other grasses and forbs. These grasses and forbs provide high levels of palatable forage for livestock grazing. Good grazing management and burning are required to maintain these sites in their most desirable condition. This Boca soil is in the Salt Water Marsh range site.

This soil has severe limitations for septic tank absorption fields, dwellings of all types, and local roads and streets. However, these limitations can be somewhat reduced by adequate water control, such as ditching and diking, and additions of fill material.

This Boca soil is in capability subclass VIIIw.

59—Urban land. Urban land consists of areas that are more than 85 percent covered with parking lots, airports, shopping centers, large buildings, streets, and sidewalks where the natural soil cannot be observed. Unoccupied areas are mostly lawns, vacant lots, and playgrounds. Individual areas are usually polyhedral in shape and range from about 10 to 320 acres.

Included in mapping are small areas where less than 12 inches of fill material has been spread over the surface. Also included are small areas of Smyrna, Myakka, Immokalee, Hallandale, and Boca soils. Included soils make up about 15 percent of any mapped area.

This map unit has not been assigned to a capability subclass.

61—Orsino fine sand. This is a nearly level to gently sloping, moderately well drained soil on low narrow ridges. Slopes are smooth to convex and are less than 5 percent.

Typically, the surface layer is dark gray fine sand about 2 inches thick. The subsurface layer is gray and white fine sand about 14 inches thick. The subsoil is fine sand to a depth of 37 inches. The upper 10 inches is yellow with discontinuous lenses of dark reddish brown material and common intrusions of white material. The lower 11 inches is yellow with discontinuous lenses of dark reddish brown material and few intrusions of white material. The substratum is fine sand to a depth of 80 inches or more. The upper 9 inches is pale brown with splotches of white. The next 19 inches is very pale brown. Below that it is white with yellowish red and reddish yellow stains along root channels.

Included with this soil in mapping are small areas of Daytona and Electra soils in similar positions and Satellite soils in slightly lower positions. Also included are areas of soils that are similar to Orsino soils but that have loamy material below a depth of 60 inches. Included soils make up about 10 to 15 percent of any mapped area.

In most years, under natural conditions, the water table is at a depth of 40 to 60 inches for about 3 months. It is at a depth of 60 to 80 inches for about 9 months.

This soil has low available water capacity. Natural fertility is low. Permeability is very rapid.

Natural vegetation consists of sand liveoak, sand pine, South Florida slash pine, pineland threeawn, and sawpalmetto.

This soil is poorly suited to cultivated crops because of poor soil quality. Intensive management is required if the soil is cultivated. Droughtiness and rapid leaching of plant nutrients reduce the variety and potential yields of crops. Row crops should be planted on the contour in strips alternating with strips of close-growing crops. Crop rotations should keep the soil under close-growing crops at least three-fourths of the time. Soil-improving crops are recommended. Only a few varieties produce good yields without irrigation. Irrigation is generally feasible where water is readily available.

This soil is suitable for citrus trees in places that are relatively free from freezing temperatures. A good ground cover of close-growing plants between the trees helps to protect the soil from blowing or washing. Good yields of oranges and grapefruit can be obtained some years without irrigation. A well designed irrigation system to maintain optimum moisture conditions is needed to ensure best yields.

This soil is moderately suited to pasture and hay crops. Deep-rooting plants, such as Coastal bermudagrass and bahiagrasses, are well adapted, but yields are reduced by periodic droughts. Regular fertilizing and liming are needed. Controlling grazing permits plants to recover and maintain vigor.

This soil has moderate potential productivity for South Florida slash pine. Sand pine is better suited than other trees. Seedling mortality, mobility of equipment, and plant competition are the major management problems.

This soil has low potential for range. The plant community consists of a dense woody understory including sawpalmetto, Florida rosemary, and scrub oak. Although this site is seldom grazed by livestock, it does furnish protection in winter. This Orsino soil is in the Sand Pine Scrub range site.

This soil has moderate to severe limitations for sanitary facilities, primarily because of the rapid permeability. It has slight to moderate limitations for sites for most kinds of buildings, but the sandy texture makes excavations unstable. The soil has severe limitations for recreational uses because of the sandy surface layer.

This Orsino soil is in capability subclass IVs.

62—Winder sand, depressional. This is a nearly level, poorly drained soil in depressions. Slopes are concave and range from 0 to 1 percent.

Typically, the surface layer is dark gray sand about 3 inches thick. The subsurface layer is light brownish gray sand about 10 inches thick. The next layer, about 3 inches thick, is light gray sand with yellowish brown mottles and intrusions of light brownish gray sandy loam. The subsoil extends to a depth of 29 inches. The upper 7 inches is gray sandy loam with yellowish brown and strong brown mottles. The lower 6 inches is gray sand with yellowish brown mottles. The substratum extends to a depth of 80 inches or more. The upper 6 inches is gray sand with brownish yellow mottles. The next 6 inches is light brownish gray sand with olive mottles. The next 12 inches is greenish gray loamy sand with olive mottles. The next 12 inches is light gray sand with olive yellow mottles. The lower 15 inches is light greenish gray sand.

Included with this soil in mapping, and making up about 15 percent of the map unit, are small areas of Hallandale, Felda, Pineda, and Copeland soils. A few areas of Rock outcrop also occur.

In most years, under natural conditions, the water table is above the surface for 3 to 6 months. It is 10 to 40 inches below the surface during extended dry periods.

The available water capacity is low in the surface and subsurface layers and medium in the subsoil. Natural fertility is low. Permeability is rapid in the surface and subsurface layers and slow in the subsoil.

Natural vegetation consists of parrot-feather, cypress, St.-Johnswort, pickleweed, and other water-tolerant plants.

This soil has moderate potential for range. The dominant forage plants are maidencane and cutgrass. Since the depth of the water table fluctuates, areas of this soil cannot be grazed during part of the year. Although this rest period increases forage production, the periods of high water may reduce the grazing value of the site. This Winder soil is in the Fresh Water Marshes and Ponds range site.

This soil has severe limitations for urban development and recreational uses, and it is not suited to cultivated crops, improved pasture, woodland, or citrus because of prolonged ponding.

This Winder soil is in capability subclass VIIw.

63—Malabar fine sand, high. This is a nearly level, poorly drained soil in the flatwoods. Slopes are smooth to slightly convex and range from 0 to 2 percent.

Typically, the surface layer is very dark gray fine sand about 4 inches thick. The subsurface layer is light gray fine sand about 13 inches thick. The subsoil is fine sand and sandy clay loam about 51 inches thick. The upper 7 inches is very pale brown fine sand with brownish yellow mottles. The next 6 inches is brownish yellow fine sand with yellowish brown mottles. Next is yellow fine sand with yellowish brown mottles, light gray fine sand with yellowish brown mottles, and gray sandy clay loam with yellowish brown stains along root channels. The lower 8 inches is greenish gray sandy clay loam. Below that and extending to a depth of 80 inches or more is gray fine sand with about 60 percent shell fragments.

Included with this soil in mapping are small areas of Pineda, Oldsmar, Wabasso, and Felda soils. Also included are scattered areas of Malabar soils in slightly lower positions. Included soils make up about 15 percent of any mapped area.

In most years, under natural conditions, the water table is 10 to 40 inches below the surface for 4 to 6 months. It recedes to more than 40 inches below the surface during extended dry periods.

The available water capacity is low in the surface and subsurface layers and medium in the subsoil. Natural fertility is low. Permeability is rapid in the surface and subsurface layers and the sandy part of the subsoil and moderately slow in the lower, loamy part of the subsoil.

Natural vegetation consists of sawpalmetto, cabbage palm, South Florida slash pine, waxmyrtle, and pineland threeawn.

This soil is poorly suited to cultivated crops because of wetness and poor soil quality. The number of adapted crops is limited unless management is very intensive. With good water-control measures and soil-improving measures, this soil can be made well suited for some vegetable crops. A water-control system is needed to remove excess water in wet seasons and provide water through subsurface irrigation in dry seasons. Row crops should be rotated with close-growing, soil-improving crops. The rotation should grow soil-improving crops three-fourths of the time. Seedbed preparation should include bedding of the rows. Fertilizer and lime should be added according to the need of the crops.

This soil is poorly suited to citrus unless management is very intensive. It is suitable for citrus only after a carefully designed water-control system has been installed that will maintain the water table below a depth of 4 feet. The trees should be planted on beds and a vegetative cover maintained between the trees. Regular application of fertilizer and lime are needed.

This soil is well suited to pasture. Pangolagrass, improved bahiagrass, and white clover grow well if they are well managed. Water-control measures are needed to remove excess surface water after heavy rains. Regular applications of fertilizer and lime are needed. Controlling grazing helps to prevent overgrazing and weakening of the plants.

This soil has moderately high potential productivity for South Florida slash pine. Equipment limitations, seedling mortality, and plant competition are major management concerns.

This soil has moderate potential for range. The dominant forage is creeping bluestem, lopsided indiangrass, pineland threeawn, and chalky bluestem. Management should include deferred grazing and brush control. This Malabar soil is in the South Florida Flatwoods range site.

This soil has severe limitations for urban development because of the high water table.

This Malabar soil is in capability subclass IVw.

64—Hallandale-Urban land complex. This map unit consists of nearly level Hallandale fine sand and Urban land. The areas of Hallandale soil and Urban land are so intermingled that they cannot be separated at the scale used for mapping.

About 50 to 70 percent of each mapped area consists of nearly level Hallandale soils or Hallandale soils that have been reworked or reshaped but which are still recognizable as Hallandale soils. Areas of these soils that have been modified by grading and shaping are not as extensive in the older communities as in the newer ones. Typically, Hallandale soils have a surface layer of dark gray fine sand about 2 inches thick. The subsurface layer is light gray fine sand about 9 inches thick. Hard, fractured limestone is at a depth of 11 inches.

About 15 to 50 percent of each mapped area is Urban land that is used for houses, streets, driveways, buildings, parking lots, and other related uses.

Most areas have drainage ditches that alter the depth to the seasonal high water table. In undrained areas, the water table is within 10 inches of the surface for 2 to 4 months in most years. It recedes below the limestone during the dry season.

Unoccupied areas are mostly areas of Hallandale soils in lawns, vacant lots, or playgrounds. Boca, Felda, Malabar, and Pineda soils make up as much as 15 percent of the land not covered by urban facilities.

Present land use precludes using this soil for cultivated crops, citrus, woodland, or improved pasture.

This complex has not been assigned to a capability subclass.

66—Caloosa fine sand. This is a nearly level, somewhat poorly drained soil formed by dredging and filling and by earthmoving operations. Slopes are smooth to slightly convex and range from 0 to 2 percent.

Typically, the surface layer is about 10 inches of light brownish gray, mixed mineral material of fine sand and lenses of silt loam with about 10 percent shell fragments. The next 17 inches is pale brown and gray, mixed mineral material of fine sand and lenses of silty clay loam. The next 11 inches is light gray silty clay with brownish yellow mottles. Below this to a depth of 80 inches or more is gray silty clay with dark gray streaks and brownish yellow mottles.

Included with this soil in mapping are areas of Matlacha and St. Augustine soils and soils that are similar to Caloosa soils but that contain 10 to 35 percent limestone and shell fragments less than 3 inches in diameter or 10 percent limestone and shell fragments larger than 3 inches. In addition, there are scattered areas of soils that are sandy to a depth of 80 inches or more. Also included are areas of fill that is less than 20 inches thick over undisturbed soils. Included soils make up about 10 to 20 percent of any mapped area.

The depth to the water table varies with the amount of fill material and the extent of artificial drainage within any mapped area. However, in most years, the water table is 30 to 42 inches below the surface of the fill material for 2 to 4 months.

The available water capacity is variable, but it is estimated to be low to medium in the upper part of the fill material and medium to high in the lower part. Permeability is variable within short distances, but it is estimated to range from rapid to very slow depending on the soil material. Natural fertility is estimated to be medium.

Most of the natural vegetation has been removed. However, the existing vegetation consists of scattered South Florida slash pine, waxmyrtle, cabbage palm, improved pasture, and various scattered weeds.

This soil is poorly suited to most plants unless topsoil is spread over the surface to make a suitable root zone.

The fill material has made most of the area fairly suitable for community development and related uses. However, because of the nature of the fill material that exists, mounding or removal and backfilling with suitable material is necessary in order for septic tanks and septic tank absorption fields to function properly.

This Caloosa soil is in capability subclass VIIs.

67—Smyrna-Urban land complex. This map unit consists of nearly level Smyrna fine sand and Urban land. The areas of Smyrna soil and Urban land are so intermingled that they cannot be separated at the scale used for mapping.

About 50 to 70 percent of each mapped area consists of nearly level Smyrna soils or Smyrna soils that have been reworked or reshaped. Typically, Smyrna soils have a black fine sand surface layer about 4 inches thick. The subsurface layer is light brownish gray fine sand about 8 inches thick. The subsoil is about 14 inches thick. The upper 9 inches is very friable, dark reddish brown fine sand, and the lower 5 inches is very friable, dark brown fine sand. The substratum is fine sand to a depth of 80 inches or more. The upper 16 inches is very pale brown with dark brown stains along root channels. The next 15 inches is brown. The lower 23 inches is light brownish gray fine sand.

About 15 to 50 percent of each mapped area is Urban land that is used for houses, streets, driveways, buildings, parking lots, and other related uses.

Areas of this soil that have been modified by grading and shaping are not as extensive in the older communities as in the newer ones. Most areas have drainage ditches that alter the depth to the seasonal high water table. In undrained areas, the water table is within 10 inches of the surface for 1 to 4 months in most years. It recedes to more than 40 inches below the surface during the dry season.

Unoccupied areas are mostly in lawns, vacant lots, or playgrounds.

EauGallie, Immokalee, Myakka, and Pompano soils make up as much as 15 percent of the land not covered by urban facilities. A few mapped areas are as much as 60 percent or as little as 10 percent Urban land.

Present land use precludes the use of this soil for cultivated crops, citrus, or improved pasture.

This complex has not been assigned to a capability subclass.

69—Matlacha gravelly fine sand. This is a nearly level, somewhat poorly drained soil formed by filling and earthmoving operations. Slopes are smooth to slightly convex and range from 0 to 2 percent.

Typically, the surface layer is about 35 inches of black, olive brown, grayish brown, dark brown, light brownish gray, very dark gray, and very pale brown mixed gravelly fine sand and sandy mineral material. The surface layer contains lenses of loamy sand and coated sandy fragments of former subsoil material with about 25 to 30 percent limestone and shell fragments. Below this, to a depth of 80 inches or more, is undisturbed fine sand. The upper 5 inches is dark gray and the lower 40 inches is light gray with common, medium, distinct dark grayish brown stains along old root channels.

Included with this soil in mapping are areas of similar soils that contain finer textured material throughout the fill. Also included are small areas that contain boulders or more than 35 percent rock fragments larger than 3 inches throughout the fill. In addition, there are areas of similar soils that have loamy material and limestone bedrock below the fill. Other inclusions are areas of fill less than 20 inches thick over undisturbed soils. These inclusions make up about 10 to 15 percent of any mapped area.

The depth to the water table varies with the amount of fill material and the extent of artificial drainage. However, in most years, the water table is 24 to 36 inches below the surface of the fill material for 2 to 4 months. It is more than 60 inches below the surface during extended dry periods.

The available water capacity is variable, but it is estimated to be low. Permeability is variable within short distances, but it is estimated to be moderately rapid to rapid in the fill material and rapid in the underlying material. Natural fertility is estimated to be low.

Most of the natural vegetation has been removed. The existing vegetation consists of South Florida slash pine and various scattered weeds.

This soil is poorly suited to most plants unless topsoil is spread over the surface to form a suitable root zone.

This soil has severe limitations for sanitary facilities and recreational uses and moderate limitations for most building site development. The high water table and sandy surface texture are the major limitations. Unstable surface material can severely limit shallow excavations, and the high water table severely limits use for dwellings with basements. In scattered areas where the fill material contains boulders or compacted material, the installation of underground utilities or functioning of septic tank absorption fields may be a problem.

This Matlacha soil is in capability subclass VIs.

70—Heights fine sand. This is a nearly level, poorly drained soil in broad flatwoods. Slopes are smooth to concave and range from 0 to 1 percent.

Typically, the surface layer is dark gray fine sand about 4 inches thick. The subsurface layer is light gray fine sand about 14 inches thick. The subsoil is about 32 inches thick. The upper 3 inches is grayish brown fine sand. The next 8 inches is yellowish brown fine sand with white calcium carbonate streaks along root channels. The next 7 inches is light yellowish brown loamy sand with yellowish brown and brownish yellow mottles and white calcium carbonate streaks along root channels. The next 6 inches is yellowish brown cobbly loamy sand with light yellowish brown mottles and about 25 percent iron-cemented sandstone. The lower 8 inches is light gray fine sandy loam with yellowish brown and olive mottles. Below the subsoil is gray loamy sand with light olive brown and light yellowish brown mottles to a depth of 80 inches or more.

Included with this soil in mapping are small areas of Felda and Wabasso soils. Also included are areas of soils that differ from Heights fine sand by having yellowish horizons instead of brownish horizons above the loamy part of the subsoil. In addition are areas of soils that differ from Heights fine sand by having a thin black layer immediately above the loamy sand part of the subsoil. Included soils make up about 10 to 15 percent of any mapped area.

In most years, under natural conditions, the water table is at a depth of less than 10 inches for 1 to 2 months and at a depth of 10 to 40 inches for 4 to 6 months. It recedes to a depth of more than 40 inches during extended dry periods.

The available water capacity is medium in the subsoil and low in the other layers. Natural fertility is low. Permeability is rapid in the surface layer and upper part of the subsoil and slow in the lower part of the subsoil.

Natural vegetation consists of sawpalmetto, pineland threeawn, South Florida slash pine, waxmyrtle, sedges, and panicums.

This soil is poorly suited to cultivated crops because of wetness. The number of adapted crops is limited unless intensive water-control measures and soil-improving measures are used. This soil can be made suitable for some vegetable crops by installing a water-control system to remove excess water in wet seasons and provide water through subsurface irrigation in dry seasons. Row crops should be rotated with close-growing, soil-improving crops. The rotation should include the soil-improving crops two-thirds of the time. Seedbed preparation should include bedding of the rows. Fertilizer and lime should be added according to the need of the crops.

This soil is poorly suited to citrus unless very intensive management is used. Those areas that are relatively free from freezing temperatures are suitable for citrus, but only after a carefully designed water-control system has been installed. The water-control system should maintain the water table below 4 feet. The trees should be planted on beds and a vegetative cover maintained between the trees. Regular applications of fertilizer and lime are needed.

This soil is well suited to pasture. Pangolagrass, improved bahiagrass, and white clover grow well if they are well managed. Water control measures are needed to remove excess surface water after heavy rains. Regular applications of fertilizer and lime are needed, and controlling grazing helps to maintain vigor of the plants for best yields.

This soil has moderately high potential productivity for pine trees. Equipment limitations, seedling mortality, and plant competition are the main management concerns.

This soil has moderate potential for range. The dominant forage plants are creeping bluestem, lopsided indiangrass, pineland threeawn, and chalky bluestem. Management should include deferred grazing and brush control. This Heights soil is in the South Florida Flatwoods range site.

This soil has severe limitations for urban development because of wetness.

This Heights soil is in capability subclass IIIw.

72—Bradenton fine sand. This is a nearly level, poorly drained soil in hammock areas along rivers, creeks, and swamps. Slopes range from 0 to 2 percent.

Typically, the surface layer is very dark gray fine sand about 5 inches thick. The subsurface layer is light brownish gray fine sand about 5 inches thick. The subsoil is about 18 inches thick. The upper 8 inches is dark gray sandy clay loam. The lower 10 inches is gray loamy fine sand. The substratum extends to a depth of 80 inches. The upper 5 inches is white, soft calcium carbonate. The next 12 inches is gray loamy fine sand. The next 12 inches is yellowish brown fine sand. The next 4 inches is light gray fine sand, and the next 10 inches is yellow sand. Common to many mottles in shades of yellow, brown, and red occur throughout these horizons. The lower part of the substratum is 9 inches of light gray sand.

Included with this soil in mapping are small areas of Copeland, Felda, and Wabasso soils and small areas of soils with limestone or calcium carbonate accumulations within 20 inches of the surface. Included soils make up about 15 percent of any mapped area.

In most years, under natural conditions, the water table is less than 10 inches below the surface for 2 to 4 months. The water table is 10 to 40 inches below the surface for more than 6 months, and it recedes to more than 40 inches below during extended dry periods. Many areas have been altered by artificial drainage.

The soil is low in natural fertility. Permeability is moderate, and the available water capacity is medium.

Natural vegetation consists of sparse sawpalmetto, oaks, cabbage palm, waxmyrtle, bluestem, and low panicums.

This soil is poorly suited to cultivated crops because of wetness. If a complete water-control system is installed and maintained, the soil is suitable for many fruit and vegetable crops. A complete water-control system should be designed to remove excess surface and internal water rapidly. It should also provide a means of applying subsurface irrigation. Good soil management also includes crop rotations that keep the soil in a close-growing crop at least two-thirds of the time. Soil-improving crops are recommended. Other important management practices are good seedbed preparation, including bedding, and fertilizer applied according to the needs of the crop.

If this soil receives proper water control, it is well suited to citrus trees. Water control systems that maintain good drainage to a depth of about 4 feet deep are needed. Bedding of the land and planting the trees on the beds helps to provide good surface drainage. A good cover of close-growing vegetation should be maintained between the trees to protect the soil from blowing in dry weather and washing during rains. The trees require regular applications of fertilizer, but the soil contains adequate lime.

This soil is excellent for pasture. It is well suited to pangolagrass, bahiagrass, and clover. Good pasture of grass or grass-clover mixtures can be grown with good management. Regular applications of fertilizer and controlled grazing produce highest yields.

The potential productivity is moderately high for South Florida slash pine. Bedding of rows helps in establishing seedlings and in removing excess surface water.

This soil has low potential for range. The plant community consists of cabbage palm, live oak, scattered sawpalmetto, grapevine, and wild coffee. Because of the dense canopy of palm trees, this site is a preferred shading and resting area for cattle. As a result, this site is usually severely grazed. Management practices should include deferred grazing, brush control, and careful consideration of stocking rates. This Bradenton soil is in the Cabbage Palm Hammocks range site.

This soil has severe limitations for sanitary facilities, building site development, and recreational use because of the high water table.

This Bradenton soil is in capability subclass IIIw.

73—Pineda fine sand, depressional. This is a nearly level, very poorly drained soil in depressions. Slopes are concave and are less than 1 percent.

Typically, the surface layer is dark gray fine sand about 3 inches thick. The subsurface layer is fine sand to a depth of 31 inches. The upper 9 inches is light gray, the next 7 inches is very pale brown with yellowish brown mottles, and the lower 12 inches is brownish yellow with many iron-coated sand grains. The subsoil is fine sandy loam to a depth of 55 inches. The upper 8 inches is gray with very pale brown sandy intrusions and yellowish brown mottles. The lower 16 inches is gray. Below that and extending to a depth of 80 inches is light gray loamy sand.

Included with this soil in mapping, and making up 10 to 15 percent of any mapped area, are small areas of Boca, Felda, Floridana, Malabar, Winder, and Valkaria soils and a soil that is similar to Pineda soils but that has limestone below a depth of 40 inches. Also included are areas of soils that are similar to Pineda soils but that have a black sandy layer immediately above the loamy subsoil.

In most years, under natural conditions, the soil is ponded for about 3 to 6 months or more. The water table is within a depth of 10 to 40 inches for 4 to 6 months.

The available water capacity is low in the surface and subsurface layers and medium in the subsoil. Natural fertility is low. Permeability is rapid in the surface and subsurface layers and slow or very slow in the loamy subsoil.

Natural vegetation consists of St.-Johnswort, cypress, maidencane, and other water-tolerant grasses.

This soil has moderate potential for range. The dominant forage plants are maidencane and cutgrass. Since the depth of the water table fluctuates, these areas cannot be grazed during part of the year. Although this rest period increases forage production, the periods of high water may reduce the grazing value of the site. This Pineda soil is in the Fresh Water Marshes and Ponds range site.

This soil is not suited to cultivated crops, improved pasture, woodland, or citrus because of prolonged ponding. It has severe limitations for urban and recreational uses because of prolonged ponding and sandy texture.

This Pineda soil is in capability subclass VIIw.

74—Boca fine sand, slough. This is a nearly level, poorly drained soil in sloughs. Slopes are smooth to slightly concave and range from 0 to 1 percent.

Typically, the surface layer is grayish brown fine sand about 3 inches thick. The subsurface layer is light gray and very pale brown fine sand about 30 inches thick. The subsoil, about 5 inches thick, is gray sandy clay loam with yellowish brown and brownish yellow mottles. At a depth of about 38 inches is hard, fractured limestone bedrock with solution holes extending to 46 inches.

Included with this soil in mapping are small areas of Hallandale, Felda, Pineda, Pompano, Wabasso, and Valkaria soils. Also included are small areas of Boca soils in higher positions. Included soils make up about 15 percent of any mapped area.

In most years, under natural conditions, the water table is within 10 inches of the surface for 2 to 4

Figure 7.—An area of Boca fine sand, slough. Maidencane is the dominant grass under an open canopy of South Florida slash pines. Sparse clumps of sawpalmetto are scattered throughout the area.

months. It is 10 to 40 inches below the surface for more than 4 months and recedes to a depth of more than than high rainfall, the soil is covered by a shallow layer of slowly moving water for periods of about 7 days to 1 month or more.

The available water capacity is low in the surface and subsurface layers and medium in the subsoil. Natural fertility is low. Permeability is rapid in the surface and subsurface layers and moderate in the subsoil.

Natural vegetation (fig. 7) consists of maidencane, scattered clumps of sawpalmetto, waxmyrtle, pineland threeawn, and South Florida slash pine.

This soil is not suitable for cultivated crops in its native state because of wetness. It can be made suitable for some vegetable crops by using a water-control system to remove excess water in wet seasons and provide water through subsurface irrigation in dry seasons. Row crops should be rotated with close-growing, soil-improving crops. The rotation should include soil-improving crops on the land two-thirds of the time. Seedbed preparation should include bedding of the rows. Fertilizer and lime should be added on the basis of soil tests and on the need of the crop.

This soil is poorly suited to citrus unless very intensively managed. Those areas that are relatively free of freezing temperatures are suitable for citrus, but only after a carefully designed water-control system has been installed that maintains the water table below a depth of 4 feet. The trees should be planted on beds and a vegetative cover maintained between the trees. Regular applications of fertilizer are needed.

The potential productivity for pine trees is moderate. Equipment limitations, seeding mortality, and competition from unwanted plants are the main concerns in management.

This soil has high potential for range. The dominant forage plants are of blue maidencane, chalky bluestem, and bluejoint panicum. Management practices should include deferred grazing. This Boca soil is in the Slough range site.

This soil has severe limitations for sanitary facilities and building site development, primarily because of the high water table.

This Boca soil is in capability subclass Vw.

75—Hallandale fine sand, slough. This is a nearly level, poorly drained soil in sloughs. Slopes are smooth to slightly concave and range from 0 to 1 percent.

Typically, the surface layer is dark grayish brown fine sand about 2 inches thick. The next layer is very pale brown fine sand about 9 inches thick. Fractured limestone is at a depth of 11 inches.

Included with this soil in mapping are small areas of Boca, Pineda, and Pompano soils in similar positions and Hallandale soils in higher positions. Also included are small areas of exposed limestone bedrock. These inclusions make up about 10 to 15 percent of any mapped area.

In most years, under natural conditions, the water table is within 10 inches of the surface for 2 to 4 months. It is 10 to 20 inches below the surface for 1 to 2 months and recedes below the limestone for 6 months or more. During periods of high rainfall, the soil is covered by slowly moving shallow water for a period of about 7 days to 1 month or more.

The available water capacity is low. Natural fertility is low. Permeability is rapid.

Natural vegetation consists of pineland threeawn, maidencane, waxmyrtle, South Florida slash pine, and scattered clumps of sawpalmetto.

This soil is not suitable for cultivated crops because of wetness and shallow depth to limestone. It can be made suitable for some vegetable crops by using a water-control system that removes excess water in wet seasons and provides water through subsurface irrigation in dry seasons. The presence of rock near the surface, however, makes construction of such a system difficult. Row crops should be rotated with close-growing, soil-improving crops. The rotation should include soil-improving crops three-fourths of the time. Seedbed preparation should include bedding of the rows. Fertilizer and lime should be added according to the need of the crops.

This soil is poorly suited to citrus unless management is very intensive. Those areas that are relatively free from freezing temperatures are suitable for citrus, but only after installation of a carefully designed water-control system that maintains the water table below a depth of 4 feet. The trees should be planted on beds, and a vegetative cover should be maintained between the trees. Regular applications of fertilizer and lime are needed.

This soil is well suited to pasture if a water-control system is used. Pangolagrass, improved bahiagrass, and white clover grow well if they are well managed. Water-control measures are needed to remove excess surface water after heavy rains. Regular applications of fertilizer and lime are needed. Controlling grazing will help to prevent overgrazing and weakening of the plants.

This soil has moderate potential productivity for slash pine. Equipment limitations, seedling mortality, windthrow hazard, and plant competition are the major management concerns.

This soil has high potential for range. The dominant forage plants are of blue maidencane, chalky bluestem, and bluejoint panicum. Management should include deferred grazing. This Hallandale soil is in the Slough range site.

This soil has severe limitations for urban uses because of the shallow depth to bedrock and wetness.

This Hallandale soil is in capability subclass Vw.

76—Electra fine sand. This is a nearly level, somewhat poorly drained soil on low knolls and ridges. Slopes are smooth to convex and range from 0 to 2 percent.

Typically, the surface layer is light brownish gray fine sand about 4 inches thick. The subsurface layer is sand and fine sand to a depth of 43 inches. It is light gray in the upper 9 inches and white in the lower 30 inches. The subsoil and underlying material are fine sand, sand, and fine sandy loam to a depth of 80 inches or more. The upper 4 inches is dark reddish brown fine sand. The next 16 inches is very pale brown fine sand, and the next 3 inches is pale olive sand. The lower 14 inches is pale olive fine sandy loam.

Included with this soil in mapping are small areas of Boca, Bradenton, Immokalee, and Daytona soils. Some areas have limestone at a depth of 70 to 80 inches below the surface. Included soils make up about 15 to 20 percent of any mapped area.

In most years, under natural conditions, the water table is at a depth of 24 to 40 inches for 2 to 6 months and at a depth of 40 to 72 inches for 6 months or more.

The available water capacity is low in the surface and subsurface layers and moderate in the subsoil. Natural fertility is low. Permeability is rapid in the surface and subsurface layers, moderate in the upper part of the subsoil, and slow in the lower part of the subsoil.

Natural vegetation consists of sand liveoak, sawpalmetto, and pineland threeawn.

This soil is not suitable for most cultivated crops, but with intensive management a few specialty crops can be grown. The adapted crops are limited unless management is intensive.

This soil is poorly suited to citrus. Planting the trees on beds raises them away from the water table. Irrigation during periods of low rainfall helps to insure good yields.

The suitability for growing improved pasture grasses is fair. Bahiagrass and pangolagrass grow if well managed. Regular applications of fertilizer and lime are needed, and controlling grazing helps to prevent overgrazing and weakening of the plants.

This soil has moderate potential productivity for pine trees. South Florida slash pine is the best tree to plant. Seedling mortality is the main management concern.

This soil has moderate potential for range. The dominant forage plants are creeping bluestem, lopsided indiangrass, pineland threeawn, and chalky bluestem. Management practices should include deferred grazing and brush control. This Electra soil is in the South Florida Flatwoods range site.

This soil has severe limitations for recreational uses, sanitary facilities, shallow excavations, dwellings with basements, and landscaping and moderate limitations for dwellings without basements, small commercial buildings, and local roads and streets because of the high water table and sandy texture.

This Electra soil is in capability subclass VIs.

77—Pineda fine sand, limestone substratum. This is a nearly level, poorly drained soil in sloughs. Slopes are smooth to slightly concave and range from 0 to 1 percent.

Typically, the surface layer is grayish brown fine sand about 4 inches thick. The subsurface layer is fine sand that is light gray in the upper 5 inches and very pale brown with brownish yellow mottles in the lower 6 inches. The subsoil extends to a depth of 41 inches. The upper 5 inches is yellow fine sand with brownish yellow mottles. The next 4 inches is brownish yellow fine sand with yellow mottles. The next 3 inches is light gray fine sand with yellow mottles. The next 8 inches is gray sandy clay loam with light gray sandy intrusions. The lower 6 inches is gray fine sandy loam. The substratum is 11 inches of gray fine sandy loam with limestone and shell fragments. At a depth of 52 inches is fractured limestone.

Included with this soil in mapping are areas of Boca, Hallandale, and Wabasso soils. Also included are areas of soils that are similar to Pineda soils but that have limestone at a depth of 60 to 72 inches. Included soils make up 10 to 15 percent of any mapped area.

In most years, under natural conditions, the water table is within 10 inches of the surface for 2 to 4 months. It is 10 to 40 inches below the surface for more than 6 months, and it recedes to a depth of more than 40 inches during extended dry periods. During periods of high rainfall, the soil is covered by slowly moving shallow water for periods of about 7 days to 1 month or more.

The available water capacity is very low in the surface and subsurface layers and the upper part of the subsoil and medium in the lower part of the subsoil. Natural fertility is low. Permeability is rapid in the surface and subsurface layers and the upper part of the subsoil and slow in the lower part of the subsoil.

Natural vegetation consists of pineland threeawn, panicums, sedges, maidencane, waxmyrtle, South Florida slash pine, and scattered clumps of sawpalmetto.

This soil is poorly suited to cultivated crops because of wetness. With a complete water-control system, however, it is well suited to many fruit and vegetable crops. A complete water-control system removes excess water rapidly and provides a means of applying subsurface irrigation. Good soil management includes crop rotation that keeps the soil in close-growing cover crops at least two-thirds of the time. Seedbed preparation should include bedding. Fertilizer should be applied according to the need of the crop.

With proper water control, the soil is good for citrus trees. A water-control system that maintains good drainage to a depth of about 4 feet is needed. Bedding and planting the trees on the beds helps provide good surface drainage. A good cover of close-growing vegetation between the trees protects the soil from blowing when the trees are young. The trees require regular applications of fertilizer and occasional liming.

This soil is well suited to pasture and hay crops with proper water control. It is well suited to pangolagrass, bahiagrass, and clover. Excellent pasture of grass or grass-clover mixture can be grown with good management. Regular applications of fertilizer and controlled grazing help to produce highest yields.

This soil has moderately high potential productivity for pine trees. Seedling mortality, equipment limitations, and plant competition are the main management concerns. Good management includes a water-control system. South Florida slash pine is the best tree to plant.

This soil has high potential for range. The dominant forage plants are blue maidencane, chalky bluestem, and bluejoint panicum. Management practices should include deferred grazing. This Pineda soil is in the Slough range site.

This soil has severe limitations for urban development because of the high water table.

This Pineda soil is in capability subclass Vw.

78—Chobee muck. This is a nearly level, very poorly drained soil in depressions. Slopes are concave and are less than 1 percent.

Typically, the surface layer is dark reddish brown muck about 4 inches thick. The next layer is black loamy fine sand to a depth of about 16 inches. The upper part of the subsoil is 12 inches of black fine sandy loam. The lower part of the subsoil is dark gray sandy clay loam and grayish brown sandy loam about 25 inches thick. The substratum extends to a depth of 80 inches or more. The upper 8 inches is light brownish gray loamy sand, and the lower 19 inches is light brownish gray fine sand.

Included with this soil in mapping are small areas of Floridana, Winder, Gator, and Copeland soils and soils that are similar to Chobee soils but that have a light colored surface horizon. Included soils make up about 10 percent of any mapped area.

Under natural conditions, the water table is above the surface for 3 to 6 months. It is 10 to 40 inches below the surface for 3 to 6 months.

The available water capacity is high in the surface layer and subsoil. It is medium in all other horizons. Natural fertility is medium. Permeability is slow or very slow.

Natural vegetation is cypress, cabbage palm, willow, and pickerelweed.

This soil has moderate potential for range. The dominant forage plants are maidencane and cutgrass. Since the depth of the water table fluctuates, these areas cannot be grazed during part of the year. Although this rest period increases forage production, the periods of high water levels may reduce the grazing value of the site. This Chobee soil is in the Fresh Water Marshes and Ponds range site.

This soil is not suitable for crops, trees, or improved pasture because of the lack of suitable drainage outlets. An adequate drainage system is difficult to establish. Most areas of this soil provide good habitat for wading birds and other wetland wildlife.

This soil has severe limitations for urban uses because of the high water table.

This Chobee soil is in capability subclass VIIw.

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 rangeland and 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 potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of 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 and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

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

Crops and Pasture

John D. Lawrence, conservation agronomist, Soil Conservation Service, helped to 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.

Approximately 73,000 acres in Lee County is used for crops and pasture, according to the 1981 Basic Resource Data Report. Of this total, 45,000 acres is used for pasture; 12,000 acres for citrus; and 16,000 acres for specialty crops. The main specialty crops are tomatoes, squash, peppers, cucumbers, watermelon, strawberries, field peas, and nursery plants.

About 285,000 acres of land is classified as rangeland and 30,000 acres as woodland, according to the Basic Resource Data Report. The potential of the soils in Lee County for increased food production is good. Current rangeland offers an opportunity to expand crop production. This soil survey can facilitate the application of crop and conservation technology to increase food production. Limitations in soil quality are somewhat offset by climate, locality, and water availability. However, range management principles applied to natural forage sites are increasing in use due to energy conservation advantages.

The acreage in crops, pasture, and woodland has gradually been decreasing as more land is used for urban development. Urban development is spreading throughout the county and continues to be a major land use change in the survey area.

Soil erosion caused by runoff is a soil problem on some of the cropland and pastureland. Loss of the soil surface layer through erosion is damaging for two reasons. First, productivity is reduced as the surface is lost, and organic matter content is reduced as part of the subsurface layer is incorporated into the plow layer. Second, soil erosion on farmland results in sediment entering streams. Control of erosion minimizes the pollution of streams by sediment and improves the quality of water for municipal use, for recreation, and for fish and wildlife.

Erosion control practices provide a protective surface cover, reduce runoff, and increase infiltration. A cropping system that keeps vegetative cover on the soil for extended periods can hold soil erosion losses to amounts that will not reduce the productive capacity of the soils. On livestock farms, which require pasture and hay, the legume and grass forage crops in the cropping system reduce erosion on erodible sloping land and also provide nitrogen and improve tilth for the next crop. Minimizing tillage and leaving crop residue on the surface help to increase infiltration and reduce the hazards of runoff and erosion. These practices can be adapted to most soils in the survey area.

Wind erosion is a major hazard on unprotected soils in the county. Wind erosion can damage soils and tender crops in a few hours in open, unprotected areas if the winds are strong and the soil is dry and bare of vegetation and surface mulch. Maintaining vegetative cover and surface mulch minimizes wind erosion.

Wind erosion is damaging for several reasons. It reduces soil fertility by removing the finer soil particles and organic matter; it damages or destroys crops by sandblasting; it spreads diseases, insects, and weed seeds; and it creates health hazards and cleaning problems. Control of wind erosion minimizes duststorms and improves the quality of air for more healthful living conditions.

Field windbreaks of adapted trees and shrubs, such as Carolina cherry laurel, slash pine, southern redcedar and Japanese privet, and strip crops of small grains are effective in reducing wind erosion and crop damage. Field windbreaks and strip crops are narrow plantings made at right angles to the prevailing wind at specific intervals across the field. The intervals depend on the erodibility of the soil and the susceptibility of the crop to damage from sandblasting.

Information on the design of erosion control practices for each kind of soil is contained in the "Water and Wind Erosion Control Handbook-Florida," which is available in local offices of the Soil Conservation Service.

Soil drainage is a major management need on almost all of the acreage used for crops and pasture in the county. Some soils are naturally so wet that the production of crops common to the area is generally not practical without extensive water control. Immokalee, EauGallie, Oldsmar, Myakka, Pompano, and Pineda soils are examples of poorly drained soils.

Unless artificially drained, some of the poorly drained soils—mainly the EauGallie, Immokalee, Myakka, Oldsmar, Wabasso, and Pineda soils—are wet enough to cause damage to pasture plants during wet seasons. These soils also have low available water capacity and are droughty during dry periods. It is necessary to subsurface irrigate these soils for maximum pasture production.

The design of surface drainage and subsurface irrigation systems varies with the kind of soil and the pasture plants grown. A combination of surface drains and subsurface irrigation systems is needed on these soils for intensive pasture production. Information on drainage and irrigation for each kind of soil is contained in the Technical Guide available in the local offices of the Soil Conservation Service.

Soil fertility is naturally low in most soils in the county. Most of the soils have a sandy surface layer and are light in color. Many of the soils have a loamy subsoil. In this category are the Bradenton, Chobee, EauGallie, Felda, Floridana, and Wabasso soils. The Satellite, Canaveral, Pompano, Valkaria, Captiva, and Orsino soils have sandy material to a depth of 80 inches or more. The EauGallie, Myakka, Daytona, Wabasso, Oldsmar, Electra, Immokalee, and Smyrna soils have an organic-stained layer within the sandy subsurface layer. Most of the soils have a surface layer that is strongly acid or very strongly acid. If the soils have never been limed, they require applications of ground limestone to raise the pH level sufficiently for good growth of crops. The levels of nitrogen, potassium, and available phosphorus are naturally low in most of these soils. Additions of lime and fertilizer should be based on the results of current soil tests, the needs of the crops, and the expected level of yields. The Cooperative Extension Service can help in determining the kinds and amounts of fertilizer and lime to apply.

Soil tilth is an important factor in the germination of seeds and the infiltration of water into the soil. Soils with good tilth are granular and porous. Most of the soils in the county have a sandy or loamy sand surface layer that is light in color and low to moderate in organic matter content. Exceptions are the Chobee, Copeland, Floridana, Gator, Terra Ceia, and Anclote soils. Gator and Terra Ceia soils have an organic surface layer.

Generally, the structure of the surface layer of most soils in the survey area is weak. In dry soils, low in organic matter content, intense rainfall causes the colloidal matter to cement, forming a slight crust. The crust is slightly hard when it is dry, and it is slightly impervious to water. Once the crust forms, it reduces infiltration and increases runoff. Regular additions of crop residue, manure, and other organic material can help to improve soil structure and reduce crust formation.

Field crops grown in the survey area include corn. The acreage in grain sorghum, sunflowers, and potatoes can be increased if economic conditions are favorable.

Rye is the common *close-growing crop* grown.

Tomatoes are the primary *specialty crop*. Other specialty crops grown commercially in the county are watermelons, cucumbers, peppers, and a small acreage of squash, nursery plants, and sod. If economic conditions are favorable, there is a potential to increase the production of nursery plants, sod, cabbage, turnips, collards, and mustard greens. If drained, the Bradenton, EauGallie, Felda, Floridana, Gator, Myakka, Terra Ceia, Immokalee, Smyrna, Oldsmar, Wabasso, and Pineda soils are suited to vegetables and small fruit.

Latest information and suggestions for growing specialty crops can be obtained from local offices of the

Cooperative Extension Service and the Soil Conservation Service.

Pastures in the survey area are used to produce forage for beef and dairy cattle. Beef cattle cow-calf operations are the major cattle systems. Bahiagrass, pangolagrass, limpograss (*Hermathria latissina*), and bermudagrass are the major pasture plants grown. Grass seeds could be harvested from these grasses for improved pasture plantings as well as for commercial purposes. Some cattlemen overseed ryegrass on pasture in the fall for winter and spring grazing. Excess pangolagrass is harvested during the summer months to use as feed during winter.

The improved pasture in many parts of the county has been greatly depleted by continued excessive use. Much of the area that was planted to improved pasture is now covered with weeds and brush. Where climate and topography are about the same, differences in the kind and amount of forage produced are related closely to the kind of soil. Effective management considers the relationship of soils to each other, pasture plant species, water control, liming, and fertilization.

Yields Per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 4. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

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

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

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

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

Crops other than those shown in table 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 does 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 rangeland, for woodland, and for engineering purposes.

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

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

Class I soils have slight limitations that restrict their use.

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

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

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

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

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

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

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

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

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

Capability units are soil groups within a subclass. The soils in a capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe-4 or IIIe-6.

The acreage of soils in each capability class and subclass is shown in table 5. The capability classification of each map unit is given in the section "Detailed Soil Map Units" and is shown in table 4.

Rangeland

Clifford W. Carter, range conservationist, Soil Conservation Service, assisted in preparing this section.

In areas that have similar climate and topography, differences in the kind and amount of vegetation produced on rangeland are closely related to the kind of soil. Effective management is based on the relationship between the soils and vegetation and water.

Table 6 shows, for each soil that supports rangeland vegetation suitable for grazing, the range site and the potential annual production of vegetation in favorable, average, and unfavorable years. Only those soils that are used as rangeland or are suited to use as rangeland are listed. Explanation of the column headings in table 6 follows.

A *range site* is a distinctive kind of rangeland that produces a characteristic natural plant community that differs from natural plant communities on other range sites in kind, amount, and proportion of range plants. The relationship between soils and vegetation was established during this survey; thus, range sites generally can be determined directly from the soil map. Soil properties that affect moisture supply and plant nutrients have the greatest influence on the productivity of range plants. Soil reaction, salt content, and a seasonal high water table are also important.

Potential production is the amount of vegetation that can be expected to grow annually on well managed rangeland that is supporting the potential natural plant community. It includes all vegetation, whether or not it is palatable to grazing animals. It includes the current year's growth of leaves, twigs, and fruits of woody plants. It does not include the increase in stem diameter of trees and shrubs. It is expressed in pounds per acre of air-dry vegetation for favorable, normal, and unfavorable years. In a favorable year, the amount and distribution of precipitation and the temperatures make growing conditions substantially better than average. In an average year, growing conditions are about average. In an unfavorable year, growing conditions are well below average, generally because of low available soil moisture.

Dry weight is the total annual yield per acre of air-dry vegetation. Yields are adjusted to a common percent of air-dry moisture content. The relationship of green weight to air-dry weight varies according to such factors as exposure, amount of shade, recent rains, and unseasonable dry periods.

Characteristic vegetation—the grasses, forbs, and shrubs that make up most of the potential natural plant community on each soil—is listed by common name. Under *composition*, the expected percentage of the total annual production is given for each species making up the characteristic vegetation. The amount that can be used as forage depends on the kinds of grazing animals and on the grazing season.

Range management requires a knowledge of the kinds of soil and of the potential natural plant community. It also requires an evaluation of the present range condition. Range condition is determined by comparing the present plant community with the potential natural plant community on a particular range site. The more closely the existing community resembles the potential community, the better the range condition. Range condition is an ecological rating only. It does not have a specific meaning that pertains to the present plant community in a given use.

The objective in range management is to control grazing so that the plants growing on a site are about the same in kind and amount as the potential natural plant community for that site. Such management generally results in the optimum production of vegetation, reduction of undesirable brush species, conservation of water, and control of erosion. Sometimes, however, a range condition somewhat below the potential meets grazing needs, provides wildlife habitat, and protects soil and water resources.

Native grasses, forbs, and browse plants from rangeland are an important resource to livestock producers in Lee County. This forage is readily available. It is economical and provides important roughage needed by cattle. There are approximately 285,000 acres of rangeland in Lee County. Most of this range acreage is in the southern and eastern portion of the county.

Range Sites

A range site has the potential to support a native plant community typified by an association of species different from that of other range sites. The differentation is based upon significant differences in kind of species or total productivity. Each range site has significant differences in the kinds and amounts of climax vegetation it produces, and each requires different management.

The vegetation that grew originally on a range site is called the climax vegetation. It generally is the most productive and most suitable vegetation for livestock on that particular site, and it maintains itself as long as the environment does not change. The climax vegetation consists mainly of three kinds of plants—decreasers, increasers, and invaders. *Decreasers* generally are the most palatable climax plants, and they are eliminated if the range is under continuous heavy grazing. *Increasers* are plants less palatable to livestock; they increase for a while under continuous heavy grazing, but are finally eliminated. *Invaders* are plants native to the site in small amounts, but they have little value for forage. These invaders increase as the range site deteriorates from excessive grazing over a period of years.

Range condition is a measure of the current productivity of the range in relation to its potential. Four condition classes are used to measure range condition. These are—

- Excellent condition—Producing 76 to 100 percent of the potential
- Good condition—Producing 51 to 75 percent of the potential
- Fair condition—Producing 26 to 50 percent of the potential
- Poor condition—Producing 0 to 25 percent of the potential

Only about 15 percent of the natural vegetative communities are in excellent condition for use as range. The amount that is in fair and poor condition is estimated at about 60 percent.

The productivity of the sites is closely related to the natural drainage of the soil. The wettest soils, such as those in marshes, produce the greatest amount of vegetation. The deep, droughty, sandy soils normally produce the least amount of herbage annually.

All sites tend to be slightly wetter in this county than they are in more northern counties. The wetness has some adverse effects on livestock health and mobility. However, these conditions are offset by the increased grass production resulting from additional moisture.

Management of the range sites should be planned with the potential productivity in mind. Sites with the highest production potential should be given highest priority if economic considerations are important. Major management considerations revolve around livestock grazing—the length of time that the sites are grazed, the time of the year that they are grazed, and the length of time and the season that the sites are rested. Other management considerations are the grazing pattern of livestock within a pasture that contains more than one range site and the palatability of the dominant plants within the site. Manipulation of a range site often involves mechanical brush control, controlled burning, and controlled livestock grazing. Predicting the effects of these practices on range sites is important. Proper management results in maximum sustained production, conservation of the soil and water resources, and improvement of the habitat for many wildlife species.

There are eight range sites in the county that are important to the livestock industry. The most important in terms of acreage are the South Florida Flatwoods and the Slough range sites. A brief description of the range sites follows.

South Florida Flatwoods—This range site consists of nearly level areas. Scattered to numerous pine trees are common, and sawpalmetto, gallberry, and other woody plants are scattered throughout. This range site produces an abundant quantity of grasses. Creeping bluestem is the dominant grass with significant amounts of indiangrass, chalky bluestem, panicum, and wiregrass. As these grasses deteriorate because of uncontrolled livestock grazing and annual burning, sawpalmetto and pineland threeawn increase significantly. Bluestem, indiangrass, and panicum decrease. If the range site is in excellent condition, annual production is approximately 6,000 pounds of air-dry herbage per acre.

Slough—This range site consists of open grassland where nearly level areas act as broad natural drainage courses in the flatwoods. The potential plant community is dominated by blue maidencane, chalky bluestem, and bluejoint panicum. These grasses are all readily grazed by livestock. If overgrazing continues for a prolonged period, carpetgrass replaces the better grasses. Average annual production of air-dry plant material from all sources varies from about 8,000 pounds per acre in areas in excellent condition in favorable years to approximately 2,000 pounds per acre in unfavorable years. If range conditions are excellent, the annual vegetation production is approximately 85 percent grasses and grasslike plants, 15 percent forbs, and a few woody plants and trees.

Longleaf Pine-Turkey Oak Hills—This range site consists of nearly level to rolling areas identified by stands of oak, sawpalmetto, and South Florida slash pine. Because of the small quantity and poor quality of native forage, cattle do not readily utilize this site if other sites are available. If range conditions are excellent, the average annual production of air-dry plant material from all sources varies from approximately 4,000 pounds per acre in favorable years to 2,000 pounds per acre in unfavorable years. The relative percentage of total annual vegetation production is approximately 60 percent grasses and grasslike plants, 20 percent forbs, and 20 percent woody plants and trees.

Fresh Water Marshes and Ponds—This range site is an open grassland marsh or pond. It has potential for producing significant amounts of maidencane and cutgrass. The water level fluctuates throughout the year.

During periods of high water, there is a natural deferment from livestock grazing. This site is a preferred grazing area, but prolonged overgrazing causes deterioration of the site. Overgrazing causes pickerelweed, buttonbush, willows, baccharis, and, in some places, sawgrass to increase. If in excellent condition, the site is capable of producing in excess of 10,000 pounds of air-dry material per acre in favorable years. Production in unfavorable years is approximately 5,000 pounds per acre. If the site is in excellent condition, the annual production is approximately 80 percent grasses and grasslike plants, 15 percent forbs, and 5 percent woody plants and trees.

Cabbage Palm Hammock—This range site is on nearly level, slightly higher "islands" in broad, nearly level areas. The areas are generally 1 or 2 acres in size, and they are scattered throughout the landscape. The site has low potential for producing forage plants because of a dense canopy of palm trees. These are preferred shading and resting areas for cattle and, as such, are usually severely denuded. Creeping bluestem is the dominant grass when the site is in excellent condition. In a deteriorated state, however, carpetgrass and several threeawn species dominate the understory. Desirable forage plants growing in shaded areas lose much of their palatibility. For this reason, this site is used as a resting area but rarely is used as a grazing area. If the range site is in excellent condition, the total annual production is approximately 55 percent grasses and grasslike plants, 20 percent forbs, and 25 percent woody plants and trees.

Sand Pine Scrub—This range site is on nearly level to gently sloping uplands. It has limited potential for producing native forage plants. The site supports a dense stand of sand pine trees and a dense woody understory. Livestock do not use this site if other range sites are available. Principal forage plants are bluestem, indiangrass, and panicum. Numerous legumes and forbs grow in these areas. Average annual production of air-dry plant material from all sources varies from approximately 3,500 pounds per acre on communities in excellent condition in favorable years to approximately 1,500 pounds per acre in unfavorable years. If the range site is in excellent condition, the total annual production is approximately 40 percent grasses and grasslike plants, 20 percent forbs, and 40 percent woody plants and trees.

Salt Water Marsh—This range site consists of tidal marsh areas along the Gulf of Mexico. The areas, if in excellent condition, produce significant amounts of smooth cordgrass, seashore saltgrass, and seashore paspalum. Tidal movement causes water levels in the marsh to vary from surface level to 18 inches above the surface. Continuous grazing and annual burning will alter the plant community to one dominated by black needlerush. If the site is in excellent condition, the average annual production of air-dry plant material from all sources is approximately 8,000 pounds per acre during favorable years and approximately 4,000 pounds per acre in unfavorable years. If the range site is in excellent condition, the total annual production is approximately 90 percent grasses and grasslike plants, 5 percent forbs, and 5 percent woody plants and trees.

Cabbage Palm Flatwoods—This range site consists of nearly level areas characterized by cabbage palm trees scattered throughout the landscape. The site is a preferred livestock grazing area. It produces a high quality and quantity of forage plants if it is in excellent condition. Creeping, chalky, and South Florida bluestems are the dominant forage grasses along with several desirable panicum species. Pineland threeawn and sawpalmetto increase as the area deteriorates. If the range is in excellent condition, the average annual production of air-dry plant material from all sources is approximately 9,000 pounds per acre in favorable years and approximately 4,500 pounds per acre in unfavorable years. The total annual production is approximately 70 percent grasses and grasslike plants, 15 percent forbs, and 15 percent woody plants and trees.

Woodland Management and Productivity

Carl D. DeFazio, forester, Soil Conservation Service, and Eric Hoyer, forester, Florida Division of Forestry, assisted in preparing this section.

Commercial forests in Lee County cover approximately 30,000 acres, or 6 percent of the total land area. They are primarily small, nonindustrial, and privately owned.

South Florida slash pine is the major species in the county. It is on Oldsmar, Wabasso, Myakka, and Immokalee soils in the eastern part of the county. Southern baldcypress is common in the southern part of the county.

Urban development is steadily reducing the acreage of forests throughout the county. Much of the western half of the county has been lost to such development.

Timber makes up a substantial amount of the total acreage of the larger ranches. Sound management generally consists of natural revegetation following harvest cutting. Site selection for planting is important in order to maximize growth to offset the cost of planting. Many soils that have loamy texture within a depth of 40 inches of the surface are very productive of timber if the water table is controlled.

Prescribed burning is important in reducing "rough," which is a dangerous fire hazard. Burning is a common practice associated with quail management.

Markets for wood are limited in the area; however, trends indicate that increased utilization of wood and wood fiber will continue. Several small sawmills now exist, and markets for post poles, pilings, and pulpwood are present.

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

Table 7 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 (woodland suitability) 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 important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *w* indicates excessive water in or on the soil and the letter *s* indicates sandy texture. The letter *o* indicates that limitations or restrictions are insignificant.

In table 7, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Ratings of the *erosion hazard* indicate the risk of loss of soil in well managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or in equipment; and *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree to which the soil affects the mortality of tree seedlings. Plant competition is not considered in the ratings. The ratings apply to seedlings from good stock that are properly planted during a period of sufficient rainfall. A rating of *slight* indicates that the expected mortality is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

Ratings of *windthrow hazard* are based on soil characteristics that affect the development of tree roots and the ability of the soil to hold trees firmly. A rating of *slight* indicates that few trees may be blown down by strong winds; *moderate*, that some trees will be blown down during periods of excessive soil wetness and strong winds; and *severe*, that many trees are blown down during periods of excessive soil wetness and moderate or strong winds.

Ratings of *plant competition* indicate the degree to which undesirable plants are expected to invade where there are openings in the tree canopy. The invading plants compete with native plants or planted seedlings. A rating of *slight* indicates little or no competition from other plants; *moderate* indicates that plant competition is expected to hinder the development of a fully stocked stand of desirable trees; *severe* indicates that plant competition is expected to prevent the establishment of a desirable stand unless the site is intensively prepared, weeded, or otherwise managed to control undesirable plants.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. Site index was determined at age 25 years for South Florida slash pine and at 50 years for all other species. 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.

Trees to plant are those that are suited to the soils and to commercial wood production.

Windbreaks and Environmental Plantings

Windbreaks protect livestock, buildings, and yards from wind and snow. 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, hold snow on the fields, 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 insure 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 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 nursery.

Recreation

The soils of the survey area are rated in table 8 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 sewerlines. 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 recreation 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 8, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 8 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 11 and interpretations for dwellings without basements and for local roads and streets in table 10.

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 has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders 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 or stones or boulders 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 free of stones and boulders, 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. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. 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, assisted in preparing this section.

This county has extensive areas of good wildlife habitat, even though much of the highly desirable habitat in the coastal areas has been lost to urban development. The beaches, mangroves, and hardwood hammock areas are under heavy pressure for development. The federally owned National Wildlife Refuges (Ding Darling, Island Bay, Matlacha Pass, and Pine Island refuges) provide pockets of habitat. The National Wildlife Refuges are along the Gulf and provide habitat primarily for pelicans, shore birds, and wintering waterfowl.

The primary game animals are bobwhite quail and white-tailed deer. There are also wild turkey, squirrels, feral hogs, snipe, and waterfowl (primarily, Florida duck in the inland areas and teal, gadwall, pintail, ringneck, and scaup in the coastal areas). Nongame animals include raccoon, opossum, skunk, armadillo, bobcat, gray fox, otter, songbirds, wading birds, shore birds, woodpeckers, reptiles, and amphibians. Numerous fish provide excellent fishing in the brackish and saltwater areas. Largemouth bass and various sunfish are the primary species caught in fresh water.

Some of the inland areas are used for vegetable production, but most are in large cattle ranches. These areas, especially those in native range, provide wildlife habitat, but they could be improved by the modification of poor grazing and burning practices.

A number of endangered or threatened species are found in the county. These range from the red-cockaded woodpecker and sandhill crane to more familiar species, such as the alligator and pelican. A complete list of endangered or threatened species, with detailed information on their range and habitat, can be obtained from the local office of the Soil Conservation Service.

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

In table 9, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

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

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

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are soybeans, 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, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are bahiagrass, pangolagrass, deervetch, 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, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, partridge pea, bristlegrass, and sloughgrass.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, the available water capacity, and wetness. Examples of these plants are oak, palmetto, dahoon holly, red maple, wild grape, sugarberry, water hickory, blackberry, and huckleberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are firethorn, waxmyrtle, and blackberry.

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, cypress, and cedar.

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

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

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

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include bobwhite quail, dove, meadowlark, field sparrow, cottontail, and sandhill cranes.

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 bobcat.

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

Habitat for rangeland wildlife consists of areas of shrubs and wild herbaceous plants. Wildlife attracted to rangeland include white-tailed deer, meadowlark, bobwhite quail, and opossum.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

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

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

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

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to 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, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

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

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

Building Site Development

Table 10 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, 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, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

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

Sanitary Facilities

Table 11 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 11 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, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

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

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

Table 11 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 bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

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

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

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

The ratings in table 11 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

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

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

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

Construction Materials

Table 12 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a probable or improbable source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

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

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

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

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

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 12, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

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

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

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

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

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

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

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, 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 13 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives 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 and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

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

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth 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, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

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

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

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind 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. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

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

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 21.

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 classifications, 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 14 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

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

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

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

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

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

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in table 21.

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 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 15 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 1/3 bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of 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.

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

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

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

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

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion 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 wind erosion in cultivated areas. The groups indicate the susceptibility of soil to wind erosion and the amount of soil lost. Soils are grouped according to the following distinctions:

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

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

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

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

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

5. Loamy soils that are less than 18 percent clay and less than 5 percent finely divided calcium carbonate and sandy clay loams and sandy clays that are less than 5 percent finely divided calcium carbonate. These soils are slightly erodible. Crops can be grown if measures to control wind erosion are used.

6. Loamy soils that are 18 to 35 percent clay and less than 5 percent finely divided calcium carbonate, except silty clay loams. These soils are very slightly erodible. Crops can easily be grown.

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

8. Stony or gravelly soils and other soils not subject to wind erosion.

Organic matter is the plant and animal residue in the soil at various stages of decomposition.

In table 15, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

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

Soil and Water Features

Table 16 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 intake 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.

Some of the soils in table 16 are shown as having dual hydrologic groups, such as B/D. A B/D listing means that under natural conditions the soil belongs to hydrologic group D, but by artificial methods the water table can be lowered sufficiently so that the soil fits in hydrologic group B. Since there are different degrees of drainage or water table control, onsite investigation is needed to determine the hydrologic group of the soil at a particular location.

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

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, common, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *common* that it is likely under normal conditions; *occasional* that it occurs, on the average, no more than once in 2 years; and *frequent* that it occurs, on the average, more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

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. The water table in 23 pedons, representing 11 soil series, was measured twice a month for three consecutive years during the course of the soil survey. The pedons were selected as typical of the series as mapped in the county, and they were as far removed as possible from any source of artificial drainage. The measurements of the water tables for nine of the major series, for the period 1977 through 1979, are shown in table 17. Indicated in table 16 are the depth to the seasonal high water table; the kind of water table—that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 16.

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. An *artesian* water table is under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole. 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.

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

Cemented pans are cemented or indurated subsurface layers within a depth of 5 feet. Such pans cause difficulty in excavation. Pans are classified as thin or thick. A thin pan is less than 3 inches thick if continuously indurated or less than 18 inches thick if discontinuous or fractured. Excavations can be made by trenching machines, backhoes, or small rippers. A thick pan is more than 3 inches thick if continuously indurated or more than 18 inches thick if discontinuous or fractured. Such a pan is so thick or massive that blasting or special equipment is needed in excavation.

Subsidence is the settlement of organic soils or of saturated mineral soils of very low density. Subsidence results from either desiccation and shrinkage or oxidation of organic material, or both, following drainage. Subsidence takes place gradually, usually over a period of several years. Table 16 shows the expected initial subsidence, which usually is a result of drainage, and annual 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.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured clayey soils that have a high water table in winter are most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

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

By Dr. V. W. Carlisle, professor of soil science, Soil Science Department, University of Florida.

Parameters for physical, chemical, and mineralogical properties of representative pedons are presented in tables 18, 19, and 20. The analyses were conducted and coordinated by the Soil Characterization Laboratory at the University of Florida. Detailed profile descriptions of soils analyzed are given in the section "Soil Series and Their Morphology." Laboratory data and profile information for additional soils in the county as well as for other counties in Florida are on file at the Soil Science Department, University of Florida.

Typifying pedons were sampled from pits at carefully selected locations. Samples were air-dried, crushed, and sieved through a 2-millimeter screen. Most analytical methods used are outlined in Soil Survey Investigations Report No. 1 *(6)*.

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, 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, and calcium and magnesium by atomic absorption spectrophotometry. Extractable acidity was determined by the barium chloridetriethanolamine 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 extracted carbon by the Walkley-Black wet combustion method.

Mineralogy of the clay fraction greater than 2 micrometers was ascertained by X-ray diffraction. Peak heights at 18 angstrom, 14 angstrom, 7.2 angstrom, 4.83 angstrom, and 4.31 angstrom positions represent montmorillonite, interstratified expandable vermiculite or 14-angstrom intergrades, kaolinite, gibbsite, and quartz, respectively. Peaks were measured, summed, and normalized to give percent 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.

Most soils in the county are inherently sandy (table 18). All pedons sampled, with the exception of Wulfert, contained at least one horizon with more than 95 percent total sands. Canaveral, Captiva, Daytona, Estero, Myakka, Orsino, Pompano, Punta, Satellite, Smyrna, and Valkaria soils contained more than 90 percent sands to a depth of 2 meters or more. Only one horizon in the Anclote, Boca, Floridana, and Immokalee soils contained less than 90 percent total sands. Deep horizons of Boca, Bradenton, EauGallie, Felda, Floridana, Heights, Isles, Malabar, Oldsmar, Terra Ceia, Wabasso, and Winder soils contained the most fine-textured materials; however, only one horizon in the Bradenton and two horizons in the Wabasso soil contained more than 20 percent clay. Silt content in most horizons of the soils sampled was less than 4 percent. EauGallie, Felda, Heights, Malabar, and Terra Ceia soils contained 10 percent or more silt in one or two subsurface horizons.

Fine sands dominated the sand fractions of most soils with amounts exceeding 90 percent in the Myakka soil. Horizons with more than 60 percent fine sands occurred in the Boca, Bradenton, Canaveral, Captiva, Cocoa, Estero, Felda, Hallandale, Isles, Kesson, Malabar, Myakka, Orsino, Peckish, Pompano, Punta, Satellite, Smyrna, Terra Ceia, Valkaria, Wabasso, and Wulfert soils. Medium sands dominated the sand fractions of Anclote, Daytona, EauGallie, Immokalee, Oldsmar, and Winder soils. Horizons with more than 50 percent medium sand occurred in all of these soils with exception of the Daytona pedon. Coarse sand commonly occurred in minor amounts, exceeding 10 percent only in one horizon of the Canaveral soil and a number of horizons in the EauGallie soils. Very coarse sand occurred in extremely low amounts, nondetectable in one or more horizons of the Anclote, Boca, Bradenton, Cocoa, Daytona, EauGallie, Estero, Felda, Floridana, Hallandale, Heights, Immokalee, Malabar, Myakka, Oldsmar, Orsino, Peckish, Pompano, Punta, Satellite, Terra Ceia, Valkaria, Wabasso, Winder, and Wulfert soils. Droughtiness is a common characteristic of sandy soils, particularly those that are moderately well drained, well drained, or excessively drained.

Bradenton, Canaveral, Orsino, Satellite, and Terra Ceia soils contained horizons with hydraulic conductivity values in excess of 60 centimeters per hour. Hydraulic conductivity values of less than 15 centimeters per hour were recorded throughout the entire Felda and Heights pedons. Malabar, Wabasso, and Winder soils contained only one horizon with hydraulic conductivity values in excess of 15 centimeters per hour. Many of the soils sampled contained one or more horizons with less than 15 centimeters per hour hydraulic conductivity. Spodic horizons or horizons with enhanced amounts of clay occurring in the subsoil of the Bradenton, EauGallie, Floridana, Heights, Immokalee, Malabar, Oldsmar, Terra Ceia, and Winder soils resulted in hydraulic conductivity values that were less than 1 centimeter per hour.

Bulk density values, generally between 1.40 and 1.70 grams per centimeter, may be used along with water content data to indicate available water content. Generally, soils in the county contain excessive amounts of sand and small amounts of organic matter, resulting in the retention of low amounts of available water. Orsino, Pompano, Satellite, and Valkaria soils retain very low amounts of available water throughout. Relatively large amounts of available water are retained by the Floridana and Terra Ceia surface soils.

Soil chemical properties (table 19) show that many soils in the county contained one or more horizons with a relatively high amount of extractable bases. The sum of extractable calcium, magnesium, sodium, and potassium exceeded 16 milliequivalents per 100 grams throughout the pedon depths of Canaveral, Captiva, Isles, Kesson, Peckish, and Wulfert soils. In addition, at least one horizon in the Bradenton, Felda, Floridana, Heights, and Terra Ceia soils contained more than 16 milliequivalents per 100 grams extractable bases. In contrast, all horizons of the Daytona, Immokalee, Myakka, Pompano, Punta, Satellite, and Valkaria pedons contained 1 milliequivalent per 100 grams extractable bases or less. Many of the other soils that were sampled contained horizons with extremely low amounts of extractable bases. Calcium was the dominant base in most soils; however, sodium and magnesium were by far the dominant bases in the Estero, Isles, Peckish, and Wulfert soils. Sodium content was extremely low or nondetectable in most horizons of the Anclote, Boca, Bradenton, Cocoa, Daytona, EauGallie, Felda, Floridana, Hallandale, Heights, Malabar, Myakka, Oldsmar, Orsino, Pompano, Punta, Satellite, Smyrna, Valkaria, and Winder soils. Likewise, potassium content was very low or nondetectable in these soils and in the Canaveral, Captiva, Kesson, Myakka, Terra Ceia, and Wabasso soils. Cation exchange capacity values exceeded 7 milliequivalents per 100 grams in the surface horizons of the Anclote, Bradenton, Canaveral, Captiva, Estero, Floridana, Immokalee, Isles, Kesson, Oldsmar, Peckish, Terra Ceia, and Wulfert soils. Within the pedon depth, the cation exchange capacity exceeded 7 milliequivalents per 100 grams in all soils sampled with the exception of the Cocoa, Hallandale, Malabar, Orsino, Pompano, Satellite, and Valkaria soils.

Soil cation exchange capacity is almost entirely a result of the amount and kind of clay and organic matter present. Soils with very low cation exchange capacities, such as Satellite, require only small amounts of lime to significantly alter both the base status and soil reaction in the upper horizons. Generally, soils of low inherent soil fertility are associated with low values for extractable bases and low cation exchange capacities and fertile soils are associated with high values for extractable bases, high cation exchange capacities, and high base saturation values.

Content of organic carbon was less than 2 percent throughout all horizons of all pedons of the Boca, Bradenton, Canaveral, Cocoa, Felda, Hallandale, Heights, Kesson, Malabar, Orsino, Pompano, Satellite, Smyrna, Valkaria, Wabasso, and Winder soils. Significant increases in organic carbon content occurred in the Bh horizons of the Daytona, EauGallie, Estero, Immokalee, Myakka, Oldsmar, Punta, Smyrna, and Wabasso soils. Soil management practices that conserve and maintain organic carbon in soils are highly desirable since organic carbon content is directly related to soil nutrient and water retention characteristics.

Electrical conductivity values were 0.1 millimho per centimeter or less in all horizons of the Cocoa, Daytona, EauGallie, Hallandale, Immokalee, Myakka, Orsino, Pompano, Punta, Satellite, Smyrna, and Valkaria soils. Values exceeding 3.0 millimho per centimeter in the surface horizon of the Captiva, Estero, Isles, Kesson, Peckish, and Wulfert soils indicated that the soluble salt content of these soils approached amounts that are detrimental to the growth of salt sensitive plants.

Soil reaction in water commonly ranged between pH 4.5 and 6.0; however, the entire pedon of Canaveral, Captiva, and Kesson soils and parts of the subsoils of the Boca, Bradenton, Felda, Heights, Malabar, Pompano, and Terra Ceia soils exceeded pH 7.0. Reactions lower than pH 4.5 were recorded in one or more horizons of the Daytona, Immokalee, Myakka, Peckish, Punta, Terra Ceia, and Wulfert soils. Soil reaction was generally 0.5 to 1.5 units lower in calcium chloride and potassium chloride solutions than in water, with the exception of soils that had high electrical conductivity values. Maximum plant nutrient availability is generally attained when soil reaction is between pH 6.5 and 7.5; however, for most crops in Florida it is usually not economically feasible to maintain the reaction of strongly acid soils above a value of pH 6.5.

Sodium pyrophosphate extractable iron was 0.06 percent or less in the Bh horizons. The ratio of pyrophosphate extractable aluminum to clay in Daytona, EauGallie, Estero, Immokalee, Myakka, Oldsmar, Punta, Smyrna, and Wabasso soils was sufficient to meet the chemical criteria for spodic horizons. Citrate-dithionite extractable iron in argillic horizons of Ultisols ranged from 0.01 percent in the Boca soil to 0.61 percent in the Wabasso soil. Similarly, these values in the Bh horizons of Spodosols ranged from 0.02 percent in the EauGallie soil to 0.10 percent in the Daytona and Myakka soils; and, in the Bir horizons, from 0.04 percent in the Malabar to 0.11 percent in the Valkaria soil. Aluminum extracted by citrate-dithionite ranged from nondetectable amounts in the Terra Ceia to 0.34 percent in the EauGallie soil. Soils in the county contain insufficient amounts of aluminum and iron to detrimentally affect phosphorus availability.

The sand fraction (2 to 0.05 millimeters) was siliceous with quartz overwhelmingly dominant in all pedons. Small amounts of heavy minerals occurred in most soils, with the greatest concentration in the very fine sand fraction. No weatherable minerals were observed. Crystalline mineral components of the clay fraction (less than 0.002 millimeters) are reported in table 20 for selected horizons of the pedons sampled. The clay mineralogical suite was composed of montmorillonite, a 14-angstrom intergrade, kaolinite, gibbsite, and quartz. Montmorillonite occurred in approxmiately two-thirds of the soils sampled but was not detected in the Boca, Cocoa, Daytona, EauGallie, Hallandale, Immokalee, Orsino, Pompano, Punta, Valkaria, and Wabasso soils. The 14-angstrom intergrade minerals, occurring in a somewhat similar proportion of the soils sampled, were not detected in the Bradenton, Canaveral, Captiva, Felda, Kesson, Myakka, Satellite, Terra Ceia, and Wulfert soils. Gibbsite, usually occurring in small amounts, was detected in some horizons of the Boca, EauGallie, Hallandale, Pompano, Smyrna, and Valkaria soils. Quartz occurred in all pedons sampled.

Large amounts of quartz, particularly in the surface horizon, indicated a severe weathering environment in the county. Clay-sized quartz has resulted from decrements of the silt fraction. Montmorillonite appears to have been inherited as it is probably the least stable of the mineral components under present environmental conditions. Inconsistent occurrence of the 14-angstrom intergrade and gibbsite together with the lack of a tendency for kaolinite to increase or decrease with pedon depth is suggestive of youthful soils. Clay mineralogy of soils occurring in the county influences their use and management less frequently than the total clay content.

Engineering Index Test Data

Table 21 shows laboratory test data for several pedons sampled at carefully selected sites in the survey area. The pedons are typical of the series and are described in the section "Soil Series and Their Morphology." The soil samples were tested by the Soils Laboratory, Florida Department of Transportation, Bureau of Materials and Research. These tests were made to help 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 plasticity indices. The mechanical analyses were made by combined sieve and hydrometer methods *(3)*. The various grain-size fractions were calculated on the basis of all the material in the soil sample, including that coarser than 2 millimeters. Mechanical analyses used in this method should not be used in naming the textural classes of soils.

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

The tests and methods are: Liquid limit—T 89 (AASHTO), D 423 (ASTM); Plasticity index—T 90 (AASHTO), D 424 (ASTM); Moisture density, Method A—T 99 (AASHTO), D 698 (ASTM).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(7)*. 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 22 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

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

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

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

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

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

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 substratum can differ within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in Lee County is described. Lee County and adjacent Charlotte County were mapped concurrently using a single soil legend for both counties. All of the soil map units described in the section "Detailed Soil Map Units" occur in both counties. Because these counties were mapped together, some of the typical pedons for the soil series in this survey are located in Charlotte County. These pedons are considered to be representative of the soils as mapped in Lee County, however. The description of the location of the typical pedon of each series names the county in which the pedon is located. The descriptions of the soil series are arranged in alphabetic order.

The location of the typical pedon of many of the series is referenced to nearby roads. Some roads that were state highways when the survey was being made have since become county highways. The highway designations have not been changed, however, since the accompanying soil maps carry the older designation.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the Soil Survey Manual *(5)*. Many of the technical terms used in the descriptions are defined in Soil Taxonomy *(7)*. 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."

Anclote Series

The soils of the Anclote series are sandy, siliceous, hyperthermic Typic Haplaquolls. They are deep, very poorly drained, rapidly permeable soils that formed in thick beds of sandy marine sediment. These soils are in depressions. Slopes range from 0 to 1 percent.

In most years, under natural conditions, the soil is ponded for more than 6 months. The water table is 10 to 40 inches below the surface for 3 to 6 months.

Anclote soils are geographically associated with Boca, Immokalee, Malabar, Oldsmar, Pineda, and Valkaria soils. Valkaria, Malabar, and Pineda soils have a Bir horizon. Malabar and Pineda soils have an argillic horizon. Immokalee and Oldsmar soils have a spodic horizon. Boca soils have an argillic horizon at a depth of 24 to 40 inches, and they are underlain by limestone.

Typical pedon of Anclote sand, depressional; in a depression approximately 1.0 mile south of State Highway 82, NW1/4NE1/4 sec. 25, T. 45 S., R. 26 E., in Lee County:

A11—0 to 8 inches; black (10YR 2/1) sand; weak fine granular structure; very friable; many fine and medium and common coarse roots; strongly acid; gradual wavy boundary.

A12—8 to 22 inches; black (10YR 2/1) sand; common light gray (10YR 7/1) sand pockets and streaks throughout; single grained; loose; many fine and medium and common coarse roots; strongly acid; gradual wavy boundary.

C1—22 to 40 inches; light brownish gray (10YR 6/2) sand; common medium distinct very dark gray (10YR 3/1) streaks along old root channels; single grained; loose; medium acid; clear wavy boundary.

C2—40 to 80 inches; light gray (10YR 7/1) sand; single grained; loose; neutral.

Anclote soils are strongly acid to slightly acid in the A horizon and medium to neutral in the C horizon.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1. Thickness is 12 to 24 inches.

The C horizon has hue of 10YR, value of 5 through 7, and chroma of 1 or 2. Very dark gray or very dark grayish brown streaks are along old root channels.

Boca Series

The soils of the Boca series are loamy, siliceous, hyperthermic Arenic Ochraqualfs. They are moderately deep, poorly drained, moderately permeable soils that formed in moderately thick beds of sandy and loamy marine sediment over limestone. These nearly level soils are on sloughs, on flatwoods, and in depressions. Slopes range from 0 to 2 percent.

In most years, in the flatwoods under natural conditions, the water table is within 10 inches of the surface for 2 to 4 months. It recedes to below the limestone for about 6 months. In sloughs, during periods of high rainfall, the soil is covered by a shallow layer of slowly moving water for periods of about 7 to 30 days or more. Depressions are ponded for 3 to 6 months or more in most years.

Boca soils are geographically associated with Hallandale, Pompano, Felda, Pineda, and Wabasso soils. Hallandale soils do not have an argillic horizon, and they have limestone within 20 inches of the surface. Pompano soils are sandy to a depth of 80 inches or more. Felda and Pineda soils do not have limestone within 80 inches of the surface. In addition, Pineda soils have a Bir horizon. Wabasso soils have a spodic horizon.

Typical pedon of Boca fine sand; on flatwoods about 0.3 mile south of Daniels Road and 300 feet east of U.S. Highway 41, NW1/4SW1/4SW1/4 sec. 24, T. 45 S., R. 24 E., in Lee County:

A1—0 to 3 inches; gray (10YR 5/1) fine sand; single grained; loose; many fine and few medium roots; neutral; clear smooth boundary.

A21—3 to 9 inches; light gray (10YR 6/1) fine sand; single grained; loose; few fine, medium, and coarse roots; neutral; clear wavy boundary.

A22—9 to 14 inches; light gray (10YR 7/2) fine sand; single grained; loose; few fine, medium, and coarse roots; neutral; clear wavy boundary.

B1—14 to 25 inches; very pale brown (10YR 7/4) fine sand; single grained; loose; few fine and medium roots; mildly alkaline; abrupt wavy boundary.

B2tg—25 to 30 inches; gray (5Y 6/1) fine sandy loam; common medium prominent brownish yellow (10YR 6/8) mottles and few very pale brown (10YR 7/4) streaks along root channels; moderate medium subangular blocky structure; friable; slightly sticky and slightly plastic; few fine and medium roots; common calcareous nodules; mildly alkaline; abrupt irregular boundary.

IIR—30 inches; fractured limestone containing solution holes; sandy clay loam material is in solution holes and fractures.

The thickness of the solum and depth to limestone range from 25 to 40 inches except in solution holes where thickness and depth are more than 40 inches. The solution holes are less than half the area of the individual pedon. Reaction ranges from medium acid to neutral in the A horizon and from neutral to moderately alkaline in the B1 and B2t horizons.

The A1 or Ap horizon has hue of 10YR, value of 2 through 5, and chroma of 1 or 2. Thickness is 3 to 8 inches. The A2 horizon has hue of 10YR, value of 6 or 7, and chroma of 1 through 4. Thickness is 10 to 22 inches.

The B1 horizon has hue of 10YR, value of 6 or 7, and chroma of 3 or 4; or it has hue of 10YR, value of 3, and chroma of 2. Mottles of yellowish brown or strong brown are in some pedons. Thickness is 0 to 15 inches.

The B2t horizon has hue of 5Y or 10YR, value of 5 or 6, and chroma of 1 or 2 with mottles of yellowish brown, brownish yellow, or strong brown. The B2t horizon is sandy clay loam, sandy loam, or fine sandy loam. Thickness is 4 to 8 inches.

Some pedons have a thin transitional layer of small rock fragments and firm calcium carbonate less than 4 inches thick between the B2t horizon and the fractured limestone.

Bradenton Series

The soils of the Bradenton series are coarse-loamy, siliceous, hyperthermic Typic Ochraqualfs. They are poorly drained, moderately permeable soils that formed in loamy marine sediment. These nearly level soils are in hammocks along rivers, creeks, and swamps. Slopes are smooth to concave and range from 0 to 2 percent.

These soils are considered to be taxadjuncts to the Bradenton series, because they have a strongly acid A horizon and a medium acid B horizon. They are similar in use, management, and behavior to the soils of the Bradenton series, however.

Under natural conditions, the water table is less than 10 inches below the surface for 2 to 4 months and 10 to 40 inches below the surface for more than 6 months. It recedes to a depth of more than 40 inches below the surface during extended dry periods.

Bradenton soils are geographically associated with Copeland, Felda, Immokalee, Oldsmar, and Wabasso soils. Copeland soils have a mollic epipedon. Felda soils have a sandy A horizon that is 20 to 40 inches thick. Immokalee, Oldsmar, and Wabasso soils have a spodic horizon and are primarily on the flatwoods. Oldsmar and Wabasso soils also have a loamy argillic horizon below the spodic horizon.

Typical pedon of Bradenton fine sand; in an orange grove approximately 800 feet north of State Highway 80 and about 2.8 miles west of the Hendry County line, SW1/4NW1/4 sec. 27, T. 43 S., R. 27 E., in Lee County:

Ap—0 to 5 inches; very dark gray (10YR 3/1) fine sand; weak medium granular structure; very friable; few medium and fine roots; many uncoated sand grains; strongly acid; clear wavy boundary.

A2—5 to 10 inches; light brownish gray (10YR 6/2) fine sand; few medium faint grayish brown (10YR 5/2) and few medium distinct very dark gray (10YR 3/1) mottles; single grained; loose; few medium and fine roots; strongly acid; abrupt smooth boundary.

B21tg—10 to 18 inches; dark gray (5Y 4/1) sandy clay loam; many fine distinct olive yellow (5Y 6/8) stains along root channels; moderate medium subangular blocky structure; friable; few medium and fine roots; medium acid; abrupt wavy boundary.

B22tg—18 to 28 inches; gray (10YR 5/1) loamy fine sand; many fine prominent yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; very friable; few medium and fine roots; medium acid; gradual wavy boundary.

IIC1ca—28 to 33 inches; white (10YR 8/1) soft calcium carbonate with intrusions of gray loamy fine sand in about 25 percent of the horizon; weak fine subangular blocky structure; very friable; few medium and fine roots; calcareous; gradual wavy boundary.

IIC2ca—33 to 45 inches; gray (5Y 6/1) loamy fine sand; common medium distinct yellowish brown (10YR 5/6) and brownish yellow (10YR 6/8) mottles; weak fine subangular blocky structure; very friable; common segregated calcium carbonate concretions less than 3 inches in diameter; mildly alkaline; clear wavy boundary.

IIIC3—45 to 57 inches; yellowish brown (10YR 5/8) fine sand; weak medium granular structure; very friable; common discontinuous strata or pockets of light gray (10YR 7/1) fine sand; common segregated iron and calcium carbonate concretions 0.5 inch to 2 inches in diameter; moderately alkaline; clear wavy boundary.

IVC4—57 to 61 inches; light gray (10YR 7/1) fine sand; many coarse distinct brownish yellow (10YR 6/8) mottles; single grained; loose; strongly alkaline; clear wavy boundary.

IVC5—61 to 71 inches; yellow (10YR 7/6) sand; common fine dark grayish brown (10YR 4/2) streaks throughout; clear wavy boundary.

IVC6—71 to 80 inches; light gray (10YR 7/1) sand; single grained; loose; moderately alkaline.

The thickness of the solum ranges from 20 to 30 inches. Reaction is strongly acid or medium acid in the A horizon, medium acid or slightly acid in the B2t horizon, and mildly alkaline to strongly alkaline in all other horizons.

The A1 or Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. Thickness is 3 to 5 inches. The A1 or Ap horizon is fine sand or loamy fine sand. The A2 horizon has hue of 10YR, value of 5 or 6, and chroma of 2 or less with mottles of very dark gray, very dark grayish brown, or grayish brown. Thickness is 5 to 7 inches.

The B2tg horizon has hue of 10YR, value of 2 through 7, and chroma of 1 or 2; hue of 2.5Y, value of 3 or 4, and chroma of 1 or less; hue of 5Y, value of 4 through 6, and chroma of 1; or it is neutral. Mottles are in shades of yellow, brown, and red, or there are no mottles. The B2tg horizon is sandy clay loam, sandy loam, or fine sandy loam in the upper part. Thickness ranges from 18 to 20 inches. Some pedons do not have accumulations of soft calcium carbonate. Few to common calcium carbonate and iron concretions are within a depth of 20 to 40 inches of the surface. Where present, the concretions are less than 3 inches across.

The IIC horizon has hue of 10YR, value of 6 or 8, and chroma of 1 or 2; or it has hue of 5Y, value of 7, and chroma of 1 or 2. The IIC horizon is fine sand or loamy fine sand. The IIIC horizon has hue of 10YR, value of 5 or 6, and chroma of 8.

Caloosa Series

The soils of the Caloosa series are sandy over clayey, siliceous, hyperthermic Typic Udifluvents. They are deep, somewhat poorly drained, slowly permeable soils that formed in dredge and fill material. These level to nearly level soils are in areas that have been prepared for urban development, and they make up a levee along the Caloosahatchee River. Slopes are 0 to 2 percent.

The depth to the water table varies with the amount of fill material and the extent of the artificial drainage. However, in most years, the water table is 30 to 42 inches below the surface of the fill material for 2 to 4 months. It is at a depth of 60 inches or more during extended dry periods.

Caloosa soils are geographically associated with Captiva, Matlacha, Kesson, St. Augustine, and Wulfert soils. The Captiva, Matlacha, and St. Augustine soils are in similar positions on the landscape. The Matlacha and St. Augustine soils are also composed of dredge and fill materials, but they are sandy throughout and contain fragments of diagnostic horizons within their profile. Captiva soils are in poorly defined drainageways. They are poorly drained and sandy and have a dark surface layer. Kesson and Wulfert soils are in tidal swamps and marshes. Kesson soils are sandy, and Wulfert soils are organic.

Typical pedon of Caloosa fine sand; in an improved pasture approximately 1,000 feet south of County Highway 78 and 200 feet east of Otter Creek, SW1/4NW1/4NE1/4 sec. 16, T. 43 S., R. 26 E., in Lee County.

Ap—0 to 10 inches; light brownish gay (10YR 6/2) fine sand; single grained; loose; common fine and few medium and coarse roots; moderately alkaline; few fine roots; lenses of silt loam; 10 percent, by volume, sand-sized shell fragments; abrupt smooth boundary.

C1—10 to 27 inches; stratified pale brown (10YR 6/3) and gray (10YR 5/1) fine sand; single grained; loose; common fine and medium roots; moderately alkaline; few fine lenses of silty clay loam; abrupt smooth boundary.

C2—27 to 38 inches; stratified light gray (10YR 7/2) silty clay; few fine prominent brownish yellow (10YR 6/6) mottles; massive; few fine roots; moderately alkaline; abrupt smooth boundary.

C3—38 to 80 inches; stratified gray (10YR 5/1) and dark gray (10YR 4/1) silty clay; common medium distinct brownish yellow (10YR 6/6) mottles; massive; moderately alkaline.

Caloosa soils range from slightly acid to moderately alkaline in all horizons. The thickness of the fill material ranges from 40 to more than 80 inches. Fragments of shell are calcareous and range mostly from sand size to 6 centimeters. Shell content ranges from less than 5 percent to 30 percent. The weighted average shell content (2 millimeters or larger) in the control section is less than 10 percent. The underlying material is generally sandy, but some pedons have silty clay loam, clay, or sandy clay Ab and Cb horizons at a depth of more than 40 inches.

The Ap horizon has hue of 10YR, value of 4 through 7, and chroma of 1 or 2. It is sand or fine sand.

The C1 horizon has hue of 10YR to 5GY, value of 4 through 8, and chroma of 1 to 3. It is sand or fine sand. The C2 and C3 horizons have hue of 10YR to 5GY, value of 4 through 8, and chroma of 1 through 3. They are sandy clay, clay, or silty clay. There are mottles in shades of yellow or brown in the C horizon in some pedons.

Canaveral Series

The soils of the Canaveral series are hyperthermic, uncoated Aquic Quartzipsamments. They are moderately well drained and somewhat poorly drained, very rapidly permeable soils that formed in thick marine deposits of sand and shell fragments. These nearly level soils are on low ridges and in depressions along the Gulf Coast. Slopes range from 0 to 2 percent.

In most years, under natural conditions, the water table is at a depth of 18 to 40 inches for a period of 2 to 6 months and at a depth of 40 to 60 inches for 6 months or more.

Canaveral soils are geographically associated with Captiva and Kesson soils and Beaches. Captiva soils are in sloughs and have a water table within 10 inches of the surface. Beaches are flooded by daily tides and are unstable. Kesson soils are in lower positions on the landscape, are very poorly drained, and are also influenced by tidal action.

Typical pedon of Canaveral fine sand; in a brush area about 1 mile west of causeway and 50 feet north of Periwinkle Way, SW1/4SW1/4 sec. 19, T. 46 S., R. 23 E., in Lee County:

A11—0 to 7 inches; black (10YR 2/1) fine sand; single grained; loose; many very fine, fine, medium, and coarse roots; about 5 percent shell fragments; mildly alkaline; calcareous; clear smooth boundary.

A12—7 to 15 inches; dark gray (10YR 4/1) fine sand; single grained; loose; many fine, medium, and coarse roots; about 5 percent shell fragments; mildly alkaline; calcareous; clear wavy boundary.
C1—15 to 22 inches; light brownish gray (10YR 6/2) fine sand; single grained; loose; few fine and medium roots; about 5 percent shell fragments; moderately alkaline; calcareous; clear wavy boundary.
C2—22 to 36 inches; light gray (10YR 7/2) fine sand; single grained; loose; about 5 percent shell fragments in stratified layers; moderately alkaline; calcareous; gradual wavy boundary.
C3—36 to 51 inches; light gray (10YR 7/2) fine sand mixed with about 25 percent multicolored shell fragments; common medium distinct white (10YR 8/1) streaks; single grained; loose; moderately alkaline; calcareous; gradual wavy boundary.
C4—51 to 80 inches; light gray (10YR 7/1) fine sand mixed with about 30 percent multicolored shell fragments; single grained; loose; mildly alkaline; calcareous.

Canaveral soils are mildly alkaline or moderately alkaline in all horizons.

The A horizon has hue of 10YR, value of 2 through 4, and chroma or 1 or 2. It is 5 to 10 percent shell fragments. Thickness ranges from 9 to 15 inches. Thickness is less than 10 inches where value is less than 3.5.

The C horizon has hue of 10YR, value of 6 or 7, and chroma of 1 through 3. The C horizon is a mixture of fine sand and multicolored shell fragments. In some pedons, the C horizon is stratified sand and shell fragments. Content of shell fragments ranges from about 10 to 60 percent. The weighted average of shell fragments is less than 35 percent in the control section.

Captiva Series

The soils of the Captiva series are siliceous, hyperthermic Mollic Psammaquents. They are poorly drained, very rapidly permeable soils that formed in thick deposits of marine sand and shell fragments. Slopes range from 0 to 1 percent.

In most years, under natural conditions, the water table is within 10 inches of the surface for 1 to 2 months. It is at a depth of 10 to 40 inches for 10 months. In some years, the soil has standing water for about 1 month.

Captiva soils are geographically associated with Canaveral and Kesson soils. Unlike Captiva soils, which are poorly drained and in sloughs, Canaveral soils are moderately well drained or somewhat poorly drained and are on low, narrow ridges bordering the sloughs. Unlike Captiva soils, Kesson soils have a high content of sulfur. In addition, Kesson soils are flooded by tides.

Typical pedon of Captiva fine sand; in a slough about 30 feet south of an unpaved road, NE1/4SW1/4 sec. 25, T. 46 S., R. 22 E., in Lee County:

A1—0 to 6 inches; black (10YR 2/1) rubbed fine sand; single grained; loose; many fine and few medium roots; about 15 percent shell fragments; mildly alkaline; clear smooth boundary.
C1—6 to 15 inches; pale brown (10YR 6/3) fine sand; commmon light gray (10YR 7/1) streaks; single grained; loose; few fine roots; about 10 percent multicolored shell fragments; moderately alkaline; gradual wavy boundary.
C2—15 to 26 inches; light gray (10YR 7/2) fine sand; many medium distinct pale brown (10YR 6/3) mottles; single grained; loose; few fine roots; about 15 percent multicolored shell fragments; moderately alkaline; abrupt smooth boundary.
C3—26 to 30 inches; light gray (10YR 7/1) fine sand; single grained; loose; about 30 percent multicolored shell fragments; moderately alkaline; clear wavy boundary.
C4g—30 to 80 inches; light gray (5Y 7/1) fine sand; single grained; loose; about 2 percent multicolored shell fragments; moderately alkaline.

Captiva soils are mildly alkaline or moderately alkaline and are calcareous. They are fine sand, sand, or coarse sand to a depth of 80 inches or more.

The A1 horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. Content of shell fragments is about 10 to 15 percent. Thickness is 6 to 9 inches.

The C horizon has hue of 10YR or 5Y, value of 5 to 7, and chroma of 1 to 3 with streaks and mottles of light gray or pale brown. Content of shell fragments is less than 35 percent in the control section.

Chobee Series

The soils of the Chobee series are fine-loamy, siliceous, hyperthermic Typic Argiaquolls. They are nearly level, very poorly drained, very slowly permeable soils in depressions. These soils formed in thick beds of marine sediment. Slopes range from 0 to 1 percent.

In most years, under natural conditions, this soil is covered with water for 3 to 6 months. The water table is 10 to 40 inches below the surface for about 3 to 6 months.

Chobee soils are geographically associated with Felda, Pineda, Malabar, Oldsmar, Wabasso, Gator, and Floridana soils. Felda, Pineda, Malabar, Oldsmar, and Wabasso soils do not have a mollic epipedon. In addition, these soils do not have an argillic horizon within 20 inches of the surface. Oldsmar and Wabasso soils have a spodic horizon. Gator soils are organic.

Typical pedon of Chobee muck; about 530 feet south of the DeSoto County line and 330 feet west of an unpaved road, NE1/4NE1/4NW1/4 sec. 2, T. 40 S., R. 26 E., in Charlotte County:

Oa—0 to 4 inches; dark reddish brown (5YR 3/2) muck; about 75 percent fiber unrubbed, about 3 percent rubbed; weak fine granular structure; very friable; many fine roots; strongly acid; clear smooth boundary.

A11—4 to 10 inches; black (10YR 2/1) loamy fine sand; common grayish brown (10YR 5/2) sand streaks; weak fine subangular blocky structure; very friable; common fine roots; slightly acid; clear wavy boundary.

A12—10 to 16 inches; black (10YR 2/1) loamy fine sand; weak fine subangular blocky structure; very friable; common fine roots; slightly acid; abrupt wavy boundary.

B21t—16 to 28 inches; black (10YR 2/1) fine sandy loam; moderate medium subangular blocky structure; friable; common fine roots; neutral; clear wavy boundary.

B22t—28 to 42 inches; dark gray (10YR 4/1) sandy clay loam; moderate medium subangular blocky structure; friable; common fine roots; neutral; clear wavy boundary.

B23tg—42 to 53 inches; grayish brown (2.5Y 5/2) sandy loam; weak medium granular structure; friable; mildly alkaline; gradual wavy boundary.

C1g—53 to 61 inches; light brownish gray (10YR 6/2) loamy sand; single grained; loose; moderately alkaline; gradual wavy boundary.

C2g—61 to 80 inches; light brownish gray (10YR 6/2) fine sand; common pockets of light gray (10YR 7/1) uncoated sand; single grained; loose; moderately alkaline.

The Oa horizon ranges from strongly acid to slightly acid. The A horizon ranges from medium acid to neutral. All other horizons range from medium acid to moderately alkaline.

The Oa horizon has hue of 10YR or 5YR, value of 3, and chroma of 1 or 2. Thickness is 2 to 5 inches.

The A horizon is loamy fine sand or fine sandy loam. Thickness ranges from 10 to 16 inches.

The Bt horizon has hue of 10YR or 2.5Y, value of 2 through 5, and chroma of 1 or 2. It is sandy loam, fine sandy loam, or sandy clay loam.

The C horizon has hue of 2.5Y, 5Y, or 10YR; value of 5 through 7; and chroma of 1 or 2. It is loamy sand, loamy fine sand, fine sand, or sandy loam.

Cocoa Series

The soils of the Cocoa series are sandy, siliceous, hyperthermic Psammentic Hapludalfs. They are moderately deep, moderately well drained, rapidly permeable soils that formed in moderately thick beds of marine sediment. These soils are on ridges adjacent to natural drainageways. Slopes are smooth to convex and range from 0 to 2 percent.

These soils are considered to be taxadjuncts to the Cocoa series. Colors indicate that they are moderately well drained instead of well drained, and they are strongly acid rather than medium acid. Nevertheless, they are similar in use, management, and behavior to the soils of the Cocoa series.

In most years, under natural conditions, the water table is within 24 inches of the surface for 1 to 2 months. It is at a depth of 24 to 40 inches for 1 to 2 months. It recedes to a depth of more than 40 inches during extended dry periods.

Cocoa soils are geographically associated with Myakka, Boca, Hallandale, and Malabar soils, all of which are poorly drained. In addition, Myakka and Malabar soils do not have limestone within a depth of 80 inches.

Typical pedon of Cocoa fine sand; on a ridge about 1.6 miles south of Alico road and 350 feet east of U.S. Highway 41, NE1/4SW1/4NW1/4 sec. 17, T. 46 S., R. 25 E., in Lee County:

A1—0 to 3 inches; brown (10YR 5/3) fine sand; single grained; loose; many fine and few medium roots; medium acid; clear wavy boundary.

A2—3 to 13 inches; reddish yellow (7.5YR 6/6) fine sand; single grained; loose; few medium roots; strongly acid; clear wavy boundary.

B11—13 to 17 inches; yellowish red (5YR 5/6) fine sand; single grained; loose; few medium roots; medium acid; gradual wavy boundary.

B12—17 to 27 inches; reddish yellow (7.5YR 6/8) fine sand; weak fine granular structure; very friable; strongly acid; clear smooth boundary.

B2t—27 to 31 inches; strong brown (7.5YR 5/8) fine sand; weak fine subangular blocky structure; very friable; slightly acid; abrupt irregular boundary.

IIR—31 inches; fractured limestone (bedrock).

The A horizon is strongly acid or medium acid. The B horizon ranges from strongly acid to slightly acid.

The A1 horizon has hue of 10YR, value of 4, and chroma of 1; or it has hue of 10YR, value of 5, and chroma of 1 through 3. Thickness ranges from 3 to 5 inches. The A2 horizon has hue of 10YR, value of 7 or 8, and chroma of 1 or 3; or it has hue of 7.5YR, value of 6 or 7, and chroma of 4 through 6. Thickness ranges from 0 to 19 inches.

The B11 horizon has hue of 10YR, value of 4 or 7, and chroma of 3; hue of 10YR, value of 8, and chroma of 6; hue of 7.5YR, value of 6 or 7, and chroma of 6 or 8; or hue of 5YR, value of 5, and chroma of 6. Thickness ranges from 2 to 24 inches. The B12 horizon has hue of 10YR, value of 7 or 8, and chroma of 2, 4, or 6; or it has hue of 7.5YR, value of 5 through 7, and chroma of 6 or 8. Thickness ranges from 0 to 21 inches.

The B2t horizon has hue of 10YR, value of 5, and chroma of 6; or it has hue of 7.5YR, value of 5, and chroma of 8. Thickness ranges from 3 to 8 inches.

The B22t horizon, where present, has hue of 10YR, value of 6, and chroma of 6 or 8; or it has hue of 2.5Y, value of 6, and chroma of 4. Mottles of yellow, red, and brown are common. Thickness ranges from 0 to 10 inches.

Depth to limestone dominantly ranges from 24 to 40 inches. The depth to limestone is more than 40 inches in solution holes.

Copeland Series

The soils of the Copeland series are fine-loamy, siliceous, hyperthermic Typic Argiaquolls. They are moderately deep, very poorly drained, moderately permeable soils that formed in moderately thick beds of marine sediment over limestone. These soils are in depressions. Slopes are smooth to concave and range from 0 to 1 percent.

These soils are considered to be taxadjuncts to the Copeland series because they do not have sufficient increase in clay content in the B horizon to qualify it as an argillic horizon, and they have a sandy loam surface layer. They are, however, similar in use, management, and behavior to the soils of the Copeland series.

In most years, under natural conditions, the water table is above the surface for 3 to 6 months. The water table is 10 to 40 inches below the surface for about 3 to 6 months.

Copeland soils are geographically associated with Anclote, Boca, Felda, Floridana, and Pompano soils. Boca, Felda, and Pompano soils do not have a mollic epipedon. Floridana soils have an argillic horizon at a depth of 20 to 40 inches and do not have limestone. Anclote and Pompano soils are sandy to a depth of 80 inches or more.

Typical pedon of Copeland sandy loam, depressional; about 0.75 mile south of State Highway 80, NE1/4SE1/4 sec. 27, T. 43 S., R. 26 E., in Lee County:

A1—0 to 8 inches; very dark gray (10YR 3/1) sandy loam; common light gray (10YR 7/2) sand streaks; weak fine granular structure; very friable; few fine and medium roots; medium acid; clear smooth boundary.

B2t—8 to 20 inches; very dark gray (10YR 3/1) sandy loam; common light gray (10YR 7/2) sand streaks; moderate medium subangular blocky structure; friable; few fine and medium roots; neutral; abrupt irregular boundary.

IICca—20 to 28 inches; light brownish gray (10YR 6/2) sandy clay loam; soft calcium carbonate throughout; many coarse prominent brownish yellow (10YR 6/8) and yellow (10YR 7/6) mottles; common iron concretions; massive; friable; moderately alkaline; abrupt irregular boundary.

IIIR—28 inches; fractured limestone bedrock.

Thickness of the solum is less than 40 inches. Depth to hard, fractured limestone ranges from 20 to 40 inches. The A horizon is medium acid or slightly acid, and all other horizons range from neutral to moderately alkaline.

The A1 horizon has hue of 10YR, value of 2 or 3, and chroma of 1. Thickness is 7 to 9 inches. Where present, the A12 horizon has hue of 10YR, value of 3, and chroma of 1 or 2. It is loamy sand or sandy loam 6 to 9 inches thick.

The Bt horizon has hue of 10YR, value of 2 or 3, and chroma of 1; or it has hue of 5Y, value of 5 or 6, and chroma of 1. There are grayish brown, yellowish brown, brownish yellow, or red mottles. The Bt horizon is sandy loam or sandy clay loam. Thickness ranges from 6 to 12 inches. Where present, the B23t horizon has hue of 10YR, value of 4, and chroma of 1; or hue of 10YR, value of 3, and chroma of 2. There are brownish yellow mottles or yellowish brown streaks. Thickness ranges from 3 to 7 inches.

The C horizon, where present, has hue of 10YR, value of 5 through 7, and chroma of 1 or 2. It is sandy loam, fine sandy loam, or sandy clay loam. Thickness is 0 to 10 inches.

Daytona Series

The soils of the Daytona series are sandy, siliceous, hyperthermic Entic Haplohumods. They are deep, moderately well drained, moderately rapidly permeable soils that formed in thick deposits of marine sands. These nearly level to gently sloping soils are on low ridges in the flatwoods. Slopes are smooth to convex and range from 0 to 5 percent.

In most years, under natural conditions, the water table is 24 to 40 inches below the surface for a period of about 1 to 4 months. It is 40 to 60 inches below the surface for 8 months.

Daytona soils are geographically associated with Immokalee, Myakka, Orsino, and Pompano soils. The Immokalee, Myakka, and Pompano soils are poorly drained. Myakka, Orsino, and Pompano soils have an A horizon that is less than 30 inches thick. Pompano and Orsino soils do not have a spodic horizon or a Bh horizon. Orsino soils have yellowish colors in the subsoil.

Typical pedon of Daytona sand; on a low ridge about 0.86 mile south of State Highway 80 and 1.05 miles west of Hickey Creek ditch, NE1/4SE1/4 sec. 26, T. 43 S., R. 26 E., in Lee County:

A1—0 to 4 inches; dark gray (10YR 4/1) sand; many uncoated sand grains; weak fine granular structure; very friable; many fine and medium roots; strongly acid; clear wavy boundary.

A21—4 to 16 inches; light gray (10YR 7/1) sand; common grayish brown (10YR 5/2) streaks along root channels; single grained; loose; common fine and medium roots in the upper part of the horizon; strongly acid; gradual wavy boundary.

A22—16 to 43 inches; white (10YR 8/1) sand; few grayish brown (10YR 5/2) streaks along root channels; single grained; loose; few fine and medium roots; strongly acid; abrupt wavy boundary.

B2h—43 to 50 inches; mixed black (10YR 2/1) and dark reddish brown (5YR 3/2) sand; weak fine subangular blocky structure; friable; extremely acid; gradual wavy boundary.

B3—50 to 80 inches; dark brown (10YR 4/3) sand; single grained; loose; very strongly acid; clear wavy boundary.

Reaction is very strongly acid or strongly acid throughout.

The A1 horizon has hue of 10YR, value of 4 through 6, and chroma of 1. Thickness ranges from 2 to 6 inches. The A2 horizon has hue of 10YR, value of 7 or 8, and chroma of 1. Combined thickness of the A1 and A2 horizons ranges from 41 to 50 inches. The combined thickness must be more than 30 inches but less than 50 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, and chroma of 2; or hue of 5YR, value of 2 or 3, and chroma of 2.

The B3 horizon has hue of 10YR, value of 4, and chroma of 3; or it has hue of 5YR, value of 3 or 4, and chroma of 2 or 4. Some pedons have a B3&Bh horizon. Where present, this horizon has matrix colors with hue of 10YR, value of 4 or 5, and chroma of 3; there are common to many spodic fragments. Thickness of the B3 horizon ranges from 5 to 18 inches.

The C horizon, where present, has hue of 10YR, value of 7, and chroma of 1 or 4. Light gray sand streaks are in the lower part of this horizon.

EauGallie Series

The soils of the EauGallie series are sandy, siliceous, hyperthermic Alfic Haplaquods. They are deep, poorly drained, moderately permeable soils in nearly level flatwoods. These soils formed in thick beds of loamy marine sediment.

These soils are considered to be taxadjuncts to the EauGallie series because they have a loamy sand B3 horizon. Nevertheless, they are similar in use, management, and behavior to the soils of the EauGallie series.

In most years, under natural conditions, the water table is less than 10 inches below the surface for 2 to 4 months. It is 10 to 40 inches below the surface for more than 6 months. It is more than 40 inches below the surface during extended dry periods.

EauGallie soils are geographically associated with Immoaklee, Oldsmar, Pineda, and Wabasso soils. Pineda and Wabasso soils have an argillic horizon within a depth of 40 inches. In addition, Pineda soils have a Bir horizon and do not have a spodic horizon. Immokalee soils are sandy to a depth of more than 80 inches and do not have a spodic horizon. Oldsmar soils have a spodic horizon below a depth of 30 inches.

Typical pedon of EauGallie sand; approximately 0.5 mile north of State Highway 74 and about 0.3 mile east of Orange Grove, NE1/4SW1/4 sec. 35, T. 40 S., R. 26 E., in Charlotte County:

A1—0 to 4 inches; dark gray (10YR 4/1) sand; weak fine granular structure; very friable; many uncoated sand grains; common fine and medium roots; medium acid; clear smooth boundary.

A21—4 to 9 inches; gray (10YR 6/1) sand; single grained; loose; common fine and medium roots; strongly acid; gradual wavy boundary.

A22—9 to 22 inches; light gray (10YR 7/1) fine sand; many medium distinct brown (10YR 5/3) mottles; single grained; loose; medium acid; abrupt wavy boundary.

B2h—22 to 27 inches; dark brown (7.5YR 3/2) sand; moderate medium subangular blocky structure; friable; sand grains are well coated with organic matter; very strongly acid; gradual wavy boundary.

B3—27 to 41 inches; dark brown (7.5YR 4/4) loamy sand; weak fine subangular blocky structure; friable; very strongly acid; clear wavy boundary.

A'21—41 to 45 inches; pale brown (10YR 6/3) loamy sand; single grained; loose; strongly acid; gradual wavy boundary.

A'22—45 to 58 inches; light gray (10YR 7/2) sand; single grained; loose strongly acid; gradual irregular boundary.

B'2tg—58 to 80 inches; light gray (5Y 7/1) sandy loam; moderate medium subangular blocky structure; friable; strongly acid.

Thickness of the solum ranges from 60 to 80 inches. EauGallie soils are strongly acid through medium acid in the A horizon and very strongly acid through medium acid in all other horizons.

The A1 horizon has hue of 10YR, value of 2 through 4, and chroma of 1. Thickness is 3 to 4 inches. The A2 horizon has hue of 10YR, value of 6 through 8, and chroma of 1 with or without mottles of brown. Thickness ranges from 18 to 22 inches.

The B2h horizon has hue of 10YR, value of 3, and chroma of 2 or 3; hue of 7.5YR, value of 3, and chroma of 2; or hue of 5YR, value of 2 or 3, and chroma of 2 with or without black, firm spodic fragments. Thickness ranges from 4 to 21 inches.

The B3 horizon, where present, has hue of 10YR, value of 4 or 5, and chroma of 3; or it has hue of 7.5YR, value of 4, and chroma of 4. Thickness ranges from 0 to 24 inches.

The A'2 horizon, where present, has hue of 10YR, value of 6 or 7, and chroma of 2 or 3. Thickness ranges from 0 to 17 inches.

The Btg horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2; or it has hue of 5Y, value of 7, and chroma of 1. It is fine sandy loam or sandy loam.

The C horizon, where present, has hue of 10YR, value of 6 or 7, and chroma of 2 or 3. It is loamy fine sand or loamy sand.

Electra Series

The soils of the Electra series are sandy, siliceous, hyperthermic Arenic Ultic Haplohumods. They are deep, somewhat poorly drained, slowly permeable to very slowly permeable soils that formed in thick beds of sandy and loamy marine sediment. These nearly level soils are on low knolls and ridges. Slopes range from 0 to 2 percent.

These soils are considered to be taxadjuncts to the Electra series because they have base saturation greater than 35 percent in the argillic horizon. They are, however, similar in use, management, and behavior to the soils of the Electra series.

In most years, under natural conditions, the water table is 24 to 40 inches below the surface for 2 to 6 months and 40 to 72 inches below the surface for 6 months or more.

Electra soils are geographically associated with Oldsmar and Bradenton soils. Oldsmar soils are in lower positions on the landscape and are poorly drained. Bradenton soils have an argillic horizon within 20 inches of the surface.

Typical pedon of Electra fine sand; on a low ridge approximately 600 feet south of State Highway 80 and 0.75 mile west of the Hendry County line, SW1/4NE1/4SE1/4 sec. 25, T. 43 S., R. 27 E., in Lee County:

Ap—0 to 4 inches; light brownish gray (10YR 6/2) fine sand; weak fine granular structure; very friable; common fine and medium roots; many uncoated sand grains; neutral; clear smooth boundary.

A21—4 to 13 inches; light gray (10YR 7/1) sand; single grained; loose; few fine roots; slightly acid; gradual wavy boundary.

A22—13 to 43 inches; white (10YR 8/1) fine sand; single grained; loose; slightly acid; abrupt wavy boundary.

B2h—43 to 47 inches; dark reddish brown (5YR 3/2) fine sand; weak fine subangular blocky structure; very friable; strongly acid; clear wavy boundary.

A'21—47 to 63 inches; very pale brown (10YR 7/3) fine sand; single grained; loose; strongly acid; clear wavy boundary.

A'22—63 to 66 inches; pale olive (5YR 6/3) sand; common fine light gray streaks; weak fine subangular blocky structure; friable; medium acid; gradual irregular boundary.

B'21tg—66 to 80 inches; pale olive (5Y 6/3) fine sandy loam; many fine distinct brownish yellow mottles; weak fine subangular blocky structure; friable; medium acid.

Reaction is strongly acid or medium acid in all horizons, except where the soil has been limed.

The Ap horizon has hue of 10YR, value of 2 through 6, and chroma of 1 or 2. Thickness ranges from 2 to 6 inches. The A2 horizon has hue of 10YR, value of 5 through 8, and chroma of 1 or 2. Thickness ranges from 35 to 48 inches.

The Bh horizon has hue of 5YR, value 2 or 3, and chroma of 1 or 2. Thickness ranges from 4 to 8 inches.

The A'2 horizon, where present, has hue of 10YR or 5Y, value of 5 through 7, and chroma of 1 through 3. It is sand or fine sand.

The Bt horizon has hue of 5Y, value of 6, and chroma of 2 or 3 with yellow mottles. It is fine sandy loam or sandy clay loam. Thickness ranges from 6 to 15 inches.

Estero Series

The soils of the Estero series are sandy, siliceous, hyperthermic Typic Haplaquods. They are deep, very poorly drained, moderately rapidly permeable soils on nearly level, broad, tidal marsh areas. Areas of these soils are subject to tidal flooding. Slopes range from 0 to 1 percent.

Estero soils are geographically associated with Pompano and Myakka soils. Myakka soils do not have a high sulfur content and are in flatwoods. Pompano soils do not have a spodic horizon.

Typical pedon of Estero muck; in a tidal marsh, about 1.25 miles south of the intersection of a powerline and Hendry Creek and about 1 mile west, SW1/4SE1/4 sec. 15, T. 46 S., R. 24 E., in Lee County:

Oa—0 to 5 inches; black (10YR 2/1) muck; about 90 percent fiber, less than 10 percent rubbed; massive; friable; 322 millimhos per centimeter conductivity; very strongly acid; abrupt smooth boundary.

A11—5 to 8 inches; black (N 2/0) fine sand; weak fine granular structure; very friable; many fine roots; 40 millimhos per centimeter conductivity; strongly acid; clear smooth boundary.

A12—8 to 13 inches; very dark gray (10YR 3/1) fine sand; weak fine granular structure; very friable; many fine roots; 20 millimhos per centimeter conductivity; neutral; clear wavy boundary.

A21—13 to 19 inches; light brownish gray (10YR 6/2) fine sand; few fine distinct yellowish red (5YR 5/8) mottles; single grained; loose; few fine roots; 20 millimhos per centimeter conductivity; neutral; clear wavy boundary.

A22—19 to 33 inches; grayish brown (10YR 5/2) fine sand; few medium distinct yellowish red (5YR 5/6) mottles; single grained; loose; few very fine roots; 21 millimhos per centimeter conductivity; mildly alkaline; abrupt wavy boundary.
B21h—33 to 39 inches; black (5YR 2/1) and dark grayish brown (10YR 4/2) fine sand; massive; very friable; sand grains thinly coated with organic matter; 36 millimhos per centimeter conductivity; very strongly acid; clear wavy boundary.
B22h—39 to 43 inches; black (10YR 2/1) and dark reddish brown (5YR 3/2) fine sand; massive; very friable; sand grains thinly coated with organic matter; 34 millimhos per centimeter conductivity; very strongly acid; gradual wavy boundary.
B3—43 to 55 inches; dark brown (10YR 4/3) and black (10YR 2/1) fine sand; massive; very friable; 18 millimhos per centimeter conductivity; very strongly acid; clear wavy boundary.
C—55 to 80 inches; grayish brown (10YR 5/2) fine sand; few fine distinct black (10YR 2/1) mottles; single grained; loose; very strongly acid.

Reaction ranges from strongly acid to mildly alkaline throughout. Conductivity of the saturation extract dominantly ranges from about 245 to 325 millimhos per centimeter in the Oa horizon and from about 17 to 40 millimhos per centimeter in the mineral horizons.

The Oa horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. Thickness ranges from 3 to 5 inches.

The A11 and A12 horizons have hue of 10YR, value of 2 to 6, and chroma of 1; or they are neutral and have value of 2. Thickness ranges from 4 to 10 inches. The A2 horizon has hue of 10YR, value of 5 through 7, and chroma of 1 or 2. There are mottles and streaks of yellowish brown, dark brown, or yellowish red. Thickness ranges from 14 to 26 inches.

The B21h horizon has hue of 5YR, value of 2, and chroma of 1; hue of 7.5YR, value of 3, and chroma of 2; or hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The B21h horizon has many uncoated sand grains and does not meet the requirements of a spodic horizon. The B22h horizon has hue of 5YR, value of 3, and chroma of 2; or it has hue of 10YR, value of 2, and chroma of 1. The sand grains are thickly coated with organic matter. The B22h horizon meets the requirements of a spodic horizon. Combined thickness of the B21h and B22h horizons ranges from 4 to 15 inches.

The C horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. There are black or very dark grayish brown mottles.

Felda Series

The soils of the Felda series are loamy, siliceous, hyperthermic Arenic Ochraqualfs. They are deep, poorly drained, moderately permeable soils that formed in sandy and loamy marine sediments. These soils are in sloughs or depressions.

These soils are considered to be taxadjuncts to the Felda series because they have a loamy fine sand Bt horizon. They are, however, similar in use, management, and behavior to the soils of the Felda series.

In sloughs, during periods of high rainfall, the soil is covered by a shallow layer of slowly moving water for periods of about 7 days to 1 month or more. In depressions, the soil is ponded for 3 to 6 months or more in most years.

Felda soils are geographically associated with Boca, Malabar, Oldsmar, Pineda, and Wabasso soils. Boca soils have limestone at a depth of 20 to 40 inches. Oldsmar and Wabasso soils have a spodic horizon. Malabar and Pineda soils have a Bir horizon within 30 inches. Malabar and Oldsmar soils have an argillic horizon below a depth of 40 inches.

Typical pedon of Felda fine sand; about 1.1 miles east of the Charlotte County Airport, and 1.7 miles north of the North Prong of Alligator Creek that crosses State Highway 768, SW1/4NW1/4SE1/4 sec. 12, T. 41 S., R. 23 E., in Charlotte County:

Ap—0 to 8 inches; dark gray (10YR 4/1) fine sand; single grained; loose; many fine roots; mildly alkaline; gradual wavy boundary.
A21—8 to 11 inches; light gray (10YR 7/2) fine sand; single grained; loose; many fine roots; medium acid; clear wavy boundary.
A22—11 to 22 inches; light brownish gray (10YR 6/2) fine sand; many medium prominent yellowish brown (10YR 5/6 and 5/8) mottles; single grained; loose; few fine roots; slightly acid; clear wavy boundary.
Btg—22 to 38 inches; light gray (10YR 7/1) loamy fine sand; many medium prominent yellowish brown (10YR 5/6 and 5/8) mottles; few krotovinas of light brownish gray fine sand, 1 to 2 inches across; moderate medium subangular blocky structure; mildly alkaline; clear wavy boundary.
C1g—38 to 60 inches; gray (5Y 6/1) fine sand; common medium distinct dark gray (10YR 4/1) mottles with black (10YR 2/1) carbon nodules; massive; neutral; abrupt wavy boundary.
C2g—60 to 66 inches; gray (5Y 5/1) fine sand; common medium distinct greenish gray (5GY 6/1) mottles; massive; mildly alkaline; gradual wavy boundary.
C3—66 to 80 inches; light gray (5Y 7/1) fine sand; many medium gray (5Y 6/1) mottles; massive; mildly alkaline.

Thickness of the solum ranges from 41 to 70 inches. The A horizon ranges from medium acid to slightly acid, except in areas that have been limed. The Btg and Cg horizons are neutral or mildly alkaline.

The A1 or Ap horizon has hue of 10YR, value of 3 through 5, and chroma of 1. Thickness ranges from 3 to

8 inches. The A2 horizon has hue of 10YR, value of 5 through 7, and chroma of 1 or 2 with few to common yellow and brown mottles. Total thickness of the A horizon ranges from 20 to 40 inches.

The B2tg horizon has hue of 10YR, value of 4 through 7, and chroma of 1 or 2; or it has hue of 2.5Y, value of 4 through 6, and chroma of 2; or it is neutral and has value of 4 to 6. There are common to many red, yellow, and brown mottles. The B2tg horizon ranges from loamy fine sand to sandy clay loam. Thickness ranges from 4 to 16 inches.

A B3g horizon is present in some pedons. It has hue, value, and chroma of 10YR 6/2, 5Y 7/1, or 2.5Y 7/2. It is loamy fine sand or sandy loam. Thickness ranges from 0 to 29 inches.

The Cg horizon has hue of 10YR, value of 7, and chroma of 2; hue of 2.5Y, value of 5, and chroma of 2; or hue of 5Y, value of 5 through 7, and chroma of 1. It ranges from fine sand to loamy fine sand. Shell fragments and shells range from few to many in many pedons.

Floridana Series

The soils of the Floridana series are loamy, siliceous, hyperthermic Arenic Argiaquolls. They are nearly level, very poorly drained, slowly permeable or very slowly permeable soils in depressions. These soils formed in thick beds of sandy and loamy marine sediments. Slopes range from 0 to 1 percent.

In most years, under natural conditions, the soil is covered by water for 3 to 6 months. The water table is 10 to 40 inches below the surface during extended dry periods.

Floridana soils are geographically associated with Boca, Felda, Gator, Hallandale, Malabar, Terra Ceia, Wabasso, and Winder soils. Boca, Felda, Winder, Hallandale, and Malabar soils do not have a mollic epipedon. In addition, Malabar soils do not have an argillic horizon within 40 inches of the surface. Terra Ceia and Gator soils are organic. Boca soils have limestone within a depth of 20 to 40 inches. Wabasso soils have a spodic horizon within 30 inches of the surface.

Typical pedon of Floridana sand, depressional; in a depression about 2 miles south of State Highway 82, SE1/4SE1/4 sec. 17, T. 45 S., R. 26 E., in Lee County:

A11—0 to 6 inches; black (10YR 2/1) sand; weak fine granular structure; very friable; common fine and few medium roots; strongly acid; clear smooth boundary.

A12—6 to 22 inches; black (10YR 2/1) sand; common light brownish gray (10YR 6/2) sand streaks throughout; single grained; loose; common fine roots; strongly acid; clear smooth boundary.

A2—22 to 39 inches; light brownish gray (10YR 6/2) sand; single grained; loose; few fine roots; medium acid; clear smooth boundary.

B2tg—39 to 54 inches; olive gray (5Y 5/2) fine sandy loam; moderate medium subangular blocky structure; slightly sticky and slightly plastic; sand grains are coated and bridged with clay; neutral; clear smooth boundary.

C—54 to 80 inches; light brownish gray (10YR 6/2) sand; few pockets of olive gray (5Y 5/2) loamy sand; massive; friable; neutral.

Thickness of the solum ranges from 56 to 80 inches. The soil is strongly acid or medium acid in the surface layer and ranges from medium acid to mildly alkaline in all other horizons.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2; or it is neutral and has value of 2 or 3. The A2 horizon has hue of 10YR, value of 4 through 7, and chroma of 1 or 2.

The B2tg or B3 horizon has hue of 10YR, value of 5 through 7, and chroma of 1 or 2 with yellow, gray, or brown mottles; or it has hue of 5Y, value of 5 or 6, and chroma of 1 or 2. It is fine sandy loam, sandy loam, or sandy clay loam.

The C horizon has hue of 10YR or 5Y, value of 6 or 7, and chroma of 1 or 2. It is sand, fine sand, or loamy sand.

Gator Series

The soils of the Gator series are loamy, siliceous, euic, hyperthermic Terric Medisaprists. They are moderately deep to deep, very poorly drained organic soils that formed in deposits of nonwoody, fibrous, hydrophytic plant remains and loamy marine sediment. These nearly level soils are on broad, freshwater marsh areas. Slopes range from 0 to 1 percent.

These soils are considered to be taxadjuncts to the Gator series because they have a strongly acid, fine sand layer underlying the organic material. They are, however, similar in use, management, and behavior to the soils of the Gator series.

In most years, under natural conditions, the soil is covered by water for 3 to 6 months. The water table is 10 to 24 inches below the surface during extended dry periods.

Gator soils are geographically associated with Terra Ceia, Floridana, Felda, and Winder soils. Floridana, Felda, and Winder soils are mineral soils and are in slightly higher positions on the landscape. Terra Ceia soils have more than 51 inches of muck over mineral material.

Typical pedon of Gator muck; in a freshwater marsh, NE1/4NE1/4 sec. 1, T. 40 S., R. 27 E., in Charlotte County:

Oa1—0 to 8 inches; sodium pyrophosphate black (10YR 2/1) muck; about 70 percent fiber unrubbed, about 10 percent rubbed; weak fine granular structure;

friable; many fine roots; extremely acid (pH is 4.2 in 0.01 molar calcium chloride); clear wavy boundary.

Oa2—8 to 21 inches; sodium pyrophosphate very dark grayish brown (10YR 3/2) muck; about 80 percent fiber unrubbed, about 12 percent rubbed; weak medium subangular blocky structure; friable; many fine roots; extremely acid (pH is 4.3 in 0.01 molar calcium chloride); gradual wavy boundary.

Oa3—21 to 29 inches; sodium pyrophosphate dark brown (10YR 3/3) muck; about 60 percent fiber unrubbed, about 5 percent rubbed; weak medium subangular blocky structure; friable; very strongly acid (pH is 4.7 in 0.01 molar calcium chloride); gradual wavy boundary.

IIC1—29 to 32 inches; very dark gray (10YR 3/1) fine sand; strong fine granular structure; friable; strongly acid; clear smooth boundary.

IIC2—32 to 34 inches; light brownish gray (10YR 6/2) fine sand; single grained; loose; strongly acid; abrupt wavy boundary.

IIIC3—34 to 39 inches; dark gray (10YR 4/1) fine sandy loam; common light gray sand intrusions; massive; friable; medium acid; clear smooth boundary.

IIIC4—39 to 53 inches; gray (5Y 5/1) fine sandy loam; massive; friable; slightly acid; clear wavy boundary.

IVC5—53 to 63 inches; gray (5Y 5/1) fine sandy loam; common dark gray sand intrusions; common streaks of light gray calcium carbonate; massive; friable; neutral; clear wavy boundary.

IVC6—63 to 68 inches; light gray (5Y 7/1) loam; few dark gray streaks; many very fine shell fragments; massive; friable; mildly alkaline; clear wavy boundary.

IVC7—68 to 80 inches; gray (5Y 6/1) fine sand; few medium distinct greenish gray mottles; single grained; friable; mildly alkaline.

Soil reaction ranges from 4.3 to 5.0 in 0.01 molar calcium chloride in the Oa horizon. In the IIC horizon, reaction ranges from 5.1 to 5.5, and in the IIIC and IVC horizons it ranges from 5.1 to 8.4.

Thickness of the organic material ranges from 16 to 38 inches.

The Oa horizon has hue of 10YR, value of 2, and chroma of 1; hue of 10YR, value of 3, and chroma of 2 or 3; or hue of 5YR, value of 2, and chroma of 1 or 2.

The IIC horizon has hue of 10YR, value of 4 through 6, and chroma of 1 or 2.

The IIIC horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2; hue of 2.5Y, value of 6, and chroma of 2 with mottles or streaks of light brownish gray or olive brown; or hue of 5Y, value of 5, and chroma of 1. The texture is fine sand, loamy fine sand, loam, or fine sandy loam.

The IVC horizon has hue of 10YR, value of 5, and chroma of 1; hue of 2.5Y, value of 6 or 7, and chroma of 2; or hue of 5Y, value of 5 through 7, and chroma of 1. Some pedons do not have shell fragments or calcium carbonate. The texture is fine sand, loamy fine sand, loam, or fine sandy loam.

Hallandale Series

The soils of the Hallandale series are siliceous, hyperthermic Lithic Psammaquents. They are shallow, poorly drained, moderately rapidly permeable soils that formed in thin beds of sandy marine sediment over limestone. These nearly level soils are in flatwoods and in broad sloughs. Slopes range from 0 to 2 percent.

In most years, in the flatwoods under natural conditions, the water table is less than 10 inches below the surface for 1 to 3 months. It recedes below the limestone for about 7 months. In sloughs during periods of high rainfall, the soil is covered by slowly moving shallow water for periods of about 7 days to 1 month or more.

Hallandale soils are geographically associated with Boca, Pineda, Immokalee, and Wabasso soils. Boca soils have an argillic horizon and limestone at a depth of 20 to 40 inches. Pineda soils have a Bir horizon and an argillic horizon. Immokalee and Wabasso soils have a spodic horizon. In addition, Wabasso soils have an argillic horizon below the spodic horizon.

Typical pedon of Hallandale fine sand; in the flatwoods, about 0.5 mile south of Daniels Road, 0.7 mile east of U.S. Highway 41, NW1/4NE1/4 sec. 25, T. 45 S., R. 25 E., in Lee County:

A1—0 to 2 inches; gray (10YR 5/1) fine sand; single grained; loose; common fine and medium and few coarse roots; medium acid; clear smooth boundary.

A2—2 to 7 inches; light gray (10YR 7/1) fine sand; single grained; loose; few fine, medium, and coarse roots; medium acid; clear smooth boundary.

B1—7 to 12 inches; very pale brown (10YR 7/4) fine sand; single grained; loose; few fine and medium roots; neutral; abrupt irregular boundary.

IIR—12 inches; fractured limestone bedrock.

The A horizon is slightly acid or neutral. The B horizon is neutral or mildly alkaline.

The A horizon has hue of 10YR, value of 3 through 6, and chroma of 1. Thickness ranges from 2 to 6 inches. The A2 horizon has hue of 10YR, value of 5 through 7, and chroma of 1. Thickness ranges from 4 to 12 inches.

The B horizon, where present, has hue of 10YR with value of 5 or 6 and chroma of 3; value of 4 through 6 and chroma of 4; or value of 5 and chroma of 6.

In many pedons, a C horizon is between the A horizon and the limestone. It has hue of 10YR, value of 4 through 8, and chroma of 1 or 2. Texture is dominantly fine sand or sand. However, some pedons have a thin layer of loamy fine sand or loamy sand in less than half of the pedon immediately above the fractured limestone bedrock.

The underlying hard limestone ledge has fractures from less than an inch to 4 or more inches in width. Solution holes from about 4 inches to 3 feet in diameter occur at intervals of about 1 to 6 feet.

Beneath the limestone ledge are variable, discontinuous layers of sand to sandy loam mixed with shells or shell fragments.

Heights Series

The soils of the Heights series are sandy, siliceous, hyperthermic Arenic Ochraqualfs. They are deep, poorly drained, slowly permeable soils in nearly level areas of flatwoods. These soils formed in a thick bed of loamy marine sediment. Slopes range from 0 to 2 percent.

Heights soils are geographically associated with Felda, Boca, Hallandale, Oldsmar, and Wabasso soils. Felda soils do not have iron-cemented sandstone. Oldsmar and Wabasso soils have a spodic horizon. Boca soils have limestone at a depth of 24 to 40 inches. Hallandale soils have limestone within 20 inches of the surface.

Typical pedon of Heights fine sand; in the flatwoods, NW1/4NW1/4NE1/4 sec. 5, T. 42 S., R. 24 E., in Charlotte County:

A1—0 to 4 inches; dark gray (10YR 4/1) fine sand; single grained; loose; common fine roots, few medium and coarse roots; slightly acid; clear smooth boundary.

A2—4 to 18 inches; light gray (10YR 7/2) fine sand; single grained; loose; common fine roots, few medium and coarse roots; neutral; clear smooth boundary.

B11—18 to 21 inches; grayish brown (10YR 5/2) fine sand; single grained; loose; few fine and medium roots; mildly alkaline; clear smooth boundary.

B12ca—21 to 29 inches; yellowish brown (10YR 5/4) fine sand; common fine distinct white (10YR 8/1) calcium carbonate streaks along root channels; single grained; loose; strongly alkaline; abrupt wavy boundary.

B21tca—29 to 36 inches; light yellowish brown (2.5Y 6/4) loamy sand; common medium distinct light gray (N 7/0) and many large prominent yellowish brown (10YR 5/8) and brownish yellow (10YR 6/8) mottles; common white (10YR 8/1) calcium carbonate streaks along root channels; weak medium subangular blocky structure; slightly sticky and slightly plastic; moderately alkaline; gradual wavy boundary.

B22tca—36 to 42 inches; yellowish brown (10YR 5/8) cobbly loamy sand; common medium distinct light yellowish brown (2.5Y 6/4) mottles; common soft masses of secondary carbonates; about 25 percent iron-cemented sandstone, 3 to 8 inches across; moderate medium subangular blocky structure; slightly sticky and slightly plastic; moderately alkaline; gradual wavy boundary.

B23tgca—42 to 50 inches; light gray (N 7/0) fine sandy loam; common coarse prominent yellowish brown (10YR 5/8) and olive (5Y 4/3 and 5/4) mottles; common soft masses of secondary carbonates; few iron-cemented sandstone cobbles; weak medium subangular blocky structure; slightly sticky and slightly plastic; mildly alkaline; gradual wavy boundary.

Cg—50 to 80 inches; gray (5Y 6/1) loamy sand; common medium distinct light olive brown (2.5Y 5/4) and light yellowish brown (2.5Y 6/4) mottles; few pockets of gray (5Y 6/1) fine sandy loam and sandy clay loam; massive; friable; neutral.

Thickness of the solum ranges from 54 to 71 inches. Reaction is slightly acid or neutral in the surface and subsurface layers and ranges from neutral to strongly alkaline in all other horizons.

The A1 horizon has hue of 10YR, value of 3 through 5, and chroma of 1. Thickness is 3 to 6 inches. The A2 horizon has hue of 10YR, value of 5 through 7, and chroma of 1 through 3. Thickness is 5 to 24 inches.

The B1 horizon has hue of 10YR, value of 4 through 6, and chroma of 2 through 4 with yellowish and brownish mottles.

The B21tca horizon has hue of 5Y, value of 6 or 7, and chroma of 1 or 2 with mottles of yellowish brown, brownish yellow, pale olive, light olive brown, or olive yellow; hue of 10YR, value of 6, and chroma of 1 or 2 with mottles of brown, brownish yellow, or yellowish brown; hue of 5GY, value of 5, and chroma of 1 with mottles of light olive brown; or hue of 2.5Y, value of 6, and chroma of 4 with mottles of light gray, yellowish brown, or brownish yellow. It is loamy sand or loamy fine sand. Thickness is 4 to 10 inches.

The B22tca horizon has hue of 10YR with value of 5 and chroma of 8 or value 7 and chroma of 2 with mottles of strong brown, light yellowish brown, or light olive brown; hue of 5Y, value of 5 or 6, and chroma of 1 with mottles of pale olive, olive yellow, or brownish yellow; or hue of 2.5Y, value of 6, and chroma of 1. It is cobbly loamy sand or cobbly sandy loam. Thickness is 6 to 12 inches.

The B23tgca horizon has hue of 5Y, value of 6 or 7, and chroma of 1 with mottles of olive yellow, light yellowish brown, or brownish yellow; or it is neutral and has value of 7 with mottles of yellowish brown or olive. It is fine sandy loam or loamy sand. Thickness is 8 to 12 inches.

The B3 horizon, where present, has hue of 5GY, value of 6, and chroma of 1; or it has hue of 5Y, value of 7, and chroma of 1. Thickness is 0 to 20 inches.

The C horizon has hue of 10YR, value of 5, and chroma of 2; hue of 5GY, value of 6, and chroma of 1;

or hue of 2.5Y, value of 6, and chroma of 4. It is fine sand or loamy fine sand.

Immokalee Series

The soils of the Immokalee series are sandy, siliceous, hyperthermic Arenic Haplaquods. They are deep, poorly drained, moderately permeable soils that formed in thick beds of marine sands. These nearly level soils are in flatwoods. Slopes are smooth to slightly convex and range from 0 to 2 percent.

In most years, under natural conditions, the water table is within 10 inches of the surface for 1 to 3 months and 10 to 40 inches below the surface for 2 to 6 months. It recedes to more than 40 inches below the surface during extended dry periods.

Immokalee soils are geographically associated with Boca, Malabar, Myakka, Oldsmar, Daytona, and Wabasso soils. All of these associated soils have a spodic horizon except for the Boca and Malabar soils. Boca soils are underlain by limestone. Malabar soils have an argillic horizon below a depth of 40 inches. Oldsmar and Wabasso soils have an argillic horizon below the spodic horizon.

Typical pedon of Immokalee sand; on a low ridge in the flatwoods, about 2 miles south of the intersection of Buckingham road and State Highway 80 and about 2 miles east, SE1/4SW1/4 sec. 35, T. 43 S., R. 26 E., in Lee County:

A11—0 to 4 inches; black (10YR 2/1) sand; many uncoated sand grains; weak fine granular structure; very friable; many fine and few medium roots; extremely acid; clear wavy boundary.

A12—4 to 9 inches; dark gray (10YR 4/1) sand; weak fine granular structure; very friable; many fine and few medium roots; very strongly acid; gradual wavy boundary.

A21—9 to 16 inches; gray (10YR 5/1) sand; few grayish brown (10YR 5/2) streaks along root channels; single grained; loose; common medium and few fine roots; strongly acid; clear wavy boundary.

A22—16 to 36 inches; light gray (10YR 7/1) sand; few very dark grayish brown and grayish brown streaks along root channels; single grained; loose; few medium roots; medium acid; abrupt wavy boundary.

B21h—36 to 50 inches; black (10YR 2/1) sand; few large dark reddish brown (5YR 2/2) spodic fragments; many sand grains coated with organic matter; moderate medium subangular blocky structure; firm; extremely acid; gradual wavy boundary.

B22h—50 to 55 inches; dark reddish brown (5YR 2/2) sand; few dark reddish brown (5YR 3/4) spodic fragments; moderate medium subangular blocky structure; firm; extremely acid; gradual smooth boundary.

B3&Bh—55 to 69 inches; dark yellowish brown (10YR 4/4) sand; common medium distinct very dark grayish brown (10YR 3/2) spodic fragments; weak fine subangular blocky structure; friable; extremely acid; clear smooth boundary.

C—69 to 80 inches; very pale brown (10YR 7/3) sand; single grained; loose; very strongly acid.

Thickness of the solum is 69 inches or more. Reaction ranges from extremely acid to medium acid in all horizons.

The A1 horizon has hue of 10YR, value of 2 through 4, and chroma of 1. The A2 horizon has hue of 10YR, value of 5 through 7, and chroma of 1 or 2. Many pedons have very dark grayish brown and grayish brown streaks along root channels in the A2 horizon. Total thickness of the A horizon is 30 to 48 inches.

The B2h horizon has hue of 5YR with value of 2 and chroma of 1 or 2 or value of 3 and chroma of 2; hue of 10YR, value of 2 or 3, and chroma of 1 or 2; or hue of 7.5YR, value of 3, and chroma of 2.

The B3 horizon has hue of 10YR, value of 3 through 5, and chroma of 3 or 4.

The C horizon has hue of 10YR, value of 4 through 7, and chroma of 1 through 3. The C horizon is absent in some pedons.

Isles Series

The soils of the Isles series are loamy, siliceous, hyperthermic Arenic Ochraqualfs. They are deep, poorly drained and very poorly drained, moderately permeable soils that formed in marine sediment 40 to 60 inches thick over limestone. These nearly level soils are in tidal swamps depressions, and sloughs. Slopes range from 0 to 1 percent.

Isles soils are geographically associated with Boca, Kesson, Wabasso, and Wulfert soils. Boca soils have less than 0.75 percent sulfur within 20 inches of the surface, do not have an organic surface layer, and have rock at a depth of less than 40 inches. Wulfert soils have more than 16 inches of organic material over mineral material. Kesson soils are sandy throughout, and Wabasso soils have a Bh horizon.

Typical pedon of Isles muck; in a mangrove swamp, approximately 0.5 mile south of Alligator Creek and 1.5 miles west of State Highway 765, SE1/4SE1/4SW1/4 sec. 30, T. 41 S., R. 23 E., in Charlotte County:

O1—0 to 5 inches; dark reddish brown (5YR 2/2) muck; about 80 percent fibers unrubbed, about 5 percent rubbed; massive; friable; about 0.8 percent sulfur; 19 millimhos per centimeter conductivity; slightly acid; clear wavy boundary.

A1—5 to 11 inches; very dark grayish brown (10YR 3/2) mucky fine sand; about 10 percent well decomposed organic material in krotovinas and along root channels; massive; friable; about 2.0 percent sulfur; many fine and medium and common coarse roots; 13.65 millimhos per centimeter conductivity; slightly acid; gradual wavy boundary.

A2—11 to 39 inches; grayish brown (10YR 5/2) fine sand; common medium distinct light brownish gray (10YR 6/2) mottles; about 5 percent organic material in krotovinas and along root channels; massive; friable; about 1.0 percent sulfur; 6.15 millimhos per centimeter conductivity; medium acid; gradual wavy boundary.

B2tg—39 to 47 inches; grayish brown (10YR 5/2) fine sandy loam; common fine distinct dark greenish gray (5BG 4/1) and common medium prominent light olive brown (2.5Y 5/6) mottles; weak medium subangular blocky structure; friable; about 1.0 percent sulfur; 3.85 millimhos per centimeter conductivity; neutral; abrupt irregular boundary.

IIR—47 inches; fractured limestone bedrock.

Thickness of the solum ranges from 40 to 60 inches. Sulfur content ranges from about 0.8 percent to 3.0 percent in the O1 and A horizons. Reaction ranges from strongly acid to neutral in the surface and subsurface horizons and from medium acid to moderately alkaline in all other horizons.

The O1 horizon has hue of 10YR, 7.5YR, or 5YR, value of 2 or 3, and chroma of 2. Thickness ranges from 3 to 5 inches.

The A1 horizon has hue of 10YR, value of 2 through 4, and chroma of 1 or 2. It is sand, fine sand, or mucky fine sand. The A2 horizon has hue of 10YR, value of 5 through 7, and chroma of 1 through 4 with mottles of light gray, brownish yellow, or reddish yellow. It is sand or fine sand. Total thickness of the A horizon ranges from 30 to 40 inches.

The B2tg horizon has hue of 10YR, 2.5Y, or 5Y; value of 4 through 6; and chroma of 1 through 3 with mottles of brownish yellow, yellowish brown, dark greenish gray, or light olive brown. It ranges from fine sandy loam to sandy clay loam. Thickness ranges from 5 to 18 inches. Some pedons have a layer of shell fragments or firm calcareous material ranging from about 4 to 8 inches in thickness between the B2tg horizon and the fractured limestone bedrock.

Kesson Series

The soils of the Kesson series are siliceous, hyperthermic Typic Psammaquents. They are very poorly drained, rapidly permeable soils that formed in a thick bed of marine sand and shells. These nearly level soils are in tidal swamps. Areas are subject to tidal flooding. Slopes range from 0 to 1 percent.

Kesson soils are geographically associated with Captiva, Estero, and Wulfert soils. Wulfert soils are organic. Captiva and Estero soils do not have appreciable amounts of sulfur within 20 inches of the surface and are on higher elevations.

Typical pedon of Kesson fine sand; in a tidal swamp, about 1 mile west of the intersection of Bailey Road and Bay Drive and 15 feet north, NE1/4NE1/4 sec. 19, T. 46 S., R., R. 23 E., in Lee County:

A1—0 to 6 inches; black (10YR 2/1) fine sand; single grained; loose; common fine and medium roots; about 15 percent shell fragments; 3.04 percent sulfur; 5.06 percent calcium carbonate; moderately alkaline; calcareous; clear smooth boundary.

C1—6 to 10 inches; pale brown (10YR 6/3) fine sand; single grained; loose; common fine and medium roots; about 10 percent shell fragments; 3.17 percent sulfur; 22.48 percent calcium carbonate; moderately alkaline; calcareous; clear smooth boundary.

C2—10 to 13 inches; light brownish gray (10YR 6/2) fine sand; single grained; loose; about 10 percent shell fragments; 2.45 percent sulfur; 12.98 percent calcium carbonate; moderately alkaline; calcareous; clear smooth boundary.

C3—13 to 23 inches; light gray (5Y 7/1) and gray (5Y 6/1) fine sand; common medium distinct dark gray (10YR 4/1) streaks; single grained; loose; about 5 percent shell fragments; 2.55 percent sulfur; 11.85 percent calcium carbonate; moderately alkaline; calcareous; gradual wavy boundary.

C4—23 to 38 inches; light gray (5Y 7/1) fine sand; single grained; loose; about 30 percent shell fragments; moderately alkaline; calcareous; gradual wavy boundary.

C5—38 to 80 inches; white (5Y 8/1) fine sand; single grained; loose; about 5 percent shell fragments; moderately alkaline; calcareous.

Sulfur content is more than 0.75 percent within a depth of 20 inches. Reaction is mildly alkaline or moderately alkaline throughout. The calcium carbonate equivalent is more than 3 times the sulfur content for some portion. The texture is sand or fine sand throughout.

The A horizon has hue of 10YR, value of 2 through 6, and chroma of 1 through 3. Content of shell fragments ranges from about 5 percent to 15 percent. Thickness is 4 to 7 inches. Some pedons have an organic horizon less than 8 inches thick above the A horizon.

The C horizon has hue of 10YR or 5Y, value of 5 through 8, and chroma of 1 or 3. Content of shell fragments ranges from about 5 to 30 percent.

Malabar Series

The soils of the Malabar series are loamy, siliceous, hyperthermic Grossarenic Ochraqualfs. They are deep, poorly drained, moderately slowly permeable to very slowly permeable soils that formed in thick beds of sandy and loamy marine sediments. These nearly level soils are in flatwoods, in sloughs, and in depressions. Slopes range from 0 to 1 percent.

These soils are considered to be taxadjuncts to the Malabar series. Their texture in the control section averages out in the sandy family instead of the loamy family. They are similar in use, management, and behavior to the soils of the Matlacha series, however.

In most years, in the flatwoods under natural conditions, the water table is within 10 inches of the surface for 2 to 4 months and 10 to 40 inches below the surface for more than 6 months. It recedes to 40 inches or more below the surface during extended dry periods. In sloughs during periods of high rainfall, the soil is covered by slowly moving shallow water for periods of about 7 days to 1 month or more. In depressions, the soil is ponded for about 3 to 6 months or more in most years.

Malabar soils are geographically associated with Myakka, Boca, Felda, Hallandale, Oldsmar, Pineda, and Pompano soils. Pineda and Felda soils have an argillic horizon within 20 to 40 inches of the surface. Myakka and Pompano soils are sandy to a depth of more than 80 inches. Oldsmar soils have a spodic horizon. Boca soils have hard, fractured limestone within 20 to 40 inches of the surface, and Hallandale soils have fractured limestone within 20 inches of the surface.

Typical pedon of Malabar fine sand; NE1/4NW1/4 sec. 7, T. 41 S., R. 24 E., in Charlotte County:

A1—0 to 5 inches; dark gray (10YR 4/1) fine sand; single grained; loose; common fine roots; strongly acid; clear smooth boundary.

A21—5 to 10 inches; light gray (10YR 7/1) fine sand; single grained; loose; common fine roots; medium acid; diffuse wavy boundary.

A22—10 to 17 inches; very pale brown (10YR 7/3) fine sand; few light gray (10YR 7/1) splotches; single grained; loose; few fine roots; slightly acid; diffuse wavy boundary.

B1ir—17 to 33 inches; light yellowish brown (10YR 6/4) fine sand; few medium distinct yellow (10YR 7/6) mottles; weak fine granular structure; very friable; few iron coatings on sand grains; few fine roots; neutral; clear wavy boundary.

B2ir—33 to 42 inches; brownish yellow (10YR 6/6) fine sand; weak fine granular structure; very friable; common iron coatings on sand grains; neutral; gradual wavy boundary.

B21tg—42 to 51 inches; gray (5Y 5/1) loamy fine sand; many large distinct yellowish brown (10YR 5/6 and 5/8) mottles; moderate medium subangular blocky structure; friable; sand grains coated and bridged with clay; neutral; gradual wavy boundary.

B22tg—51 to 59 inches; gray (5Y 6/1) fine sandy loam; common large distinct yellowish brown (10YR 5/6 and 5/8) mottles; moderate medium subangular blocky structure; friable; sand grains coated and bridged with clay; slightly acid; gradual wavy boundary.

B3g—59 to 80 inches; light gray (5Y 7/1) loamy fine sand; few medium distinct yellowish brown (10YR 5/6) mottles; massive; very friable; neutral.

Thickness of the solum ranges from 59 to 80 inches. Malabar soils are strongly acid to slightly acid in the A1 and A21 horizons and slightly acid or neutral in all other horizons.

The A1 horizon has hue of 10YR, value of 2 through 4, and chroma of 1 or 2. Thickness ranges from 2 to 6 inches. The A2 horizon has hue of 10YR, value of 6 through 8, and chroma of 1 through 3. Thickness ranges from 4 to 13 inches.

The Bir horizon has hue of 10YR, value of 5 through 7, and chroma of 4, 6, or 8. Thickness ranges from 10 to 26 inches. Where present, the A'2 horizon has hue of 10YR, value of 5 through 7, and chroma of 1 or 2. Thickness ranges from 0 to 13 inches.

The B2tg horizon has hue of 10YR, value of 5 or 6, and chroma of 1; or hue of 5Y, value of 5 or 6, and chroma of 1 or 2 with mottles in shades of brown or yellow. The B21tg horizon is loamy fine sand or loamy sand, and the B22tg horizon is fine sandy loam or sandy clay loam. Thickness of the B21tg horizon ranges from 0 to 9 inches. Thickness of the B22tg horizon ranges from 8 to 20 inches.

The B3g horizon has hue of 5Y, value of 5 through 7, and chroma of 1. It is loamy fine sand or loamy sand. Thickness ranges from 10 to 21 inches.

The Cg horizon, where present, has hue of 10YR, value of 6, and chroma of 1; or hue of 5Y, value of 6, and chroma of 1. It is fine sand or loamy fine sand.

Matlacha Series

The soils of the Matlacha series are sandy, siliceous, hyperthermic Udalfic Arents. They are deep, somewhat poorly drained, moderately rapidly permeable to moderately slowly permeable soils that formed in fill material. These nearly level soils are on areas that have been prepared for urban development. Slopes range from 0 to 2 percent.

The depth to the water table varies with the amount of fill material and the extent of artificial drainage within any mapped area. However, in most years the water table is 24 to 36 inches below the surface of the fill for 2 to 4 months. It is more than 60 inches below the surface during extended dry periods.

Matlacha soils are geographically associated with Oldsmar, Wabasso, Smyrna, Boca, Hallandale, Estero, Immokalee, Myakka, and Pineda soils. All of the associated soils are poorly drained and have a sandy A horizon and a sandy or loamy subsoil. In addition, Boca and Hallandale soils are underlain by fractured limestone bedrock.

Typical pedon of Matlacha gravelly fine sand; in a vacant lot, approximately 0.5 mile east of the Coralwood Mall, SE1/4NW1/4SE1/4 sec. 29, T. 44 S., R. 24 E., in Lee County:

C—0 to 35 inches; mixed black (10YR 2/1), dark brown (10YR 3/3), light brownish gray (10YR 6/2), very dark gray (10YR 3/1) and very pale brown (10YR 7/3) gravelly fine sand; discontinuous olive brown (2.5Y 4/4) and grayish brown (2.5Y 5/2) loamy lenses; massive; friable; about 25 to 30 percent shell and limestone fragments less than 3 inches across; moderately alkaline; abrupt wavy boundary.

A1b—35 to 40 inches; dark gray (10YR 4/1) fine sand; weak fine granular structure; very friable; slightly acid; clear smooth boundary.

A2b—40 to 80 inches; light gray (10YR 7/1) fine sand; common medium distinct dark grayish brown (10YR 4/2) stains along old root channels; single grained; loose; slightly acid.

Reaction ranges from medium acid to moderately alkaline in the fill material and from medium acid to neutral in the A1b and A2b horizons. Thickness of the mixed fill material ranges from about 20 to 48 inches. Content of shell and rock fragments less than 3 inches across in the mixed fill material ranges from about 15 to 30 percent. Content of rock fragments more than 3 inches across ranges from about 0 to 15 percent.

The original soil material below the mixed fill material is variable and ranges from several feet of sand over loamy material to sandy throughout. The mixed soil material is black (10YR 2/1), dark brown (10YR 3/3), light brownish gray (10YR 6/2), very dark gray (10YR 3/1), very pale brown (10YR 7/3 and 7/4), light gray (10YR 7/1 and 7/2), gray (10YR 5/1), yellowish brown (10YR 5/6), olive brown (2.5Y 4/4), brown (2.5Y 5/2), light brownish gray (2.5Y 6/2), or greenish gray (5GY 5/1). The matrix is a mixture of gravelly fine sand and sand with a few lenses of loamy sand or fine sandy loam throughout.

The A1b horizon has hue of 10YR, value of 3 or 4, and chroma of 1 or 2. The A2b horizon has hue of 10YR, value of 5 through 7, and chroma of 1 through 4. Some pedons contain fine sandy loam or sandy clay loam below a depth of 40 inches.

Myakka Series

The soils of the Myakka series are sandy, siliceous, hyperthermic Aeric Haplaquods. They are deep, poorly drained, moderately permeable soils that formed in thick beds of marine sands. These nearly level soils are in flatwoods and in depressions. Slopes range from 0 to 2 percent.

In most years, under natural conditions, the water table is within 10 inches of the surface for 1 to 3 months and 10 to 40 inches below the surface for 2 to 6 months. It recedes to a depth of more than 40 inches during extended dry periods. In depressions, the soil is ponded for 3 to 6 months in most years.

Myakka soils are geographically associated with EauGallie, Immokalee, Oldsmar, Daytona, Pompano, Smyrna, and Wabasso soils. All of the associated soils have a spodic horizon except the Pompano soils. In addition, Wabasso, EauGallie, and Oldsmar soils have an argillic horizon below the spodic horizon. Daytona soils are moderately well drained. Immokalee soils have an A horizon that is more than 30 inches thick, and Smyrna soils have an A horizon that is less than 20 inches thick and a solum that is less than 40 inches thick.

Typical pedon of Myakka fine sand; in low, broad flatwoods, approximately 200 feet west of the intersection of Stringfellow Road and Durrance Court on Pine Island, SE1/4SE1/4SE1/4 sec. 8, T. 44 S., R. 22 E., in Lee County:

A1—0 to 3 inches; very dark gray (10YR 3/1) fine sand; weak fine granular structure; very friable; common fine and medium and few coarse roots; many uncoated sand grains; extremely acid; clear smooth boundary.

A21—3 to 6 inches; gray (10YR 6/1) fine sand; single grained; loose; few fine and common medium roots; common sand grains coated with organic matter; very strongly acid; clear smooth boundary.

A22—6 to 26 inches; light gray (10YR 7/1) fine sand; few dark grayish brown (10YR 4/2) streaks along root channels; single grained; loose; few medium roots; medium acid; abrupt wavy boundary.

B21h—26 to 30 inches; black (5YR 2/1) fine sand; moderate medium subangular blocky structure; firm; few fine, medium, and coarse roots; sand grains well coated with organic matter; extremely acid; clear wavy boundary.

B22h—30 to 35 inches; dark reddish brown (5YR 3/2) fine sand; weak fine subangular blocky structure; friable; few fine and medium roots; sand grains well coated with organic matter; extremely acid; gradual wavy boundary.

B23h—35 to 52 inches; black (5YR 2/1) fine sand; moderate medium subangular blocky structure; firm; few medium roots; sand grains well coated with organic matter; extremely acid; gradual wavy boundary.

B24h—52 to 63 inches; dark reddish brown (5YR 3/4) fine sand; common fine distinct black (5YR 2/1) splotches; weak medium subangular blocky structure; friable; sand grains well coated with organic matter; very strongly acid; clear wavy boundary.

B3&Bh—63 to 80 inches; mixed black (5YR 2/1) and dark reddish brown (5YR 3/2) fine sand; weak fine subangular blocky structure; friable; many uncoated sand grains; strongly acid.

Thickness of the solum is 60 inches or more. The A horizon ranges from extremely acid to medium acid, and the Bh horizon ranges from extremely acid to strongly acid.

The A1 horizon has hue of 10YR, value of 2 or 3, and chroma of 1. Thickness ranges from 3 to 4 inches. The A2 horizon has hue of 10YR, value of 5 through 7, and chroma of 1 with mottles of light brownish gray or dark gray or dark grayish brown streaks. Thickness ranges from 19 to 25 inches.

The B2h horizon has hue of 5YR, value of 2 or 3, and chroma of 1 or 2; hue of 5YR, value of 3, and chroma of 4; hue of 7.5YR, value of 3, and chroma of 2; or hue of 10YR, value of 2 or 3, and chroma of 3.

The B3&Bh horizon has hue of 5YR, value of 2, and chroma of 1 or 2; hue of 5YR, value of 3, and chroma of 2; hue of 7.5YR, value of 2, and chroma of 1; hue of 10YR, value of 5, and chroma of 3; or hue of 10YR, value of 2, and chroma of 1. Thickness ranges from 3 to 17 inches.

Oldsmar Series

The soils of the Oldsmar series are sandy, siliceous, hyperthermic Alfic Arenic Haplaquods. They are deep, poorly drained, slowly permeable or very slowly permeable soils that formed in thick beds of sandy and loamy marine sediment. These nearly level soils are in flatwood areas. Slopes range from 0 to 2 percent.

In most years, under normal conditions, the water table is within 10 inches of the surface for 1 to 3 months during wet seasons. It is 10 to 40 inches below the surface for periods of more than 6 months, and it recedes to more than 40 inches below the surface during extended dry periods.

Oldsmar soils are geographically associated with Immokalee, Malabar, Pineda, Pompano, and Wabasso soils. Immokalee soils do not have an argillic horizon. Wabasso soils have an argillic horizon above a depth of 40 inches. Pineda soils do not have a spodic horizon. Pompano soils do not have a spodic horizon or an argillic horizon.

Typical pedon of Oldsmar sand; in the flatwoods, approximately 1.9 miles south of Nalle Grade Road and 1 mile east of Slater Road, NW1/4SE1/4 sec. 17, T. 43 S., R. 25 E., in Lee County:

A1—0 to 3 inches; black (N 2/0) sand; weak fine granular structure; very friable; many fine and medium roots; many uncoated sand grains; very strongly acid; clear smooth boundary.

A21—3 to 13 inches; gray (10YR 5/1) sand; single grained; loose; common fine and many medium roots; very strongly acid; gradual wavy boundary.

A22—13 to 42 inches; light gray (10YR 7/1) sand; few dark reddish gray (5YR 4/2) streaks along root channels; single grained; loose; few fine and many medium roots; strongly acid; abrupt wavy boundary.

B2h—42 to 47 inches; very dark gray (5YR 3/1) sand; moderate medium subangular blocky structure; friable; few fine and medium roots; very strongly acid; clear wavy boundary.

B21tg—47 to 53 inches; yellowish brown (10YR 5/4) fine sandy loam; few dark brown (10YR 3/3) streaks along root channels; weak fine subangular blocky structure; slightly sticky and slightly plastic; few fine roots; very strongly acid; clear wavy boundary.

B22tg—53 to 58 inches; mixed light brownish gray (10YR 6/2) and pale brown (10YR 6/3) fine sandy loam; weak fine subangular blocky structure; slightly sticky; very strongly acid; clear wavy boundary.

C—58 to 80 inches; pale brown (10YR 6/3) sand; massive; very friable; strongly acid.

The A horizon ranges from medium acid to very strongly acid, and the Bh horizon is strongly acid or very strongly acid. All other horizons range from very strongly acid to mildly alkaline.

The Ap or A1 horizon has hue of 10YR, value of 2 through 4, and chroma of 1; or it is neutral and has value of 2 through 4 with light gray uncoated sand grains. Thickness ranges from 3 to 8 inches. The A2 horizon has hue of 10YR, value of 5 through 8, and chroma of 1 or 2 with mottles and streaks of gray, dark gray, or very dark grayish brown. Thickness ranges from 28 to 39 inches.

The Bh horizon has hue of 5YR, value of 2, and chroma of 1; hue of 5YR, value of 3, and chroma of 1 through 3; or hue of 10YR, value of 2, and chroma of 1 or 2. Thickness ranges from 5 to 10 inches.

A B3 horizon is in some pedons. Where present, it has hue of 7.5YR or 10YR, value of 4, and chroma of 2 or 4. Thickness ranges from 0 to 15 inches.

The Bt horizon has hue of 2.5Y, 5Y, or 10YR; value of 4 through 6; and chroma of 1 through 4 with yellowish brown or dark brown mottles or streaks. It is fine sandy loam or sandy clay loam. Thickness ranges from 9 to 26 inches.

The C horizon has hue of 5Y or 10YR, value of 5 or 6, and chroma of 3.

In places, the soil is underlain by a ledge of fractured limestone. This ledge is dominantly at a depth of 60 to 80 inches, but depth ranges to 40 inches.

Orsino Series

The soils of the Orsino series are hyperthermic, uncoated Spodic Quartzipsamments. They are deep, moderately well drained, very rapidly permeable soils that formed in thick beds of marine sand. These nearly level to gently sloping soils are on narrow upland ridges. Slopes are smooth to convex and range from 0 to 5 percent.

In most years, under natural conditions, the water table is at a depth of 40 to 60 inches for about 3 months and at a depth of 60 to 80 inches for about 9 months.

Orsino soils are geographically associated with Immokalee, Myakka, Daytona, and Satellite soils. Immokalee, Myakka, and Daytona soils have a spodic horizon. Satellite soils are loose fine sand to a depth of 80 inches or more.

Typical pedon of Orsino fine sand; on a narrow ridge, about 0.1 mile south of Spring Creek and 150 feet west of U. S. Highway 41, SW1/4SE1/4 sec. 21, R. 47 S., R. 25 E., in Lee County:

A1—0 to 2 inches inches; dark gray (10YR 4/1) fine sand; single grained; loose; many uncoated sand grains; many fine and common medium roots; very strongly acid; clear wavy boundary.

A1—2 to 5 inches; gray (10YR 6/1) fine sand; single grained; loose; many fine and common medium roots; very strongly acid; clear wavy boundary.

A22—5 to 16 inches; white (10YR 8/1) fine sand; single grained; loose; few fine and medium roots; strongly acid; gradual wavy boundary.

B21&Bh—16 to 26 inches; yellow (10YR 7/8) fine sand; common medium distinct dark reddish brown (5YR 3/2) lenses of loose fine sand; common intrusions of white (10YR 8/1) fine sand; single grained; loose; few fine and common medium roots; very strongly acid; gradual wavy boundary.

B22&Bh—26 to 37 inches; yellow (10YR 7/6) fine sand; few fine distinct dark reddish brown (5YR 3/2) lenses of loose fine sand; few fine distinct white (10YR 8/1) intrusions; single grained; loose; few fine and common medium roots; very strongly acid; gradual wavy boundary.

C1—37 to 46 inches; very pale brown (10YR 7/3) fine sand; few fine distinct white (10YR 8/1) splotches; single grained; loose; few fine roots; very strongly acid; gradual wavy boundary.

C2—46 to 65 inches; very pale brown (10YR 8/3) fine sand; single grained; loose; few fine and medium roots; strongly acid; clear wavy boundary.

C3—65 to 80 inches; white (10YR 8/1) fine sand; common medium prominent yellowish red (5YR 5/8) and reddish yellow (7.5YR 6/6) stains along root channels; single grained; loose; very strongly acid.

Orsino soils are very strongly acid to strongly acid in all horizons.

The A1 horizon has hue of 10YR, value of 4 through 6, and chroma of 1. The A2 horizon has hue of 10YR, value of 6 through 8, and chroma of 1.

The B2 part of the B2&Bh horizon has hue of 10YR, value of 6 or 7, and chroma of 6 or 8. The Bh part of the B2&Bh horizon has hue of 5YR, value of 3, and chroma of 2. In some pedons, the white intrusions of fine sand are absent.

The B3 horizon, where present, has hue of 10YR, value of 6 or 8, and chroma of 4 with mottles of yellowish brown or strong brown.

The C horizon has hue of 10YR, value of 6 or 7, and chroma of 3 or 4 with mottles of yellowish brown or strong brown; it has hue of 10YR, value of 8, and chroma of 1 or 3.

Peckish Series

The soils of the Peckish series are sandy, siliceous, hyperthermic Typic Sulfaquents. They are very poorly drained, rapidly permeable soils that formed in thick beds of marine sand. These nearly level soils are in tidal swamps. Areas are subject to tidal flooding. Slopes range from 0 to 1 percent.

Peckish soils are geographically associated with Estero and Hallandale soils. Estero soils do not have appreciable amounts of sulfides within 20 inches of the surface, and they have a spodic horizon. Hallandale soils have limestone less than 20 inches below the surface, and they do not have a Bh horizon.

Typical pedon of Peckish mucky fine sand; in a tidal swamp, about 0.7 mile southeast of the intersection of State Highway 867 and Shell Point Blvd. and 150 feet south, SE1/4NE1/4 sec. 11, T. 46 S., R. 23 E., in Lee County:

A11—0 to 4 inches; dark reddish brown (5YR 2/2) mucky fine sand; massive; friable; 45.14 percent sulfur; 222.50 millimhos per centimeter conductivity; very strongly acid; abrupt smooth boundary.

A12—4 to 6 inches; dark grayish brown (10YR 4/2) mucky fine sand; massive; friable; 13.19 percent sulfur; 58.80 millimhos per centimeter conductivity; very strongly acid; abrupt smooth boundary.

A13—6 to 9 inches; dark reddish brown (5YR 3/2) mucky fine sand; massive; friable; 25.90 percent sulfur; 105.00 millimhos per centimeter conductivity; strongly acid; abrupt smooth boundary.

A21—9 to 12 inches; gray (10YR 5/1) fine sand; single grained; loose; many fine roots; 6.93 percent sulfur; 31.95 millimhos per centimeter conductivity; strongly acid; clear smooth boundary.

A22—12 to 25 inches; gray (10YR 6/1) fine sand; few light gray (10YR 7/1) streaks along old root channels; single grained; loose; few fine and medium roots; few pockets of organic material; 2.01 percent sulfur; 49.80 millimhos per centimeter conductivity; very strongly acid; gradual wavy boundary.

A23—25 to 36 inches; light gray (10YR 7/1) fine sand; common medium distinct light brownish gray (10YR 6/2) and grayish brown (10YR 4/2) mottles; single grained; loose; 3.98 percent sulfur; 24.75 millimhos per centimeter conductivity; neutral; clear wavy boundary.

B2h—36 to 43 inches; dark grayish brown (10YR 4/2) and very dark grayish brown (10YR 3/2) fine sand; single grained; very friable; sand grains thinly coated with organic matter, many uncoated sand grains; 3.42 percent sulfur; 29.25 millimhos per centimeter conductivity; extremely acid; clear smooth boundary.

B3&Bh—43 to 48 inches; brown (10YR 5/3) and dark brown (10YR 4/3) fine sand; common medium distinct very dark grayish brown (10YR 3/2) mottles; single grained; very friable; many uncoated sand grains; 5.91 percent sulfur; 30.15 millimhos per centimeter conductivity; very strongly acid; gradual wavy boundary.

C—48 to 61 inches; pale brown (10YR 6/3) fine sand; few fine distinct very dark grayish brown (10YR 3/2) streaks along old root channels; single grained; loose; 3.50 percent sulfur; 27.45 millimhos per centimeter conductivity; very strongly acid.

Sulfur content ranges from about 2 to 45 percent within a depth of 20 inches. Reaction ranges from very strongly acid to moderately alkaline in the natural state and from extremely acid to neutral after drying.

The A1 horizon has hue of 10YR, value of 2, and chroma of 1; hue of 10YR, value of 4, and chroma of 1 through 3; hue of 7.5YR, value of 3, and chroma of 2; or hue of 5YR, value of 2 or 3, and chroma of 2. It is mucky fine sand or fine sand. Thickness is 4 to 9 inches. The A2 horizon has hue of 10YR, value of 5 through 7, and chroma of 1 or 2; or it has hue of 2.5Y, value of 5, and chroma of 2. Thickness is 24 to 51 inches.

The Bh horizon does not meet the requirements for a spodic horizon. It has hue of 10YR, value of 3 or 5, and chroma of 2 or 3; or it has hue of 7.5YR, value of 3, and chroma of 2. Thickness is 5 to 7 inches.

Where present, the B3 or B3&Bh horizon has hue of 10YR, value of 4, and chroma of 2 or 3; hue of 10YR, value of 5 or 6, and chroma of 3; or hue of 7.5YR, value of 5, and chroma of 3. Thickness is 0 to 7 inches.

The C horizon has hue of 10YR, value of 5 through 7, and chroma of 3 or less. It is sand or fine sand. Shell fragments are in the C horizon in some pedons.

Pineda Series

The soils of the Pineda series are loamy, siliceous, hyperthermic Arenic Glossaqualfs. They are deep, poorly drained and very poorly drained, slowly permeable soils that formed in thick beds of sandy and loamy marine sediments. These nearly level soils are in sloughs and depressions. Slopes range from 0 to 1 percent.

In most years, under natural conditions, the water table is within 10 inches of the surface for 2 to 4 months and at a depth of 10 to 40 inches for more than 6 months. It recedes to a depth of more than 40 inches during extended dry periods. During periods of high rainfall, the soil is covered by slowly moving, shallow water for periods of about 7 days to 1 month or more. In depressions, the soil is ponded for about 3 to 6 months or more in most years.

Pineda soils are geographically associated with Boca, Valkaria, Felda, Hallandale, Malabar, Oldsmar, Pompano, and Winder soils. Pompano and Valkaria soils are sandy to a depth of 80 inches or more. Boca soils have limestone within 20 to 40 inches of the surface, and Hallandale soils have limestone at a depth of less than 20 inches. Felda soils do not have a Bir horizon. Malabar soils have sandy horizons 40 to 60 inches thick. Oldsmar soils have a spodic horizon underlain by an argillic horizon below a depth of 40 inches. Winder soils are not sandy to a depth of 20 inches or more.

Typical pedon of Pineda fine sand; in a slough, about 2,900 feet north of the intersection of the Shands and Baker-Alico Road rock pit and the Florida Power and Light powerline, and 100 feet west of the powerline, NW1/4NW1/4SW1/4 sec. 6, T. 46 S., R. 26 E., in Lee County:

A1—0 to 1 inch; black (10YR 2/1) fine sand; single grained; loose; many fine and medium and few coarse roots; medium acid; clear smooth boundary.

A2—1 to 5 inches; very pale brown (10YR 7/3) fine sand; single grained; loose; many fine and medium roots; medium acid; clear wavy boundary.

B1ir—5 to 13 inches; brownish yellow (10YR 6/8) fine sand; single grained; loose; strongly acid; clear wavy boundary.

B21ir—13 to 23 inches; strong brown (7.5YR 6/8) fine sand; single grained; loose; medium acid; clear wavy boundary.

B22ir—23 to 29 inches; yellowish brown (10YR 5/8) fine sand; single grained; loose; medium acid; clear wavy boundary.

A'2—29 to 36 inches; light gray (10YR 7/2) fine sand; few fine distinct brownish yellow (10YR 6/6) mottles; single grained; loose; medium acid; abrupt irregular boundary.

B2tg&A'2—36 to 54 inches; light brownish gray (2.5Y 6/2) fine sandy loam and light gray (10YR 7/2) vertical intrusions of fine sand; weak fine subangular blocky structure; slightly sticky and slightly plastic; sandy intrusions are single grained and loose; neutral; abrupt irregular boundary.

Cg—54 to 80 inches; light gray (10YR 7/1) fine sand; single grained; loose; slightly acid.

Pineda soils are strongly acid to medium acid in the A and Bir horizons. The Bt and C horizons are slightly acid to mildly alkaline.

The A1 horizon has hue of 10YR with value of 2 or 3 and chroma of 1, value of 4 and chroma of 1 or 2, or value of 5 and chroma of 2. Thickness ranges from 1 to 5 inches. The A2 horizon has hue of 10YR, value of 7, and chroma of 1 through 4 with mottles of brownish yellow or yellow. Thickness ranges from 3 to 18 inches.

The Bir horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 8. Thickness ranges from 5 to 23 inches.

The A'2 horizon, where present, has hue of 10YR, value of 7, and chroma of 2 or 3. Thickness ranges from 0 to 9 inches.

The B2tg horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2 with mottles of brownish yellow or yellowish brown; hue of 5Y, value of 6, and chroma of 1 or 2; or hue of 2.5Y, value of 5 or 6, and chroma of 2. It is sandy loam or sandy clay loam. Thickness ranges from 8 to 18 inches.

The Cg horizon has hue of 10YR, value of 7, and chroma of 1 or 2. It is sand, fine sand, or loamy sand.

Pompano Series

The soils of the Pompano series are siliceous, hyperthermic Typic Psammaquents. They are deep, poorly drained, rapidly permeable soils that formed in thick beds of sandy marine sediment. These nearly level soils are in sloughs and depressions. Slopes range from 0 to 1 percent.

In sloughs, in most years under natural conditions, during periods of high rainfall, the soil is covered by slowly moving water for periods of about 7 days to 1 month or more. The water table is at a depth of less than 10 inches for 2 to 4 months and at a depth of 10 to 40 inches for about 6 months. It recedes to a depth of more than 40 inches for about 3 months.

Pompano soils are geographically associated with Anclote, Myakka, Immokalee, Oldsmar, and Hallandale soils. Anclote soils are on lower positions on the landscape and have a mollic epipedon. Myakka, Oldsmar, and Immokalee soils have a spodic horizon. In addition, Oldsmar soils have a loamy argillic horizon below the spodic horizon. Hallandale soils have hard, fractured limestone within 20 inches of the surface.

Typical pedon of Pompano fine sand; in a slough, about 2 miles east of U. S. Highway 41 and approximately 0.2 mile south of Alico Road, SE1/4NW1/4NE1/4 sec. 9, T. 46 S., R. 25 E., in Lee County:

A1—0 to 4 inches; dark gray (10YR 4/1) fine sand; weak fine granular structure; loose; many fine and few medium roots; medium acid; clear wavy boundary.

C1—4 to 12 inches; light gray (10YR 7/1) fine sand; single grained; loose; common fine roots; medium acid; clear wavy boundary.

C2—12 to 20 inches; very pale brown (10YR 8/4) fine sand; common fine distinct brownish yellow (10YR 6/8) and few fine distinct yellowish red (5YR 5/6) mottles; single grained; loose; slightly acid; gradual wavy boundary.

C3—20 to 29 inches; white (10YR 8/2) fine sand; single grained; loose; neutral; gradual wavy boundary.

C4—29 to 44 inches; light gray (10YR 7/2) fine sand; single grained; loose; neutral; gradual wavy boundary.

C5—44 to 80 inches; light gray (10YR 7/1) fine sand; few fine distinct very dark grayish brown (10YR 3/2), brown (10YR 5/3), and pale brown (10YR 6/3) streaks; single grained; loose; neutral.

Pompano soils are medium acid to mildly alkaline in all horizons.

The A1 or Ap horizon has hue of 10YR with value of 3 and chroma of 1 or value of 4 or 5 and chroma of 1 or 2. Thickness is 4 to 8 inches.

The C horizon has hue of 10YR with value of 5 and chroma 1 or 2, value of 6 and chroma of 1 through 3, or value of 7 or 8 and chroma of 1 through 4. It has yellowish brown or strong brown mottles.

Punta Series

The soils of the Punta series are sandy, siliceous, hyperthermic Grossarenic Haplaquods. They are deep, poorly drained, moderately permeable, nearly level soils. These soils formed in thick deposits of marine sands. These soils are in broad, slightly elevated flatwoods areas. Slopes range from 1 to 2 percent.

In most years, under natural conditions, the water table is within 10 inches of the surface for 1 to 3 months and 10 to 40 inches below the surface for 2 to 6 months. During extended dry periods, the water table is more than 40 inches below the surface.

Punta soils are geographically associated with Immokalee, Myakka, and Smyrna soils. Immokalee soils have a spodic horizon at a depth of 30 to 50 inches. Myakka soils have a spodic horizon at a depth of 20 to 30 inches. Smyrna soils have a spodic horizon at a depth of less than 20 inches.

Typical pedon of Punta fine sand; in a wooded area, approximately 0.7 mile east of State Highway 775, SE1/4SW1/4 sec. 16, T. 41 S., R. 20 E., in Charlotte County:

A1—0 to 4 inches; dark gray (10YR 4/1) fine sand; weak fine granular structure; very friable; many fine and common medium roots; very strongly acid; clear smooth boundary.

A21—4 to 11 inches; light brownish gray (10YR 6/2) fine sand; single grained; loose; common fine and medium roots; very strongly acid; gradual wavy boundary.
A22—11 to 57 inches; white (10YR 8/1) fine sand; single grained; loose; few fine and common medium roots; strongly acid; abrupt wavy boundary.
B2h—57 to 80 inches; black (N 2/0) fine sand; moderate fine subangular blocky structure; friable; extremely acid.

Thickness of the solum is more than 80 inches. The A horizon ranges from very strongly acid to medium acid, and the Bh horizon is very strongly acid or extremely acid.

The A1 horizon has hue of 10YR, value of 3 through 5, and chroma of 1. The A2 horizon has hue of 10YR, value of 5 through 8, and chroma of 2 or less. Mottles and stains of light brownish gray and grayish brown occur along root channels in some pedons.

The B2h horizon has hue of 10YR, 7.5YR, or 5YR; value of 2 or 3, and chroma of 2 or less; or it is neutral and has value of 2. Less than half of the horizon in each pedon is weakly cemented. Fine to medium streaks of A2 horizon material are in the B2h horizon in some pedons.

Satellite Series

The soils of the Satellite series are hyperthermic, uncoated Aquic Quartzipsamments. They are somewhat poorly drained, very rapidly permeable soils that formed in thick beds of marine sands. These nearly level soils are on low knolls and ridges.

In most years, under natural conditions, the water table is 18 to 40 inches below the surface for 2 to 6 months and 40 to 72 inches below the surface for 6 months or more.

Satellite soils are geographically associated with Immokalee, Myakka, Orsino, Daytona, and Pompano soils. Immokalee, Myakka, and Daytona soils have a spodic horizon. Pompano soils are in lower positions on the landscape and are poorly drained. Orsino soils are better drained.

Typical pedon of Satellite fine sand; on a low ridge, NE1/4NW1/4 sec. 33, T. 47 S., R. 25 E., in Lee County:

A1—0 to 3 inches; gray (10YR 5/1) fine sand; single grained; loose; common very fine and fine roots; strongly acid; clear smooth boundary.
C1—3 to 30 inches; white (10YR 8/1) fine sand; few fine faint light brownish gray (10YR 6/2) mottles; single grained; loose; common fine, medium, and coarse roots; medium acid; clear wavy boundary.
C2—30 to 65 inches; white (10YR 8/1) fine sand; few fine distinct grayish brown (10YR 5/2) and brown (10YR 5/3) mottles; single grained; loose; few fine and medium roots; slightly acid; clear wavy boundary.
C3—65 to 80 inches; light gray (10YR 7/1) fine sand; few fine distinct brown (10YR 5/3) mottles; single grained; loose; medium acid.

Satellite soils are very strongly acid to slightly acid in all horizons.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 1. Thickness is 3 to 4 inches.

The C horizon has hue of 10YR, value of 7 or 8, and chroma of 1 with mottles or streaks of pale brown, dark grayish brown, or grayish brown.

Smyrna Series

The soils of the Smyrna series are sandy, siliceous, hyperthermic Aeric Haplaquods. They are deep, poorly drained, moderately rapidly permeable soils that formed in thick beds of marine sand. These nearly level soils are on broad flatwoods. Slopes range from 0 to 2 percent.

These soils are considered to be taxadjuncts to the Smyrna series because they have a spodic horizon less than 12 inches thick. They are similar in use, management, and behavior to the soils of the Smyrna series, however.

In most years, under natural conditions, the water table is within 10 inches of the surface for 1 to 3 months and 10 to 40 inches below the surface for 2 to 6 months. It recedes to more than 40 inches below the surface during extended dry periods.

Smyrna soils are geographically associated with EauGallie, Immokalee, Myakka, Oldsmar, Daytona, and Satellite soils. All of the associated soils except Satellite soils have a spodic horizon. EauGallie and Oldsmar soils have an argillic horizon beneath the spodic horizon. Immokalee soils have an A horizon that is more than 30 inches thick, and Myakka soils have a solum that is more than 40 inches thick. Daytona soils are better drained and have an A horizon that is more than 30 inches thick. Satellite soils are in slightly higher positions on the landscape and are better drained.

Typical pedon of Smyrna fine sand; in a flatwoods area, NW1/4NW1/4 sec. 29, T. 41 S., R. 21 E., in Charlotte County:

A1—0 to 4 inches; black (10YR 2/1) fine sand; many uncoated sand grains; weak fine granular structure; very friable; common medium and many fine roots; strongly acid; clear smooth boundary.
A2—4 to 13 inches; light gray (10YR 7/1) fine sand; single grained; loose; few fine and medium roots; strongly acid; abrupt smooth boundary.
B21h—13 to 15 inches; very dark grayish brown (10YR 3/2) fine sand; weak fine subangular blocky structure; friable; few fine and medium roots; sand

grains are well coated with organic matter; strongly acid; clear smooth boundary.

B22h—15 to 18 inches; dark brown (10YR 3/3) fine sand; weak medium granular structure; very friable; sand grains are well coated with organic matter; strongly acid; clear wavy boundary.

B3&Bh—18 to 22 inches; brown (10YR 5/3) fine sand; common medium distinct firm dark brown Bh fragments; weak fine granular structure; very friable; sand grains in Bh fragments are well coated with organic matter; strongly acid; gradual wavy boundary.

C1—22 to 37 inches; light gray (10YR 7/2) fine sand; common fine faint very pale brown (10YR 7/4) mottles; single grained; loose; strongly acid; clear smooth boundary.

C—37 to 49 inches; pale brown (10YR 6/3) fine sand; common fine distinct yellow (10YR 7/6) mottles; single grained; loose; strongly acid; gradual wavy boundary.

C3—49 to 55 inches; white (10YR 8/1) fine sand; common medium prominent yellow (10YR 7/8) and common medium distinct yellow (10YR 7/6) mottles; single grained; loose; medium acid; gradual wavy boundary.

C4—55 to 80 inches; white (10YR 8/1) fine sand; common coarse prominent reddish gray (5YR 5/2) splotches and few fine distinct yellow (10YR 7/6) mottles; single grained; loose; medium acid.

Thickness of the solum ranges from 23 to 39 inches. Reaction is strongly acid or medium acid in all horizons.

The A1 horizon has hue of 10YR, value of 2 or 3, and chroma of 1. Thickness is 2 to 5 inches. The A2 horizon has hue of 10YR, value of 5 through 7, and chroma of 1. Thickness is 7 to 9 inches.

The B21h horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. Thickness is 2 to 5 inches. The B22h horizon has hue of 7.5YR, value of 3, and chroma of 2; hue of 10YR, value of 3, and chroma of 3; or hue of 5YR, value of 2 or 3, and chroma of 2. Thickness is 3 to 8 inches.

The B3&Bh horizon has hue of 10YR, value of 4 or 5, and chroma of 3; or hue of 7.5YR, value of 4, and chroma of 4 with medium, firm 10YR 3/3 or 10YR 3/2 spodic fragments. Thickness is 5 to 10 inches.

The C horizon has hue of 10YR with value of 5 or 7 and chroma 3, value of 6 and chroma of 2, or value of 7 and chroma of 4. It has very dark grayish brown or dark brown mottles.

St. Augustine Series

The soils of the St. Augustine series are sandy, siliceous, hyperthermic Udalfic Arents. They are deep, somewhat poorly drained, rapidly permeable soils that were formed by fill and earthmoving operations. These nearly level soils are on areas that have been prepared for urban development. Slopes range from 0 to 2 percent.

The depth to the water table varies with the amount of fill material and the extent of artificial drainage within any mapped area. However, in most years, the water table is 24 to 36 inches below the surface of the fill for 2 to 4 months. It is at a depth of more than 60 inches during extended dry periods.

St. Augustine soils are geographically associated with Captiva, Kesson, and Wulfert soils. All of the associated soils are poorly drained. In addition, Wulfert soils are organic.

Typical pedon of St. Augustine sand; in a vacant lot, approximately 0.4 mile north of intersection of State Highway 867 and Periwinkle Way and 0.3 mile west, SW1/4NE1/4 sec. 19, T. 46 S., R. 23 E., in Lee County:

C1—0 to 30 inches; mixed very dark grayish brown (10YR 3/2), gray (10YR 6/1), very dark gray (10YR 3/1), and dark gray (10YR 4/1) sand; few lenses of silt loam; about 20 percent multicolored shell fragments less than 3 inches across; single grained; loose; moderately alkaline; clear smooth boundary.

A1b—30 to 40 inches; dark grayish brown (10YR 4/2) fine sand; single grained; loose; about 15 percent multicolored shell fragments; moderately alkaline; clear smooth boundary.

C1b—40 to 80 inches; light gray (10YR 7/1) fine sand; single grained; loose; about 30 percent multicolored shell fragments; moderately alkaline.

Reaction is mildly alkaline or moderately alkaline in all horizons.

The C1 horizon has hue of 10YR, value of 3 through 7, and chroma of 1 through 3. Shell fragments range from about 10 to 25 percent. The C1 horizon is sand or fine sand that has a few lenses of silt loam or silty clay loam within 40 inches of the surface in some pedons.

The A1b horizon has hue of 10YR, value of 3 through 5, and chroma of 1 through 3. It is sand or fine sand with about 10 to 15 percent multicolored shell fragments.

The C1b horizon has hue of 10YR, value of 5 through 7, and chroma of 1 or 2. It is sand or fine sand with about 20 to 35 percent shell fragments.

Terra Ceia Series

The soils of the Terra Ceia series are euic, hyperthermic Typic Medisaprists. They are deep, very poorly drained, rapidly permeable organic soils that formed in thick deposits of nonwoody fibrous hydrophytic plant remains and loamy marine sediment. These nearly level soils are in broad areas of freshwater marsh. Slopes range from 0 to 1 percent.

In most years, under natural conditions, the soil is covered by water for 3 to 6 months. The water table is at a depth of 10 to 24 inches below the surface during extended dry periods.

Terra Ceia soils are geographically associated with Felda, Floridana, Gator, and Winder soils. Felda, Floridana, and Winder soils are mineral soils and are in slightly higher positions on the landscape. Gator soils have less than 51 inches of muck over mineral material.

Typical pedon of Terra Ceia muck; in a freshwater marsh, NE1/4NW1/4 sec. 6, T. 40 S., R. 27 E., in Charlotte County:

Oa1—0 to 8 inches; sodium pyrophosphate black (10YR 2/1) muck; about 55 percent fiber unrubbed, about 4 percent rubbed; weak fine granular structure; very friable; many fine roots; very strongly acid (pH 4.5 in 0.01 molar calcium chloride); gradual wavy boundary.

Oa2—8 to 35 inches; sodium pyrophosphate black (10YR 2/1) muck; about 25 percent fiber unrubbed, about 4 percent rubbed; weak medium subangular blocky structure; friable; many fine roots; extremely acid (pH 4.4 in 0.01 molar calcium chloride); gradual wavy boundary.

Oa3—35 to 44 inches; sodium pyrophosphate very dark grayish brown (10YR 3/2) muck; about 35 percent fiber unrubbed, about 2 percent rubbed; weak medium subangular blocky structure; friable; very strongly acid (pH 4.8 in 0.01 molar calcium chloride); gradual wavy boundary.

Oa4—44 to 53 inches; sodium pyrophosphate very dark grayish brown (10YR 3/2) muck; about 40 percent fiber unrubbed, about 4 percent rubbed; weak medium subangular blocky structure; friable; strongly acid (pH 5.3 in 0.01 molar calcium chloride); clear smooth boundary.

IIC1—53 to 56 inches; black (5YR 2/1) mucky fine sand; weak medium granular structure; friable; medium acid; clear wavy boundary.

IIC2—56 to 59 inches; light brownish gray (10YR 6/2) fine sand; single grained; loose; many uncoated sand grains; medium acid; clear wavy boundary.

IIC3—59 to 63 inches; dark gray (5Y 4/1) fine sandy loam; moderate medium subangular blocky structure; friable; few intrusions of sand into loamy material; neutral; gradual wavy boundary.

IIC4—63 to 71 inches; gray (5Y 5/1) fine sandy loam; moderate medium subangular blocky structure; friable; neutral; gradual wavy boundary.

IIC5—71 to 80 inches; gray (5Y 5/1) fine sandy loam; common large distinct greenish gray (5GY 6/1) mottles; weak medium subangular blocky structure; friable; neutral.

Soil reaction averages 4.5 or higher in 0.01 molar calcium chloride in the organic material. Thickness of the organic material ranges from 52 to 70 inches.

The Oa horizon has hue of 10YR, value of 2 or 3, and chroma 1 or 2; or hue of 5YR, value of 2 or 3, and chroma of 2; or it is neutral and has value of 2.

A IIC horizon of fine sand, mucky fine sand, loamy fine sand, fine sandy loam, or sandy clay loam underlies the muck in many pedons. Where present, this horizon has hue of 10YR, value of 4 or 6, and chroma of 1 or 2; hue of 5YR, value of 2, and chroma of 1; hue of 2.5Y, value of 6, and chroma of 2; or hue of 5Y, value of 4 or 5, and chroma of 1 with mottles of very dark gray, gray, greenish gray, or olive brown.

Valkaria Series

The soils of the Valkaria series are siliceous, hyperthermic Spodic Psammaquents. They are deep, poorly drained, rapidly permeable soils that formed in thick beds of sandy marine sediment. These nearly level soils are in sloughs and depressions. Slopes range from 0 to 1 percent.

In sloughs, in most years under natural conditions, during periods of high rainfall, the soil is covered by slowly moving water for periods of about 7 days to 1 month or more. The water table is less than 10 inches below the surface for 1 to 3 months and 10 to 40 inches below the surface for about 6 months. It recedes to more than 40 inches below the surface for about 3 months. In depressions, the soil is ponded for 3 to 6 months or more in most years.

Valkaria soils are geographically associated with Myakka, Malabar, and Pompano soils. Myakka and Pompano soils do not have a Bir horizon. Malabar soils have an argillic horizon at a depth of more than 40 inches.

Typical pedon of Valkaria fine sand; in a slough, approximately 2.3 miles south of Alico Road and 0.3 mile east of U.S. Highway 41, NW1/4SW1/4NW1/4 sec. 21, T. 46 S., R. 25 E., in Lee County:

A1—0 to 2 inches; dark grayish brown (2.5Y 4/2) fine sand; single grained; loose; slightly acid; clear wavy boundary.

A2—2 to 7 inches; very pale brown (10YR 7/4) fine sand; single grained; loose; neutral; clear wavy boundary.

B21ir—7 to 16 inches; yellow (10YR 7/6) fine sand; common fine distinct brownish yellow (10YR 6/8) streaks; single grained; loose; slightly acid; gradual wavy boundary.

B22ir—16 to 20 inches; brownish yellow (10YR 6/8) fine sand; single grained; loose; slightly acid; gradual wavy boundary.

B23ir—20 to 26 inches; yellowish brown (10YR 5/8) fine sand; single grained; loose; neutral; clear wavy boundary.

B31ir—26 to 37 inches; pale yellow (2.5Y 7/4) fine sand; single grained; loose; neutral; clear wavy boundary.

B32ir—37 to 51 inches; very pale brown (10YR 7/4) fine sand; common medium distinct brownish yellow (10YR 6/8) mottles; single grained; loose; neutral; clear wavy boundary.

B33ir—51 to 54 inches; brown (10YR 5/3) fine sand; single grained; loose; neutral; clear wavy boundary.

B34ir—54 to 80 inches; very pale brown (10YR 7/3) fine sand; few fine distinct yellowish red (5YR 5/6) streaks along root channels; single grained; loose; neutral.

Valkaria soils are slightly acid to strongly acid in the A horizon and neutral to strongly acid in all other horizons.

The A1 horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 2 or less. Thickness ranges from 2 to 6 inches. The A2 horizon has hue of 10YR, value of 5 through 7, and chroma of 1 or 2. Thickness ranges from 3 to 14 inches.

The B2ir horizon has hue of 10YR or 2.5Y, value of 5 through 7, and chroma of 4 through 8. Thickness ranges from 7 to 13 inches. The B3ir horizon has hue of 10YR, value of 5 through 7, and chroma of 3 or 4. Thickness ranges from 6 to 15 inches.

The C horizon, where present, has hue of 10YR, value of 7 or 8, and chroma of 1 or 2.

Wabasso Series

The soils of the Wabasso series are sandy, siliceous, hyperthermic Alfic Haplaquods. They are deep, poorly drained, slowly permeable to very slowly permeable soils that formed in sandy and loamy marine sediments. These nearly level soils are in flatwoods. Slopes range from 0 to 1 percent.

In most years, under natural conditions, the water table is less than 10 inches below the surface for 2 to 4 months and 10 to 40 inches below the surface for more than 6 months. It recedes to a depth of 40 inches or more during extended dry periods.

Wabasso soils are geographically associated with Heights, Boca, Felda, and Oldsmar soils. Heights, Boca, and Felda soils do not have a spodic horizon. Oldsmar soils have a Bh horizon below a depth of 30 inches and a Bt horizon below a depth of 40 inches.

Typical pedon of Wabasso sand; in a cultivated field, about 0.9 mile north of Nalle Grade Road, NW1/4NW1/4NE1/4 sec. 1, T. 43 S., R. 24 E., in Lee County:

Ap—0 to 6 inches; dark gray (10YR 4/1) sand; weak fine granular structure; very friable; many fine roots; medium acid; clear wavy boundary.

A21—6 to 17 inches; light brownish gray (10YR 6/2) sand; few fine distinct dark grayish brown (10YR 4/2) stains along root channels; single grained; loose; many fine roots; slightly acid; gradual wavy boundary.

A22—17 to 24 inches; light gray (10YR 7/1) sand; few fine distinct dark grayish brown (10YR 4/2) stains along root channels; single grained; loose; few fine roots; slightly acid; abrupt wavy boundary.

B2h—24 to 28 inches; very dark grayish brown (10YR 3/2) sand; common medium distinct black (10YR 2/1) spodic fragments; weak fine subangular blocky structure; very friable; few iron concretions 3 to 5 centimeters across; sand grains are well coated with organic matter; strongly acid; abrupt wavy boundary.

B21tg—28 to 36 inches; brownish yellow (10YR 6/6) sandy clay loam; common medium distinct light brownish gray (2.5Y 6/2) mottles and few fine distinct light gray (N 7/0) and reddish brown (5YR 4/4) mottles; massive; sticky and plastic; many fine partially decomposed roots; very strongly acid; diffuse wavy boundary.

B22tg—36 to 62 inches; light gray (5Y 7/1) sandy clay loam; common medium distinct pale olive (5Y 6/4) and few fine distinct olive (5Y 4/4) mottles and stains along root channels; massive parting to moderate medium subangular blocky structure; slightly sticky and slightly plastic; common fine roots; very strongly acid; gradual wavy boundary.

Cg—62 to 80 inches; light gray (5Y 7/1) fine sandy loam; common medium prominent olive (5Y 4/4 and 5/4) mottles; few loamy sand pockets; massive parting to weak fine subangular blocky structure; very strongly acid.

Thickness of the solum ranges from 42 to 66 inches.

The A1 or Ap horizon has hue of 10YR, value of 2 through 4, and chroma of 1 or 2. Thickness ranges from 3 to 10 inches. The A2 horizon has hue of 10YR, value of 5 through 7, and chroma of 1 or 2. Thickness ranges from 8 to 18 inches. The A horizon is sand or fine sand. It is strongly acid or medium acid.

The Bh horizon has hue of 5YR, value of 2 or 3, and chroma of 2; hue of 7.5YR, value of 3, and chroma of 2; or hue of 10YR, value of 2, and chroma of 1. Thickness ranges from 5 to 13 inches. The Bh horizon ranges from strongly acid to neutral. It is sand or fine sand.

The B2t horizon has hue of 10YR, value of 4 through 7, and chroma of 1 through 4; hue of 2.5Y, value of 5 or 6, and chroma of 2; or hue of 5Y, value of 5 or 7, and chroma of 1 or 2. Thickness ranges from 14 to 34 inches. The B2t horizon ranges from very strongly acid to moderately alkaline. It is fine sandy loam or sandy clay loam.

The Cg horizon, where present, has hue of 5Y or 10YR, value of 6 or 7, and chroma of 1 through 3; or hue of 2.5Y, value of 6, and chroma of 2. The Cg horizon ranges from neutral to moderately alkaline. It is fine sand, loamy fine sand, or fine sandy loam.

Winder Series

The soils of the Winder series are fine-loamy, siliceous, hyperthermic Typic Glossaqualfs. They are deep, poorly drained, slowly permeable soils that formed in thick beds of sandy and loamy marine sediments. These nearly level soils are in depressions. Slopes are 0 to 1 percent.

These soils are considered to be taxadjuncts to the Winder series because they have, according to laboratory data, a weighted average clay content of 14 percent in the particle-size control section that meets the criteria for the coarse-loamy family. They are similar in use, management, and behavior to the soils of the Winder series, however.

In most years, under natural conditions, the water table is above the surface for about 3 to 6 months or more. It is 10 to 40 inches below the surface during extended dry periods.

Winder soils are geographically associated with Boca, Hallandale, Pineda, Malabar, Felda, Oldsmar, Wabasso, Floridana, and Gator soils. Boca soils have an argillic horizon and limestone within 40 inches of the surface. Hallandale soils have limestone within a depth of 20 inches of the surface. Pineda and Malabar soils have a Bir horizon. Oldsmar and Wabasso soils have a spodic horizon that is underlain by an argillic horizon. Floridana soils have a mollic epipedon. Gator soils are organic.

Typical pedon of Winder sand, depressional; in a freshwater pond, about 4 5/8 miles east of Jones loop road and 0.4 mile north of Tucker grade, SW1/4SW1/4NW1/4 sec. 35, T. 41 S., R. 24 E., in Charlotte County:

A1—0 to 3 inches; dark gray (10YR 4/1) sand; single grained; loose; few fine roots; slightly acid; gradual wavy boundary.

A2—3 to 13 inches; light brownish gray (10YR 6/2) sand; single grained; loose; few fine roots; slightly acid; clear wavy boundary.

B&A—13 to 16 inches; light gray (10YR 7/2) sand; many coarse faint yellowish brown (10YR 5/8) mottles; many uncoated sand grains; few light brownish gray (10YR 6/2) intrusions of finer textured material; massive; slightly acid; abrupt wavy boundary.

B2tg—16 to 23 inches; gray (5Y 6/1) sandy loam; many coarse faint yellowish brown (10YR 5/8) and common coarse prominent strong brown (7.5YR 5/8) mottles; few coarse distinct gray (10YR 6/1) sand intrusions 1 to 3 inches across; strong medium subangular blocky structure; friable; sand grains are coated and bridged with clay; slightly acid; gradual wavy boundary.

B3g—23 to 29 inches; gray (5Y 5/1) sand; common coarse prominent yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; medium acid; clear wavy boundary.

C1—29 to 35 inches; gray (5Y 6/1) sand; common coarse prominent brownish yellow (10YR 6/6) mottles; weak fine granular structure; friable; strongly acid; gradual wavy boundary.

C2—35 to 41 inches; light brownish gray (10YR 6/2) sand; common medium distinct olive (5Y 5/4) mottles; weak fine granular structure; friable; very strongly acid; gradual wavy boundary.

C3—41 to 53 inches; greenish gray (5GY 6/1) loamy sand; many coarse distinct olive (5Y 5/4 and 5/6) mottles; weak fine granular structure; friable; very strongly acid; gradual wavy boundary.

C4—53 to 65 inches; light gray (10YR 7/2) sand; common medium distinct olive yellow (2.5Y 6/6) mottles; single grained; loose; strongly acid; gradual wavy boundary.

C5—65 to 80 inches; light greenish gray (5GY 7/1) sand; single grained; loose; strongly acid.

The solum ranges from medium acid to neutral, and the C horizon ranges from very strongly acid to mildly alkaline.

The A or Ap horizon has hue of 10YR, value of 2 through 4, and chroma of 1. It is sand or fine sand. Thickness ranges from 2 to 4 inches. The A2 horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2; or hue of 2.5Y, value of 4, and chroma of 2. It is sand, fine sand, or loamy sand. Thickness ranges from 4 to 10 inches.

The B&A horizon has hue of 10YR or 2.5Y, value of 4 through 7, and chroma of 1 or 2. The B part is sandy loam or fine sandy loam. The A part is sand or fine sand. Thickness ranges from 3 to 9 inches.

The B2tg horizon has hue of 10YR or 5Y, value of 5 through 7, and chroma of 1 or 2 with mottles of brown, yellow, or gray. It is fine sandy loam or sandy loam. Thickness ranges from 7 to 13 inches.

The C or IICg horizon has hue of 10YR, value of 5 through 7, and chroma of 2; hue of 5GY, value of 6 or 7, and chroma of 1; or hue of 5Y, value of 6 or 7, and chroma of 1 or 2 with mottles or streaks of brown, black, gray, yellow, or olive. Texture is sand, loamy sand, fine sandy loam, or sandy loam. In some pedons, this horizon has light gray or white calcareous material throughout.

Wulfert Series

The soils of the Wulfert series are sandy or sandy-skeletal, siliceous, euic, hyperthermic Terric Sulfihemists. They are very poorly drained, rapidly permeable soils that formed in moderately thick deposits of well decomposed organic material and sandy marine deposits. These soils are in nearly level tidal swamps. Areas are subject to tidal flooding. Slopes range from 0 to 1 percent.

Wulfert soils are geographically associated with Kesson and Captiva soils. Kesson soils are mineral.

Captiva soils do not have sulfidic materials within 20 inches of the surface and are on higher positions.

Typical pedon of Wulfert muck; in a mangrove swamp, about 0.2 mile north of intersection of a powerline and a dike and 75 feet west, SE1/2SE1/2 sec. 7, T. 46 S., R. 22 E., in Lee County:

Oa1—0 to 2 inches; dark reddish brown (5YR 2/2) muck; about 15 percent fiber, less than 5 percent rubbed; massive; friable; many fine and common medium roots; 0.5 percent sulfur; 318.5 millimhos per centimeter conductivity; slightly acid; clear smooth boundary.

Oa2—2 to 12 inches; dark reddish brown (5YR 3/2) muck; about 75 percent fiber, less than 5 percent rubbed; massive; friable; common coarse roots; 1.51 percent sulfur; 350.0 millimhos per centimeter conductivity; strongly acid; clear smooth boundary.

Oa3—12 to 36 inches; dark brown (7.5YR 3/2) muck; about 95 percent fiber, about 20 percent rubbed; massive; friable; common fine and medium roots; 2.35 percent sulfur; 245.0 millimhos per centimeter conductivity; extremely acid; gradual wavy boundary.

IIC—36 to 80 inches; gray (5Y 5/1) fine sand; light gray (5Y 7/1) streaks; single grained; loose; about 10 percent shell fragments; 0.28 percent sulfur; 74.25 millimhos per centimeter conductivity; extremely acid.

Sulfur content ranges from 0.75 to 2.35 percent in the Oa2 and Oa3 horizons. The organic material in all tiers is dominantly sapric material, but in some pedons, hemic material occurs. Conductivity of the saturation extract above the IIC horizon ranges from about 200 to 400 millimhos per centimeter. Reaction ranges from strongly acid to slightly acid in water and from medium acid to neutral in 0.01 molar calcium chloride in the Oa1 and Oa2 horizons in the natural state, and ranges from extremely acid to neutral in water and from very strongly acid to mildly alkaline in 0.01 molar calcium chloride in the Oa3 and IIC horizons. After drying, reaction is one-half to one unit lower.

The Oa horizon has hue 5YR, value 2 or 3, and chroma 1 or 2; hue of 10YR, value of 2, and chroma of 1; or hue of 7.5YR, value of 3, and chroma of 2. Unrubbed fiber content ranges from about 15 to 95 percent; rubbed fiber conent is about 5 to 20 percent. Total thickness of the Oa horizon ranges from about 16 to 48 inches.

The IIC horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2. It is fine sand with about 5 to 30 percent shell fragments.

Formation of the Soils

In this section, the factors and processes of soil formation are described and related to the soils in the survey area.

Factors of Soil Formation

Soil is produced by forces of weathering acting on the parent material that has been deposited or accumulated by geologic agencies. The kind of soil that develops depends on five major factors. These factors are—

- the climate under which soil material has existed since accumulation
- the plant and animal life in and on the soil
- the type of parent material
- the relief, or lay of the land
- the length of time the forces of soil formation have acted on the soil material

The five soil-forming factors are interdependent; each modifies the effect of the others. Any one of the five factors can have more influence than the others on the formation of a soil and can account for most of its properties. For example, if the parent material is quartz sand, the soil generally has weakly expressed horizons. In some places, 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 each of the five factors, but in some places one factor has a predominant effect. A modification or variation in any of these factors results in a different kind of soil.

Parent Material

Parent material is the unconsolidated mass from which a soil is formed. It determines the limits of the chemical and mineralogical composition of the soil. The parent material of the soils of Lee County consists of beds of sandy and clayey materials, which were transported and deposited by waters of the sea that covered the area a number of times during the Pleistocene period. During the high stands of the sea, the Miocene-Pliocene sediments were eroded and redeposited or were reworked on the shallow sea bottom to form marine terraces.

Climate

The climate of Lee County is tropical near the coast and humid-subtropical in the rest of the county. Extreme temperatures are moderated by the Gulf of Mexico and the Peace River. The average rainfall is about 55 inches per year. In summer, the climate is uniform throughout the survey area.

Few differences among the soils are caused by the climate; however, the climate aids in rapid decomposition of organic matter, and it hastens chemical reactions in the soil. The heavy rainfall leaches the soils of most plant nutrients and produces a strongly acid condition in many of the sandy soils. Rain also carries the less soluble fine particles downward.

Because of these climatic conditions, many soils are sandy and have low organic matter content, low natural fertility, and low available water capacity.

Plants and Animals

Plants have been the principal biological factor in the formation of soils in the survey area. Animals, insects, bacteria, and fungi have also been important agents. Plants and animals furnish organic matter to the soil and bring nutrients from the lower layers to the upper layers of the soil. In places, plants and animals cause differences in the amount of organic matter, nitrogen, and nutrients in the soil and differences in soil structure and porosity. For example, crayfish and the roots of trees have penetrated the loamy subsoil and mixed sandy surface layers with the subsoil.

Microorganisms, including bacteria and fungi, help to weather and break down minerals and to decompose organic matter. These organisms are most numerous in the upper few inches of the soil. Earthworms and other small animals inhabit the soil, alter its chemical composition, and mix it with other soil material. However, the native vegetation in the survey area has affected soil formation more than other living organisms.

Man has influenced the formation of soils by clearing the forests, cultivating the soils, draining wet areas, and introducing different kinds of plants. The complex of living organisms that affect soil formation has been drastically changed because of man's activities; nevertheless, these activities have had little effect on the soils except for loss of organic matter.

Relief

Relief has affected the formation of soils in the county mainly through its influence on soil-water relationships.

Other factors of soil formation generally associated with relief, such as erosion, temperature, and plant cover, are of minor importance.

The survey area is made up of flatwoods, freshwater swamps and marshes, saltwater swamps and marshes, and sparse areas of sand ridges. Differences among the soils in these areas are directly related to relief.

Time

Time is an important factor in soil formation. The physical and chemical changes brought about by climate, living organisms, and relief are slow. The length of time needed to convert raw geological material into soil varies according to the nature of the geological material and the interaction of the other factors. Some basic minerals from which soils are formed weather fairly rapidly; other minerals are chemically inert and show little change over long periods. The translocation of fine particles within the soil to form horizons varies under differing conditions, but the processes always take a relatively long time.

Processes of Soil Formation

Soil genesis refers to the formation of soil horizons. The differentiation of horizons in soils in Lee County is the result of accumulation of organic matter, leaching of carbonates, reduction and transfer of iron, or accumulation of silicate clay minerals. Sometimes more than one of these processes is involved.

Some organic matter has accumulated in the upper layers of most of the soils to form an A1 horizon. The quantity of organic matter is small in some of the soils and fairly large in others.

Carbonates and salts have been leached in all of the soils. Because the leaching permitted the subsequent translocation of silicate clay materials in some soils, the effects have been indirect. The soils of the survey area are leached to varying degrees.

The reduction and transfer of iron has occurred in most of the soils in the county except the organic soils. In some of the wet soils, iron in the subsoil forms yellowish brown horizons and some concretions. The Pineda soil, for example, has a yellowish brown layer with common segregated iron concretions.

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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 a soil formed in recent alluvium or on steep rocky slopes.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation exchange capacity.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

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) up to 38 centimeters (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 (7.5 to 25 centimeters) in diameter.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

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

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

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

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

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

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

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.
Soft.—When dry, breaks into powder or individual grains under very slight pressure.
Cemented.—Hard; little affected by moistening.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

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.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

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.

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.

Excess salts (in tables). Excess water-soluble salts in the soil that restrict the growth of most plants.

Excess sulfur (in tables). Excessive amount of sulfur in the soil. The sulfur causes extreme acidity if the soil is drained, and the growth of most plants is restricted.

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.

Fine textured soil. Sandy clay, silty clay, and clay.

Flatwoods. Broad, nearly level, low ridges of poorly drained, dominantly sandy soils that have a characteristic vegetation of open forest of pines and a ground cover of sawpalmetto and pineland threeawn.

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 up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.5 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

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 upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual*. The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

B horizon.—The mineral horizon below an O or A 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 (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Arabic numeral 2 precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

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

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

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 the 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.

Invaders. On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, invader plants follow disturbance of the surface.

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.

Low strength. The soil is not strong enough to support loads.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Muck. Dark colored, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of the 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.)

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.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor filter (in tables). Because of rapid permeability the soil may not adequately filter effluent from a waste disposal system.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

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

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.

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.

Range site. An area of rangeland where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. A range site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other range sites in kind or proportion of species or total production.

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 degree of acidity or alkalinity is expressed as—

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

Relief. The elevations or inequalities of a land surface, considered collectively.

Rippable. Bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 draw bar horsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline soil. A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

Salty water (in tables). Water that is too salty for consumption by livestock.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-size particles.

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.

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.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slough. A broad, nearly level, poorly defined drainageway that is subject to sheet flow during the rainy season.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

	Millimeters
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 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.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

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

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed 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.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Toxicity (in tables). Excessive amount of toxic substances, such as sodium or sulfur, that severely hinder establishment of vegetation or severely restrict plant growth.

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a limited geographic area that creation of a new series is not justified.

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.

Wetness. The soil is wet during the period of use.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Information extracted from U.S. Department of Commerce, National Oceanic and Atmospheric Administration. 1979. Local Climatological Data. Data recorded in the period 1941-70 at Fort Myers, Florida]

Month	Temperature					Precipitation	
	Monthly normal mean	Normal daily maximum	Normal daily minimum	Mean number of days with temperature of-- 90° F or higher	Mean number of days with temperature of-- 32° F or lower	Normal total	Mean number of days with rainfall of-- 0.10 inch or more
	°F	°F	°F			In	
January	63.5	74.7	52.3	0	0	1.64	5
February	64.7	76.0	53.3	0	0	2.03	6
March	68.5	79.7	57.3	0	0	3.06	5
April	73.3	84.8	61.8	3	0	2.03	5
May	77.7	89.0	66.4	14	0	3.99	8
June	81.1	90.5	71.7	18	0	8.89	15
July	82.5	91.1	73.8	23	0	8.90	18
August	82.8	91.5	74.1	24	0	7.72	18
September	81.6	89.8	73.4	18	0	8.71	16
October	76.4	85.3	67.5	4	0	4.37	8
November	69.4	79.9	58.8	4	0	1.31	4
December	64.8	75.9	53.6	4	0	1.30	5
Year	73.9	84.0	63.7	112	0	53.95	113

TABLE 2.--SUITABILITY AND LIMITATION OF MAP UNITS ON THE GENERAL SOIL MAP

[Ratings for each unit are based on the soil or soils that make up the largest percent of the unit. Absence of an entry indicates that the soil was not rated]

Map unit	Extent of area	Limitations for community development	Suitability for--			Potential productivity for woodland
			Citrus	Improved pasture	Vegetables	
	Pct					
1. Immokalee-Pompano------	12.9	Severe: wetness.	Poorly suited: wetness.	Well suited: wetness.	Poorly suited: wetness.	Moderate: wetness.
2. Hallandale-Boca--------	8.7	Severe: wetness, depth to rock.	Poorly suited: wetness, depth to rock.	Well suited: wetness.	Poorly suited: wetness, depth to rock.	Moderate: wetness.
3. Immokalee-Myakka-------	10.6	Severe: wetness.	Poorly suited: wetness.	Well suited: wetness.	Poorly suited: wetness.	Moderate: wetness.
4. Oldsmar-Malabar-Immokalee-------------	21.7	Severe: wetness.	Poorly suited: wetness.	Well suited: wetness.	Poorly suited: wetness.	Moderately high: wetness.
5. Pineda-Boca-Wabasso----	15.8	Severe: wetness.	Poorly suited: wetness.	Well suited: wetness.	Poorly suited: wetness.	Moderately high: wetness.
6. Isles-Boca-Pompano-----	8.4	Severe: wetness, ponding.	Poorly suited: wetness, ponding.	Moderately suited: wetness, ponding.	Poorly suited: wetness, ponding.	Moderate: wetness, ponding.
7. Wulfert-Kesson-Captiva	1.3	Severe: wetness, flooding.	Poorly suited: wetness, flooding, excess salt.	Poorly suited: wetness, flooding, excess salt.	Poorly suited: wetness, flooding, excess salt.	Low: wetness, flooding, excess salt.
8. Peckish-Estero-Isles---	6.8	Severe: wetness, flooding.	Poorly suited: wetness, flooding, excess salt.	Poorly suited: wetness, flooding, excess salt.	Poorly suited: wetness, flooding, excess salt.	Low: wetness, flooding, excess salt.
9. Canaveral-Captiva-Kesson----------------	2.7	Severe: wetness.	Poorly suited: wetness.	Moderately suited: wetness.	Poorly suited: wetness.	Moderate: wetness.
10. Matlacha---------------	10.1	Moderate: wetness.	---	---	---	---

TABLE 3.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
2	Canaveral fine sand	3,534	0.7
4	Canaveral-Urban land complex	2,685	0.5
5	Captiva fine sand	3,289	0.7
6	Hallandale fine sand	25,156	5.0
7	Matlacha-Urban land complex	7,800	1.6
8	Hallandale fine sand, tidal	882	0.2
9	EauGallie sand	1,608	0.3
10	Pompano fine sand	13,210	2.6
11	Myakka fine sand	15,159	3.0
12	Felda fine sand	4,221	0.9
13	Boca fine sand	37,523	7.5
14	Valkaria fine sand	11,938	2.4
15	Estero muck	6,069	1.2
16	Peckish mucky fine sand	12,094	2.4
17	Daytona sand	2,002	0.4
18	Matlacha gravelly fine sand, limestone substratum	13,479	2.7
19	Gator muck	680	0.1
20	Terra Ceia muck	64	*
22	Beaches	591	0.1
23	Wulfert muck	10,761	2.1
24	Kesson fine sand	5,537	1.1
25	St. Augustine sand, organic substratum-Urban land complex	1,317	0.3
26	Pineda fine sand	26,855	5.3
27	Pompano fine sand, depressional	15,197	3.0
28	Immokalee sand	48,930	9.7
29	Punta fine sand	570	0.1
33	Oldsmar sand	40,229	8.0
34	Malabar fine sand	22,329	4.4
35	Wabasso sand	10,271	2.0
36	Immokalee-Urban land complex	6,719	1.3
37	Satellite fine sand	1,719	0.4
38	Isles fine sand, slough	70	*
39	Isles fine sand, depressional	8,784	1.8
40	Anclote sand, depressional	1,463	0.3
41	Valkaria fine sand, depressional	1,410	0.3
42	Wabasso sand, limestone substratum	19,830	3.9
43	Smyrna fine sand	1,348	---
44	Malabar fine sand, depressional	4,596	0.9
45	Copeland sandy loam, depressional	6,734	1.3
48	St. Augustine sand	1,023	0.2
49	Felda fine sand, depressional	12,014	2.4
50	Oldsmar fine sand, limestone substratum	4,036	0.8
51	Floridana sand, depressional	2,113	0.4
53	Myakka fine sand, depressional	4,029	0.8
55	Cocoa fine sand	2,169	0.4
56	Isles muck	2,401	0.5
57	Boca fine sand, tidal	1,152	0.2
59	Urban land	3,168	0.6
61	Orsino fine sand	870	0.2
62	Winder sand, depressional	1,380	0.3
63	Malabar fine sand, high	6,119	1.2
64	Hallandale-Urban land complex	3,181	0.6
66	Caloosa fine sand	3,750	0.8
67	Smyrna-Urban land complex	388	0.1
69	Matlacha gravelly fine sand	23,284	4.6
70	Heights fine sand	50	*
72	Bradenton fine sand	1,454	0.3
73	Pineda fine sand, depressional	9,631	1.9
74	Boca fine sand, slough	7,833	1.6
75	Hallandale fine sand, slough	2,613	0.5
76	Electra fine sand	832	0.2
77	Pineda fine sand, limestone substratum	7,868	1.6
78	Chobee muck	31	*
	Water	4,998	1.0
	Total	503,040	100.0

* Less than 0.1 percent.

TABLE 4.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Map symbol and soil name	Land capability	Tomatoes	Cabbage	Peppers	Cucumbers	Watermelons	Oranges	Bahiagrass
		Tons	Crates	Bu	Tons	Tons	Boxes	AUM*
2--------------- Canaveral	VIs	---	---	---	---	---	---	---
4--------------- Canaveral-Urban land	---	---	---	---	---	---	---	---
5--------------- Captiva	IVw	---	---	---	---	---	300	8
6--------------- Hallandale	IVw	---	---	---	---	---	---	---
7--------------- Matlacha-Urban land	---	---	---	---	---	---	---	---
8--------------- Hallandale	VIIIw	---	---	---	---	---	---	---
9--------------- EauGallie	IVw	15	900	1,000	10	20	425	8
10-------------- Pompano	IVw	13	700	800	10	16	325	6
11-------------- Myakka	IVw	15	900	1,000	10	20	425	8
12-------------- Felda	IIIw	13	700	800	10	16	325	6
13-------------- Boca	IIIw	15	900	1,000	11	20	425	8
14-------------- Valkaria	IVw	---	---	---	---	---	---	---
15-------------- Estero	VIIIw	---	---	---	---	---	---	---
16-------------- Peckish	VIIIw	---	---	---	---	---	---	---
17-------------- Daytona	VIs	---	---	---	---	---	---	---
18-------------- Matlacha	VIs	---	---	---	---	---	---	---
19-------------- Gator	VIIw	---	---	---	---	---	---	---
20-------------- Terra Ceia	IIIw	---	---	---	---	---	---	---
22-------------- Beaches	---	---	---	---	---	---	---	---
23-------------- Wulfert	VIIIw	---	---	---	---	---	---	---
24-------------- Kesson	VIIIw	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 4.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Land capability	Tomatoes	Cabbage	Peppers	Cucumbers	Watermelons	Oranges	Bahiagrass
		Tons	Crates	Bu	Tons	Tons	Boxes	AUM*
25--------------- St. Augustine- Urban land	---	---	---	---	---	---	---	---
26--------------- Pineda	IIIw	13	700	800	10	16	325	6
27--------------- Pompano	VIIw	---	---	---	---	---	---	---
28--------------- Immokalee	IVw	12	700	900	10	20	400	8
29--------------- Punta	IVw	12	900	900	10	20	375	8
33--------------- Oldsmar	IVw	12	900	900	10	20	400	8
34--------------- Malabar	IVw	13	700	800	10	16	325	6
35--------------- Wabasso	IIIw	15	900	1,000	10	20	425	8
36--------------- Immokalee- Urban land	---	---	---	---	---	---	---	---
37--------------- Satellite	VIs	---	---	---	---	---	---	5
38--------------- Isles	IVw	---	---	---	---	---	---	---
39--------------- Isles	VIIw	---	---	---	---	---	---	---
40--------------- Anclote	VIIw	---	---	---	---	---	---	---
41--------------- Valkaria	VIIw	---	---	---	---	---	---	---
42--------------- Wabasso	IIIw	15	900	1,000	10	20	425	8
43--------------- Smyrna	IVw	15	900	1,000	10	20	425	8
44--------------- Malabar	VIIw	---	---	---	---	---	---	---
45--------------- Copeland	VIIw	---	---	---	---	---	---	---
48--------------- St. Augustine	VIIs	---	---	---	---	---	---	---
49--------------- Felda	VIIw	---	---	---	---	---	---	---
50--------------- Oldsmar	IVw	12	900	900	10	20	400	8
51--------------- Floridana	VIIw	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 4.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Land capability	Tomatoes	Cabbage	Peppers	Cucumbers	Watermelons	Oranges	Bahiagrass
		Tons	Crates	Bu	Tons	Tons	Boxes	AUM*
53--------------- Myakka	VIIw	---	---	---	---	---	---	---
55--------------- Cocoa	IVs	12	700	800	9	12	425	4
56--------------- Isles	VIIIw	---	---	---	---	---	---	---
57--------------- Boca	VIIIw	---	---	---	---	---	---	---
59--------------- Urban land	---	---	--	---	---	---	---	---
61--------------- Orsino	IVs	---	---	---	---	---	425	5
62--------------- Winder	VIIw	---	---	---	---	---	---	---
63--------------- Malabar	IVw	15	900	1,000	10	20	425	8
64--------------- Hallandale- Urban land	---	---	---	---	---	---	---	---
66--------------- Caloosa	VIIs	---	---	---	---	---	---	---
67--------------- Smyrna-Urban land	---	---	---	---	---	---	---	---
69--------------- Matlacha	VIs	---	---	---	---	---	---	---
70--------------- Heights	IIIw	---	---	---	---	---	---	---
72--------------- Bradenton	IIIw	15	900	1,000	11	20	450	8
73--------------- Pineda	VIIw	---	---	---	---	---	---	---
74--------------- Boca	Vw	12	700	800	9	16	350	6
75--------------- Hallandale	Vw	---	---	---	---	---	---	---
76--------------- Electra	VIs	---	---	---	---	---	---	6
77--------------- Pineda	Vw	13	700	800	10	16	325	6
78--------------- Chobee	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.--CAPABILITY CLASSES AND SUBCLASSES

[Miscellaneous areas are excluded. Absence of an entry indicates no acreage]

Class	Total acreage	Major management concerns (Subclass)			
		Erosion (e)	Wetness (w)	Soil problem (s)	Climate (c)
		Acres	Acres	Acres	Acres
I	---	---	---	---	---
II	---	---	---	---	---
III	100,268	---	100,268	---	---
IV	202,341	---	199,302	3,039	---
V	20,541	---	20,541	---	---
VI	50,630	---	---	50,630	---
VII	73,691	---	68,062	5,629	---
VIII	38,896	---	38,896	---	---

TABLE 6.--RANGELAND PRODUCTIVITY

[Only the soils that support rangeland vegetation suitable for grazing are listed]

Map symbol and soil name	Range site	Potential annual production for kind of growing season		
		Favorable	Average	Unfavorable
		Lb/acre	Lb/acre	Lb/acre
6 Hallandale	South Florida Flatwoods	6,000	4,500	3,000
8 Hallandale	Salt Water Marsh	-----	-----	-----
9 EauGallie	South Florida Flatwoods	6,000	4,500	3,000
10 Pompano	Slough	8,000	6,000	3,000
11 Myakka	South Florida Flatwoods	6,000	4,500	3,000
12 Felda	Slough	8,000	6,000	3,000
13 Boca	South Florida Flatwoods	6,000	4,500	3,000
14 Valkaria	Slough	8,000	6,000	3,000
15 Estero	Salt Water Marsh	8,000	6,000	4,000
17 Daytona	Sand Pine Scrub	3,500	2,000	1,500
19 Gator	Fresh Water Marshes and Ponds	9,000	7,000	5,000
20 Terra Ceia	Fresh Water Marshes and Ponds	9,000	7,000	5,000
23 Wulfert	Salt Water Marsh	8,000	6,000	4,000
26 Pineda	Slough	8,000	6,000	3,000
27 Pompano	Fresh Water Marshes and Ponds	9,000	7,000	5,000
28 Immokalee	South Florida Flatwoods	6,000	4,500	3,000
29 Punta	South Florida Flatwoods	6,000	4,500	3,000
33 Oldsmar	South Florida Flatwoods	6,000	4,500	3,000
34 Malabar	Slough	8,000	6,000	3,000
35 Wabasso	South Florida Flatwoods	6,000	4,500	3,000
37 Satellite	Sand Pine Scrub	3,500	2,000	1,500

TABLE 6.--RANGELAND PRODUCTIVITY--Continued

Map symbol and soil name	Range site	Potential annual production for kind of growing season		
		Favorable Lb/acre	Average Lb/acre	Unfavorable Lb/acre
38----------------------- Isles	Slough----------------------------------	8,000	6,000	3,000
39----------------------- Isles	Fresh Water Marshes and Ponds----------	9,000	7,000	5,000
40----------------------- Anclote	Fresh Water Marshes and Ponds----------	9,000	7,000	5,000
41----------------------- Valkaria	Fresh Water Marshes and Ponds----------	9,000	7,000	5,000
42----------------------- Wabasso	South Florida Flatwoods----------------	6,000	4,500	3,000
43----------------------- Smyrna	South Florida Flatwoods----------------	6,000	4,500	3,000
44----------------------- Malabar	Fresh Water Marshes and Ponds----------	9,000	7,000	5,000
45----------------------- Copeland	Fresh Water Marshes and Ponds----------	9,000	7,000	5,000
49----------------------- Felda	Fresh Water Marshes and Ponds----------	9,000	7,000	5,000
50----------------------- Oldsmar	Cabbage Palm Flatwoods-----------------	9,000	6,000	4,500
51----------------------- Floridana	Fresh Water Marshes and Ponds----------	9,000	7,000	5,000
53----------------------- Myakka	Fresh Water Marshes and Ponds----------	9,000	7,000	5,000
55----------------------- Cocoa	Longleaf Pine-Turkey Oak Hills---------	4,000	3,000	2,000
56----------------------- Isles	Salt Water Marsh-----------------------	8,000	6,000	4,000
57----------------------- Boca	Salt Water Marsh-----------------------	8,000	6,000	4,000
61----------------------- Orsino	Sand Pine Scrub------------------------	3,500	2,000	1,500
62----------------------- Winder	Fresh Water Marshes and Ponds----------	9,000	7,000	5,000
63----------------------- Malabar	South Florida Flatwoods----------------	6,000	4,500	3,000
70----------------------- Heights	South Florida Flatwoods----------------	6,000	4,500	3,000
72----------------------- Bradenton	Cabbage Palm Hammocks------------------	4,000	3,000	2,000
73----------------------- Pineda	Fresh Water Marshes and Ponds----------	9,000	7,000	5,000
74----------------------- Boca	Slough----------------------------------	8,000	6,000	3,000

TABLE 6.--RANGELAND PRODUCTIVITY--Continued

Map symbol and soil name	Range site	Potential annual production for kind of growing season		
		Favorable	Average	Unfavorable
		Lb/acre	Lb/acre	Lb/acre
75: Hallandale	Slough	8,000	6,000	3,000
76: Electra	South Florida Flatwoods	6,000	4,500	3,000
77: Pineda	Slough	8,000	6,000	3,000
78: Chobee	Fresh Water Marshes and Ponds	9,000	7,000	5,000

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Map symbol and soil name	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	
2 Canaveral	4s	Severe	Severe	Slight	Moderate	Sand pine Slash pine South Florida slash pine	70 70 35	Slash pine, South Florida slash pine.
5 Captiva	4w	Severe	Severe	Slight	Moderate	South Florida slash pine	35	South Florida slash pine.
6 Hallandale	4w	Moderate	Moderate	Moderate	Moderate	South Florida slash pine	35	South Florida slash pine.
9 EauGallie	3w	Moderate	Moderate	Slight	Moderate	Slash pine Longleaf pine South Florida slash pine	80 70 45	Slash pine, South Florida slash pine.
10 Pompano	4w	Severe	Severe	Slight	Moderate	Slash pine South Florida slash pine	70 40	Slash pine, South Florida slash pine.
11 Myakka	4w	Moderate	Moderate	Moderate	Moderate	Slash pine Longleaf pine South Florida slash pine	70 60 35	Slash pine, South Florida slash pine.
12 Felda	3w	Moderate	Severe	Slight	Moderate	Slash pine Longleaf pine South Florida slash pine	80 65 45	Slash pine, South Florida slash pine.
13 Boca	2w	Moderate	Moderate	Slight	Moderate	South Florida slash pine	55	South Florida slash pine.
14 Valkaria	4w	Severe	Moderate	Slight	Moderate	Slash pine Longleaf pine South Florida slash pine	70 60 35	Slash pine, South Florida slash pine.
17 Daytona	4s	Moderate	Severe	--------	--------	Sand pine	70	Sand pine.
26 Pineda	3w	Moderate	Severe	Slight	Moderate	Slash pine Longleaf pine South Florida slash pine	80 70 45	Slash pine.
27 Pompano	4w	Severe	Severe	Severe	Severe	Pond pine	60	
28 Immokalee	4w	Moderate	Moderate	Moderate	Moderate	Slash pine Longleaf pine South Florida slash pine	70 65 35	Slash pine, South Florida slash pine.
29 Punta	4w	Moderate	Moderate	Moderate	Moderate	South Florida slash pine	45	South Florida slash pine.
33 Oldsmar	3w	Moderate	Moderate	Slight	Moderate	Slash pine Longleaf pine South Florida slash pine	80 65 40	Slash pine, South Florida slash pine.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
34----------------- Malabar	3w	Moderate	Severe	Slight	Moderate	Slash pine---------- Longleaf pine------- South Florida slash pine --------------	80 70 45	Slash pine, South Florida slash pine.
35----------------- Wabasso	3w	Moderate	Moderate	Slight	Moderate	Slash pine---------- South Florida slash pine --------------	80 45	Slash pine, South Florida slash pine.
37----------------- Satellite	4s	Moderate	Severe	Slight	Moderate	Slash pine---------- Longleaf pine------- Sand pine----------- South Florida slash pine -------------- Sand live oak-------	70 60 65 35 ---	Slash pine, sand pine, South Florida slash pine.
38----------------- Isles	4w	Severe	Severe	Slight	Severe	Pond pine----------- Cabbage palm--------	60 ---	
41----------------- Valkaria	4w	Severe	Severe	Slight	Severe	Pond pine-----------	60	
42----------------- Wabasso	3w	Moderate	Moderate	Moderate	Moderate	Slash pine---------- Longleaf pine------- South Florida slash pine --------------	80 70 45	Slash pine.
43----------------- Smyrna	3w	Moderate	Moderate	Slight	Moderate	Slash pine---------- Longleaf pine------- South Florida slash pine --------------	80 70 40	Slash pine, South Florida slash pine.
44----------------- Malabar	4w	Severe	Severe	Moderate	Severe	Pond pine-----------	60	
49----------------- Felda	4w	Severe	Severe	Slight	Severe	Pond pine-----------	60	
50----------------- Oldsmar	3w	Moderate	Moderate	Slight	Moderate	South Florida slash pine --------------	40	South Florida slash pine.
51----------------- Floridana	3w	Severe	Severe	Slight	Severe	Pond pine----------- Cypress-------------	65 ---	Pond pine, South Florida slash pine, slash pine.
53----------------- Myakka	4w	Severe	Severe	Severe	Severe	Pond pine-----------	60	South Florida slash pine.
55----------------- Cocoa	3s	Moderate	Moderate	Slight	Moderate	Slash pine---------- Longleaf pine------- Sand pine----------- South Florida slash pine -------------- Turkey oak----------	80 70 60 35 ---	Slash pine, South Florida slash pine.
61----------------- Orsino	4s	Moderate	Severe	Slight	Moderate	Slash pine---------- Longleaf pine------- Sand pine----------- South Florida slash pine -------------- Sand live oak------- Turkey oak----------	70 60 70 35 --- ---	Slash pine, sand pine, South Florida slash pine.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	
62------------------ Winder	4w	Severe	Severe	Severe	Severe	Pond pine------------	60	
63------------------ Malabar	3w	Moderate	Moderate	Slight	Moderate	South Florida slash pine ---------------	45	South Florida slash pine.
70------------------ Heights	3w	Moderate	Moderate	Slight	Moderate	South Florida slash pine ---------------	45	South Florida slash pine.
72------------------ Bradenton	2w	Moderate	Moderate	Slight	Moderate	Slash pine----------- Longleaf pine-------- South Florida slash pine ---------------	90 75 45	Slash pine.
73------------------ Pineda	4w	Severe	Severe	Severe	Severe	Pond pine------------	60	
74------------------ Boca	4w	Severe	Severe	Slight	Severe	South Florida slash pine ---------------	35	South Florida slash pine.
75------------------ Hallandale	4w	Severe	Severe	Moderate	Severe	South Florida slash pine ---------------	35	South Florida slash pine.
76------------------ Electra	4s	Moderate	Severe	Slight	Slight	Slash pine----------- Sand pine------------ Longleaf pine-------- South Florida slash pine ---------------	70 65 65 35	Slash pine, sand pine, South Florida slash pine.
77------------------ Pineda	3w	Moderate	Severe	Slight	Moderate	Slash pine----------- Longleaf pine-------- South Florida slash pine-----------------	60 70 45	Slash pine, South Florida slash pine.

TABLE 8.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "moderate" and "severe." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
2 Canaveral	Severe: wetness, too sandy.	Severe: too sandy.	Severe: too sandy, wetness.	Severe: too sandy.	Severe: droughty.
4: Canaveral	Severe: wetness, too sandy.	Severe: too sandy.	Severe: too sandy, wetness.	Severe: too sandy.	Severe: droughty.
Urban land.					
5 Captiva	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
6 Hallandale	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
7: Matlacha	Severe: too sandy.	Severe: too sandy.	Severe: too sandy, small stones.	Severe: too sandy.	Severe: droughty.
Urban land.					
8 Hallandale	Severe: flooding, wetness, too sandy.	Severe: flooding, wetness, too sandy.	Severe: too sandy, flooding, wetness.	Severe: wetness, too sandy.	Severe: excess salt, wetness, flooding.
9 EauGallie	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, droughty.
10 Pompano	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
11 Myakka	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
12 Felda	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
13 Boca	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
14 Valkaria	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, droughty.
15 Estero	Severe: flooding, wetness, excess humus.	Severe: wetness, excess humus, excess salt.	Severe: excess humus, wetness, flooding.	Severe: wetness, excess humus.	Severe: excess salt, wetness, flooding.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
16---------------------- Peckish	Severe: flooding, wetness, too sandy.	Severe: wetness, too sandy, excess salt.	Severe: too sandy, wetness, flooding.	Severe: wetness, too sandy.	Severe: excess salt, excess sulfur, wetness.
17---------------------- Daytona	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
18---------------------- Matlacha	Severe: too sandy.	Severe: too sandy.	Severe: too sandy, small stones.	Severe: too sandy.	Moderate: too sandy, large stones, small stones.
19---------------------- Gator	Severe: flooding, ponding, excess humus.	Severe: ponding, excess humus, excess salt.	Severe: excess humus, ponding, flooding.	Severe: ponding, excess humus.	Severe: excess salt, ponding, flooding.
20---------------------- Terra Ceia	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
22. Beaches					
23---------------------- Wulfert	Severe: wetness, excess humus, excess salt.	Severe: flooding, wetness, excess humus.	Severe: excess humus, wetness, flooding.	Severe: wetness, excess humus.	Severe: excess salt, excess sulfur, wetness.
24---------------------- Kesson	Severe: flooding, wetness, too sandy.	Severe: flooding, wetness, too sandy.	Severe: too sandy, wetness, flooding.	Severe: wetness, too sandy, flooding.	Severe: excess salt, excess sulfur, wetness.
25: St. Augustine---------	Severe: flooding, too sandy, excess salt.	Severe: too sandy, excess salt.	Severe: too sandy, excess salt.	Severe: too sandy.	Severe: excess salt.
Urban land.					
26---------------------- Pineda	Severe: wetness, percs slowly, too sandy.	Severe: wetness, too sandy, percs slowly.	Severe: too sandy, wetness, percs slowly.	Severe: wetness, too sandy.	Severe: wetness, droughty.
27---------------------- Pompano	Severe: ponding, too sandy.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding, droughty.
28---------------------- Immokalee	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
29---------------------- Punta	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
33---------------------- Oldsmar	Severe: wetness, percs slowly, too sandy.	Severe: wetness, too sandy, percs slowly.	Severe: too sandy, wetness, percs slowly.	Severe: wetness, too sandy.	Severe: wetness, droughty.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
34-------------------- Malabar	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
35-------------------- Wabasso	Severe: wetness, percs slowly, too sandy.	Severe: wetness, too sandy, percs slowly.	Severe: too sandy, wetness, percs slowly.	Severe: wetness, too sandy.	Severe: wetness.
36:					
Immokalee------------	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
Urban land.					
37-------------------- Satellite	Severe: wetness, too sandy.	Severe: too sandy.	Severe: too sandy, wetness.	Severe: too sandy.	Severe: droughty.
38-------------------- Isles	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
39-------------------- Isles	Severe: ponding, too sandy.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding.
40-------------------- Anclote	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
41-------------------- Valkaria	Severe: ponding, too sandy.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding, droughty.
42-------------------- Wabasso	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
43-------------------- Smyrna	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
44-------------------- Malabar	Severe: ponding, too sandy.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding, droughty.
45-------------------- Copeland	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
48-------------------- St. Augustine	Severe: flooding, too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty.
49-------------------- Felda	Severe: ponding, too sandy.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding, droughty.
50-------------------- Oldsmar	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
51--------------------- Floridana	Severe: ponding, percs slowly, too sandy.	Severe: ponding, too sandy, percs slowly.	Severe: too sandy, ponding, percs slowly.	Severe: ponding, too sandy.	Severe: ponding.
53--------------------- Myakka	Severe: ponding, too sandy.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding.
55--------------------- Cocoa	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
56--------------------- Isles	Severe: flooding, wetness, excess humus.	Severe: wetness, excess salt, excess humus.	Severe: wetness, flooding, excess humus.	Severe: wetness, excess humus.	Severe: excess salt, wetness, flooding.
57--------------------- Boca	Severe: flooding, wetness, too sandy.	Severe: wetness, too sandy, excess salt.	Severe: wetness, too sandy, flooding.	Severe: wetness, too sandy.	Severe: excess salt, wetness, flooding.
59. Urban land					
61--------------------- Orsino	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
62--------------------- Winder	Severe: ponding, percs slowly, too sandy.	Severe: ponding, too sandy.	Severe: too sandy, ponding, percs slowly.	Severe: ponding, too sandy.	Severe: ponding.
63--------------------- Malabar	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
64:					
Hallandale-----------	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
Urban land.					
66--------------------- Caloosa	Severe: percs slowly, too sandy.	Severe: too sandy, percs slowly.	Severe: too sandy, percs slowly.	Severe: too sandy.	Moderate: droughty.
67:					
Smyrna---------------	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
Urban land.					
69--------------------- Matlacha	Severe: too sandy.	Severe: too sandy.	Severe: too sandy, small stones.	Severe: too sandy.	Severe: droughty.
70--------------------- Heights	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
72-------------------- Bradenton	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
73-------------------- Pineda	Severe: ponding, percs slowly, too sandy.	Severe: ponding, too sandy, percs slowly.	Severe: too sandy, ponding, percs slowly.	Severe: ponding, too sandy.	Severe: ponding.
74-------------------- Boca	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
75-------------------- Hallandale	Severe: wetness, too sandy, depth to rock.	Severe: wetness, too sandy, depth to rock.	Severe: too sandy, wetness, depth to rock.	Severe: wetness, too sandy.	Severe: wetness, thin layer.
76-------------------- Electra	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
77-------------------- Pineda	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, droughty.
78-------------------- Chobee	Severe: ponding, percs slowly, excess humus.	Severe: ponding, excess humus, percs slowly.	Severe: excess humus, ponding, percs slowly.	Severe: ponding, excess humus.	Severe: ponding, excess humus.

TABLE 9.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Potential for habitat elements								Potential as habitat for--			
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
2 Canaveral	Poor	Poor	Fair	Poor	Poor	---	Very poor.	Very poor.	Poor	Poor	Very poor.	---
4:												
Canaveral	Poor	Poor	Fair	Poor	Poor	---	Very poor.	Very poor.	Poor	Poor	Very poor.	---
Urban land.												
5 Captiva	Poor	Fair	Fair	Fair	Poor	---	Good	Good	Poor	Fair	Good	---
6 Hallandale	Poor	Poor	Poor	Poor	Poor	---	Fair	Good	Poor	Poor	Fair	Poor.
7:												
Matlacha.												
Urban land.												
8 Hallandale	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	---	Poor	Poor	Very poor.	Very poor.	Poor	---
9 EauGallie	Poor	Poor	Fair	Poor	Poor	---	Poor	Poor	Poor	Poor	Poor	---
10 Pompano	Poor	Fair	Poor	Poor	Poor	---	Fair	Fair	Poor	Poor	Fair	---
11 Myakka	Poor	Fair	Fair	Poor	Poor	---	Fair	Poor	Fair	Poor	Poor	---
12 Felda	Poor	Fair	Fair	Poor	Fair	---	Fair	Fair	Fair	Poor	Fair	---
13 Boca	Poor	Fair	Fair	Poor	Poor	---	Good	Fair	Fair	Poor	Fair	Good.
14 Valkaria	Poor	Fair	Fair	Fair	Fair	---	Good	Fair	Poor	Poor	Good	---
15 Estero	Very poor.	Very poor.	Poor	Very poor.	Very poor.	---	Fair	Good	Very poor.	Very poor.	Good	---
16 Peckish	Very poor.	Very poor.	Poor	Very poor.	Very poor.	---	Fair	Fair	Very poor.	Very poor.	Fair	---
17 Daytona	Poor	Poor	Poor	Poor	Poor	---	Very poor.	Very poor.	Poor	Poor	Very poor.	
18. Matlacha												
19 Gator	Very poor.	Very poor.	Very poor.	Fair	Very poor.	---	Good	Good	Very poor.	Poor	Good	---
20 Terra Ceia	Very poor.	Poor	Poor	Poor	Poor	---	Good	Good	Poor	Poor	Good	---
22. Beaches												

TABLE 9.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
23. Wulfert	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	---	Fair	Fair	Very poor.	Very poor.	Fair	---
24. Kesson	Very poor.	Very poor.	Poor	Very poor.	Very poor.	---	Fair	Fair	Very poor.	Very poor.	Fair	---
25: St. Augustine	Very poor.	Very poor.	Very poor.	Poor	Poor	---	Poor	Poor	Very poor.	Very poor.	Poor	---
Urban land.												
26. Pineda	Poor	Fair	Fair	Poor	Poor	---	Good	Fair	Fair	Poor	Fair	---
27. Pompano	Very poor.	Very poor.	Poor	Poor	Poor	---	Good	Good	Very poor.	Poor	Good	---
28. Immokalee	Poor	Poor	Fair	Poor	Poor	---	Fair	Poor	Poor	Poor	Poor	---
29. Punta	Poor	Fair	Good	Poor	Fair	---	Fair	Poor	Fair	Fair	Poor	---
33. Oldsmar	Poor	Fair	Fair	Poor	Fair	---	Poor	Poor	Fair	Fair	Poor	---
34. Malabar	Poor	Poor	Poor	Poor	Poor	---	Fair	Fair	Poor	Poor	Fair	---
35. Wabasso	Poor	Poor	Poor	Poor	Good	---	Fair	Poor	Poor	Fair	Poor	---
36: Immokalee	Poor	Poor	Fair	Poor	Poor	---	Fair	Poor	Poor	Poor	Poor	---
Urban land.												
37. Satellite	Very poor.	Poor	Poor	Poor	Poor	---	Poor	Very poor.	Poor	Poor	Very poor.	---
38. Isles	Poor	Poor	Poor	Poor	Poor	---	Good	Good	Fair	Poor	Good	---
39. Isles	Very poor.	Very poor.	Very poor.	Very poor.	Poor	---	Good	Good	Very poor.	Very poor.	Good	---
40. Anclote	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	---	Good	Good	Very poor.	Very poor.	Good	---
41. Valkaria	Very poor.	Very poor.	Poor	Very poor.	Very poor.	---	Good	Good	Very poor.	Very poor.	Good	---
42. Wabasso	Poor	Poor	Poor	Poor	Good	---	Fair	Poor	Poor	Fair	Poor	---
43. Smyrna	Poor	Fair	Fair	Poor	Fair	---	Fair	Fair	Fair	Fair	Fair	---
44. Malabar	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	---	Fair	Good	Very poor.	Very poor.	Good	---
45. Copeland	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	---	Good	Good	Very poor.	Very poor.	Good	---
48. St. Augustine	Very poor.	Very poor.	Very poor.	Poor	Poor	---	Poor	Poor	Very poor.	Very poor.	Poor	---

TABLE 9.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements								Potential as habitat for--			
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
49----------------- Felda	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	---	Good	Good	Very poor.	Very poor.	Good	---
50----------------- Oldsmar	Poor	Fair	Fair	Poor	Fair	---	Poor	Poor	Fair	Fair	Poor	Fair.
51----------------- Floridana	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	---	Good	Good	Very poor.	Very poor.	Good	---
53----------------- Myakka	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	---	Fair	Good	Very poor.	Very poor.	Good	---
55----------------- Cocoa	Poor	Poor	Poor	Poor	Poor	---	Very poor.	Very poor.	Poor	Poor	Very poor.	---
56----------------- Isles	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	---	Fair	Poor	Very poor.	Very poor.	Fair	Poor.
57----------------- Boca	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	---	Poor	Fair	Very poor.	Very poor.	Poor	Very poor.
59. Urban land												
61----------------- Orsino	Poor	Poor	Poor	Poor	Poor	---	Very poor.	Very poor.	Poor	Poor	Very poor.	---
62----------------- Winder	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	---	Good	Good	Very poor.	Very poor.	Good	---
63----------------- Malabar	Poor	Fair	Fair	Poor	Fair	---	Fair	Fair	Fair	Poor	Fair	Fair.
64: Hallandale---------	Poor	Poor	Poor	Poor	Poor	---	Fair	Good	Poor	Poor	Fair	Poor.
Urban land.												
66----------------- Caloosa	Very poor.	Very poor.	Very poor.	Poor	Poor	---	Poor	Poor	Very poor.	Very poor.	Poor	---
67: Smyrna------------	Poor	Fair	Fair	Poor	Fair	---	Fair	Fair	Fair	Fair	Fair	---
Urban land.												
69. Matlacha												
70----------------- Heights	Poor	Fair	Fair	Poor	Fair	---	Fair	Fair	Fair	Fair	Fair	---
72----------------- Bradenton	Poor	Fair	Fair	Fair	Fair	---	Poor	Fair	Fair	Fair	Poor	---
73----------------- Pineda	Very poor.	Poor	Very poor.	Very poor.	Very poor.	---	Good	Good	Very poor.	Very poor.	Good	---
74----------------- Boca	Poor	Poor	Poor	Poor	Poor	---	Fair	Fair	Poor	Very poor.	Fair	Fair.
75----------------- Hallandale	Poor	Poor	Poor	Poor	Poor	---	Fair	Fair	Poor	Poor	Fair	Poor.
76----------------- Electra	Poor	Poor	Fair	Poor	Poor	---	Poor	Poor	Poor	Poor	Poor	---

TABLE 9.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
77------------------- Pineda	Poor	Fair	Fair	Poor	Poor	---	Good	Fair	Fair	Poor	Fair	---
78------------------- Chobee	Poor	Poor	Poor	Fair	Poor	---	Good	Good	Poor	Poor	Good	---

TABLE 10.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
2------------------ Canaveral	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Severe: droughty.
4:						
Canaveral--------	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Severe: droughty.
Urban land.						
5------------------ Captiva	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
6------------------ Hallandale	Severe: wetness, depth to rock.	Severe: wetness.	Severe: wetness, depth to rock.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
7:						
Matlacha----------	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Severe: droughty.
Urban land.						
8------------------ Hallandale	Severe: depth to rock, wetness, flooding.	Severe: flooding, wetness.	Severe: flooding, wetness, depth to rock.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: excess salt, wetness, flooding.
9------------------ EauGallie	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
10----------------- Pompano	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
11----------------- Myakka	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
12----------------- Felda	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
13----------------- Boca	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
14----------------- Valkaria	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness, droughty.
15----------------- Estero	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: excess salt, wetness, flooding.
16----------------- Peckish	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: excess salt, excess sulfur, wetness.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
17----------------- Daytona	Severe: cutbanks cave.	Slight---------	Moderate: wetness.	Slight---------	Slight---------	Severe: droughty.
18----------------- Matlacha	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: too sandy, large stones, small stones.
19----------------- Gator	Severe: cutbanks cave, excess humus, ponding.	Severe: flooding, ponding, low strength.	Severe: flooding, ponding.	Severe: flooding, ponding, low strength.	Severe: low strength, ponding, flooding.	Severe: excess salt, ponding, flooding.
20----------------- Terra Ceia	Severe: excess humus, ponding.	Severe: ponding, low strength.	Severe: ponding.	Severe: ponding, low strength.	Severe: ponding, low strength.	Severe: ponding, excess humus.
22. Beaches						
23----------------- Wulfert	Severe: cutbanks cave, excess humus, wetness.	Severe: flooding, wetness, low strength.	Severe: flooding, wetness.	Severe: flooding, wetness, low strength.	Severe: low strength, wetness, flooding.	Severe: excess salt, excess sulfur, wetness.
24----------------- Kesson	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: excess salt, excess sulfur, wetness.
25: St. Augustine----	Severe: cutbanks cave, excess humus.	Severe: flooding.	Severe: flooding, wetness, low strength.	Severe: flooding.	Moderate: wetness, flooding.	Severe: excess salt.
Urban land.						
26----------------- Pineda	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
27----------------- Pompano	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, droughty.
28----------------- Immokalee	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
29----------------- Punta	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
33----------------- Oldsmar	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
34----------------- Malabar	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
35----------------- Wabasso	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
36: Immokalee--------	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
36: Urban land.						
37: Satellite	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Severe: droughty.
38: Isles	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
39: Isles	Severe: ponding, cutbanks cave.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
40: Anclote	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
41: Valkaria	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, droughty.
42: Wabasso	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
43: Smyrna	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
44: Malabar	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, droughty.
45: Copeland	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
48: St. Augustine	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Moderate: wetness, flooding.	Moderate: droughty.
49: Felda	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, droughty.
50: Oldsmar	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
51: Floridana	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
53: Myakka	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
55: Cocoa	Severe: depth to rock, cutbanks cave.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: depth to rock.	Moderate: depth to rock.	Severe: droughty.
56: Isles	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: excess salt, wetness, flooding.
57: Boca	Severe: depth to rock, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness, depth to rock.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: excess salt, wetness, flooding.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
59. Urban land						
61----------------- Orsino	Severe: cutbanks cave.	Slight---------	Moderate: wetness.	Slight---------	Slight---------	Severe: droughty.
62----------------- Winder	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
63----------------- Malabar	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
64: Hallandale--------	Severe: wetness, depth to rock.	Severe: wetness.	Severe: wetness, depth to rock.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
Urban land.						
66----------------- Caloosa	Severe: cutbanks cave.	Slight---------	Severe: shrink-swell.	Slight---------	Slight---------	Moderate: droughty.
67: Smyrna------------	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Urban land.						
69----------------- Matlacha	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Severe: droughty.
70----------------- Heights	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
72----------------- Bradenton	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
73----------------- Pineda	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
74----------------- Boca	Severe: depth to rock, cutbanks cave, wetness.	Severe: wetness.	Severe: wetness, depth to rock.	Severe: wetness.	Severe: wetness.	Severe: wetness.
75----------------- Hallandale	Severe: depth to rock, wetness.	Severe: wetness, depth to rock.	Severe: wetness, depth to rock.	Severe: wetness, depth to rock.	Severe: depth to rock, wetness.	Severe: wetness, thin layer.
76----------------- Electra	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Severe: droughty.
77----------------- Pineda	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
78----------------- Chobee	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, excess humus.

TABLE 11.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "severe," "moderate," "poor," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
2------------------ Canaveral	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
4:					
Canaveral----------	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
Urban land.					
5------------------ Captiva	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
6------------------ Hallandale	Severe: depth to rock, wetness.	Severe: seepage, depth to rock, wetness.	Severe: depth to rock, seepage, wetness.	Severe: depth to rock, seepage, wetness.	Poor: area reclaim, seepage, too sandy.
7:					
Matlacha-----------	Severe: wetness, poor filter.	Severe: wetness, seepage.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: too sandy, seepage.
Urban land.					
8------------------ Hallandale	Severe: depth to rock, flooding, wetness.	Severe: seepage, depth to rock, flooding.	Severe: flooding, depth to rock, wetness.	Severe: flooding, depth to rock, seepage.	Poor: seepage, too sandy, wetness.
9------------------ EauGallie	Severe: wetness.	Severe: wetness, seepage.	Severe: wetness, seepage, too sandy.	Severe: wetness, seepage.	Poor: too sandy, wetness, seepage.
10----------------- Pompano	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
11----------------- Myakka	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
12----------------- Felda	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
13----------------- Boca	Severe: depth to rock, wetness.	Severe: seepage, depth to rock, wetness.	Severe: depth to rock, wetness, too sandy.	Severe: area reclaim, seepage, too sandy.	Poor: seepage, too sandy, wetness.

TABLE 11.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
14----------------- Valkaria	Severe: wetness, poor filter.	Severe: wetness, seepage.	Severe: wetness, seepage, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
15----------------- Estero	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, wetness.
16----------------- Peckish	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, wetness.
17----------------- Daytona	Severe: wetness, poor filter.	Severe: seepage.	Severe: seepage, wetness, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
18----------------- Matlacha	Severe: percs slowly, wetness.	Severe: wetness.	Severe: depth to rock, wetness.	Severe: seepage, wetness.	Poor: too sandy, seepage.
19----------------- Gator	Severe: flooding, ponding.	Severe: seepage, flooding, excess humus.	Severe: flooding, seepage, ponding.	Severe: flooding, seepage, ponding.	Poor: ponding, excess humus, excess salt.
20----------------- Terra Ceia	Severe: ponding, poor filter.	Severe: seepage, excess humus.	Severe: ponding, excess humus.	Severe: seepage, ponding.	Poor: ponding, excess humus.
22. Beaches					
23----------------- Wulfert	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, excess humus.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, wetness, excess humus.
24----------------- Kesson	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, wetness.
25: St. Augustine------	Severe: wetness.	Severe: seepage, excess humus, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
Urban land.					
26----------------- Pineda	Severe: wetness, percs slowly, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
27----------------- Pompano	Severe: ponding, poor filter.	Severe: seepage, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
28----------------- Immokalee	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.

TABLE 11.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
29 Punta	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, too sandy, wetness.
33 Oldsmar	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
34 Malabar	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: seepage, too sandy, wetness.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
35 Wabasso	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: wetness.	Poor: seepage, too sandy, wetness.
36: Immokalee	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
Urban land.					
37 Satellite	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
38 Isles	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: depth to rock, wetness, too sandy.	Severe: wetness, seepage.	Poor: too sandy, wetness, seepage.
39 Isles	Severe: ponding.	Severe: ponding, seepage.	Severe: ponding, depth to rock.	Severe: seepage, ponding.	Poor: ponding.
40 Anclote	Severe: ponding, poor filter.	Severe: seepage, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
41 Valkaria	Severe: ponding, poor filter.	Severe: seepage, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
42 Wabasso	Severe: wetness.	Severe: seepage, wetness.	Severe: depth to rock, seepage, wetness.	Severe: seepage, wetness.	Poor: wetness.
43 Smyrna	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
44 Malabar	Severe: ponding, percs slowly.	Severe: seepage, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.

TABLE 11.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
45------------------- Copeland	Severe: depth to rock, ponding.	Severe: seepage, depth to rock, ponding.	Severe: depth to rock, seepage, ponding.	Severe: depth to rock, seepage, ponding.	Poor: area reclaim, ponding.
48------------------- St. Augustine	Severe: wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
49------------------- Felda	Severe: ponding.	Severe: seepage, ponding.	Severe: seepage, ponding.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
50------------------- Oldsmar	Severe: wetness, percs slowly.	Severe: wetness, seepage.	Severe: depth to rock, seepage, wetness.	Severe: seepage, wetness.	Poor: too sandy, seepage, wetness.
51------------------- Floridana	Severe: ponding, percs slowly.	Severe: seepage, ponding.	Severe: ponding.	Severe: ponding, seepage.	Poor: ponding.
53------------------- Myakka	Severe: ponding.	Severe: seepage, ponding.	Severe: seepage, ponding.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
55------------------- Cocoa	Severe: depth to rock, poor filter.	Severe: seepage, depth to rock.	Severe: depth to rock, seepage, too sandy.	Severe: depth to rock, seepage.	Poor: area reclaim, seepage, too sandy.
56------------------- Isles	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, excess humus.	Severe: flooding, depth to rock, wetness.	Severe: flooding, wetness, seepage.	Poor: seepage, too sandy, wetness.
57------------------- Boca	Severe: flooding, depth to rock, wetness.	Severe: seepage, depth to rock, flooding.	Severe: flooding, depth to rock, wetness.	Severe: flooding, depth to rock, wetness.	Poor: seepage, wetness, thin layer.
59. Urban land					
61------------------- Orsino	Moderate: wetness.	Severe: seepage.	Severe: seepage, wetness, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
62------------------- Winder	Severe: ponding, percs slowly.	Severe: seepage, ponding.	Severe: seepage, ponding.	Severe: ponding.	Poor: ponding, thin layer.
63------------------- Malabar	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
64:					
Hallandale----------	Severe: depth to rock, wetness.	Severe: seepage, depth to rock, wetness.	Severe: depth to rock, seepage, wetness.	Severe: depth to rock, seepage, wetness.	Poor: area reclaim, seepage, too sandy.
Urban land.					

TABLE 11.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
66------------------ Caloosa	Severe: wetness, percs slowly, poor filter.	Severe: wetness, seepage.	Severe: wetness, too clayey.	Severe: wetness, seepage.	Severe: too clayey, hard to pack.
67:					
Smyrna-------------	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
Urban land.					
69------------------ Matlacha	Severe: wetness, poor filter.	Severe: wetness, seepage.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: too sandy, seepage.
70------------------ Heights	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: too sandy, wetness.
72------------------ Bradenton	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
73------------------ Pineda	Severe: ponding, percs slowly.	Severe: seepage, ponding.	Severe: seepage, ponding.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
74------------------ Boca	Severe: depth to rock, wetness.	Severe: seepage, depth to rock, wetness.	Severe: depth to rock, wetness, too sandy.	Severe: depth to rock, seepage, wetness.	Poor: seepage, wetness, thin layer.
75------------------ Hallandale	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock, seepage, wetness.	Poor: area reclaim, seepage, too sandy.
76------------------ Electra	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
77------------------ Pineda	Severe: wetness, percs slowly, poor filter.	Severe: seepage, wetness.	Severe: depth to rock, wetness.	Severe: seepage, wetness.	Poor: wetness, thin layer.
78------------------ Chobee	Severe: ponding, percs slowly.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding.	Severe: seepage, ponding.	Poor: seepage, ponding.

TABLE 12.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," "poor," "probable," and "improbable." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
2 Canaveral	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
4: Canaveral	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
Urban land.				
5 Captiva	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
6 Hallandale	Poor: area reclaim, thin layer, wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, wetness.
7: Matlacha	Fair: wetness.	Probable	Improbable: thin layer.	Poor: too sandy, small stones.
Urban land.				
8 Hallandale	Poor: area reclaim, thin layer, wetness.	Improbable: thin layer.	Improbable: too sandy, thin layer.	Poor: area reclaim, too sandy, excess salt.
9 EauGallie	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
10 Pompano	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
11 Myakka	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
12 Felda	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
13 Boca	Poor: thin layer, wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, wetness.
14 Valkaria	Poor: wetness.	Probable	Improbable: too sandy.	Poor: wetness, too sandy.
15 Estero	Poor: wetness.	Probable	Improbable: too sandy.	Poor: excess humus, excess salt, wetness.
16 Peckish	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, excess salt, wetness.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
17: Daytona	Good	Probable	Improbable: too sandy.	Poor: too sandy.
18: Matlacha	Fair: thin layer, area reclaim, wetness.	Probable	Improbable: too sandy.	Poor: too sandy, small stones.
19: Gator	Poor: wetness.	Probable	Improbable: too sandy.	Poor: excess humus, excess salt, wetness.
20: Terra Ceia	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.
22. Beaches				
23: Wulfert	Poor: low strength, wetness.	Probable	Improbable: too sandy.	Poor: excess humus, wetness, excess salt.
24: Kesson	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, excess salt, wetness.
25: St. Augustine	Fair: thin layer, wetness.	Probable	Improbable: too sandy.	Poor: too sandy, excess salt.
Urban land.				
26: Pineda	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
27: Pompano	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
28: Immokalee	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
29: Punta	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
33: Oldsmar	Poor: wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, wetness.
34: Malabar	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
35: Wabasso	Poor: wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, wetness.
36: Immokalee	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
36: Urban land.				
37 Satellite	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
38 Isles	Poor: wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, wetness.
39 Isles	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, wetness.
40 Anclote	Poor: wetness.	Probable	Improbable: too sandy.	Poor: wetness.
41 Valkaria	Poor: wetness.	Probable	Improbable: too sandy.	Poor: wetness, too sandy.
42 Wabasso	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, wetness.
43 Smyrna	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
44 Malabar	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
45 Copeland	Poor: area reclaim, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
48 St. Augustine	Fair: wetness.	Probable	Improbable: excess fines.	Poor: too sandy.
49 Felda	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
50 Oldsmar	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
51 Floridana	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, wetness.
53 Myakka	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
55 Cocoa	Poor: area reclaim.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy.
56 Isles	Poor: wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: excess salt, wetness.
57 Boca	Poor: area reclaim, wetness.	Improbable: thin layer.	Improbable: too sandy, thin layer.	Poor: too sandy, excess salt, wetness.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
59. Urban land				
61 Orsino	Good	Probable	Improbable: too sandy.	Poor: too sandy.
62 Winder	Poor: wetness.	Probable	Improbable: excess fines.	Poor: too sandy, wetness.
63 Malabar	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
64: Hallandale	Poor: area reclaim, thin layer, wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, wetness.
Urban land.				
66 Caloosa	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.
67: Smyrna	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
Urban land.				
69 Matlacha	Fair: wetness.	Probable	Improbable: thin layer.	Poor: too sandy, small stones.
70 Heights	Poor: wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, wetness.
72 Bradenton	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
73 Pineda	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
74 Boca	Poor: thin layer, wetness.	Improbable: thin layer.	Improbable: too sandy, thin layer.	Poor: too sandy, wetness.
75 Hallandale	Poor: area reclaim, thin layer, wetness.	Improbable: thin layer.	Improbable: too sandy, thin layer.	Poor: area reclaim, too sandy, thin layer.
76 Electra	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
77 Pineda	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, wetness.
78 Chobee	Poor: wetness.	Improbable: excess fines.	Improbable: too sandy.	Poor: excess humus.

TABLE 13.--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; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Grassed waterways
2-----------------Canaveral	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.
4:						
Canaveral---------	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.
Urban land.						
5-----------------Captiva	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty, rooting depth.
6-----------------Hallandale	Moderate: depth to rock.	Severe: seepage, piping, wetness.	Severe: depth to rock, cutbanks cave.	Depth to rock, cutbanks cave.	Wetness, droughty, fast intake.	Wetness, droughty, depth to rock.
7:						
Matlacha----------	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Droughty.
Urban land.						
8-----------------Hallandale	Severe: seepage, depth to rock.	Severe: thin layer, seepage, wetness.	Severe: salty water, depth to rock, cutbanks cave.	Depth to rock, flooding, cutbanks cave.	Wetness, fast intake, depth to rock.	Wetness, excess salt, depth to rock.
9-----------------EauGallie	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Fast intake, wetness, droughty.	Wetness, droughty.
10----------------Pompano	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.
11----------------Myakka	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.
12----------------Felda	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.
13----------------Boca	Severe: seepage.	Severe: seepage, piping, wetness.	Moderate: depth to rock, cutbanks cave.	Depth to rock, cutbanks cave.	Wetness, droughty, fast intake.	Wetness, droughty, depth to rock.
14----------------Valkaria	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.

TABLE 13.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Grassed waterways
15----------------- Estero	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: salty water, cutbanks cave.	Flooding, cutbanks cave, excess salt.	Wetness, soil blowing, flooding.	Wetness, excess salt.
16----------------- Peckish	Severe: seepage.	Severe: seepage, wetness, excess salt.	Severe: salty water, cutbanks cave.	Flooding, cutbanks cave, excess salt.	Wetness, droughty, fast intake.	Wetness, excess salt, droughty.
17----------------- Daytona	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Deep to water	Droughty, fast intake, soil blowing.	Droughty.
18----------------- Matlacha	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave, slow refill.	Cutbanks cave	Wetness, droughty, fast intake.	Droughty.
19----------------- Gator	Severe: seepage.	Severe: excess humus, ponding, excess salt.	Severe: salty water, cutbanks cave.	Ponding, flooding, subsides.	Ponding, flooding, excess salt.	Wetness, excess salt.
20----------------- Terra Ceia	Severe: seepage.	Severe: excess humus, ponding.	Slight----------	Ponding, subsides.	Ponding, soil blowing.	Wetness.
22. Beaches						
23----------------- Wulfert	Severe: seepage.	Severe: seepage, piping, excess humus.	Severe: salty water, cutbanks cave.	Flooding, subsides, excess salt.	Wetness, soil blowing, flooding.	Wetness, excess salt.
24----------------- Kesson	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: salty water, cutbanks cave.	Flooding, cutbanks cave, excess salt.	Wetness, fast intake, soil blowing.	Wetness, excess salt.
25: St. Augustine-----	Severe: seepage.	Severe: seepage, piping.	Severe: salty water, cutbanks cave.	Subsides, cutbanks cave, excess salt.	Droughty, fast intake, soil blowing.	Excess salt, droughty.
Urban land.						
26----------------- Pineda	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: slow refill, cutbanks cave.	Percs slowly, cutbanks cave.	Wetness, droughty, fast intake.	Wetness, droughty, percs slowly.
27----------------- Pompano	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, cutbanks cave.	Ponding, droughty, fast intake.	Wetness, droughty.
28----------------- Immokalee	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.
29----------------- Punta	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.

TABLE 13.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Limitations for-- Aquifer-fed excavated ponds	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Grassed waterways
33----------------- Oldsmar	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: slow refill.	Percs slowly, cutbanks cave.	Wetness, droughty, fast intake.	Wetness, droughty.
34----------------- Malabar	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: slow refill, cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.
35----------------- Wabasso	Severe: seepage.	Severe: seepage, wetness.	Severe: slow refill.	Percs slowly, cutbanks cave.	Wetness, droughty, fast intake.	Wetness, droughty.
36:						
Immokalee---------	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.
Urban land.						
37----------------- Satellite	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.
38----------------- Isles	Severe: seepage.	Severe: wetness, seepage.	Severe: cutbanks cave.	Cutbanks cave	Wetness, fast intake, droughty.	Wetness.
39----------------- Isles	Severe: seepage.	Severe: ponding.	Severe: cutbanks cave.	Ponding---------	Ponding, fast intake, droughty.	Wetness, droughty, rooting depth.
40----------------- Anclote	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, cutbanks cave.	Ponding, fast intake, soil blowing.	Wetness.
41----------------- Valkaria	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, cutbanks cave.	Ponding, droughty, fast intake.	Wetness, droughty.
42----------------- Wabasso	Severe: seepage.	Severe: thin layer, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.
43----------------- Smyrna	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.
44----------------- Malabar	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: slow refill, cutbanks cave.	Ponding, cutbanks cave.	Ponding, droughty, fast intake.	Wetness, droughty.
45----------------- Copeland	Severe: seepage.	Severe: thin layer, ponding.	Severe: depth to rock.	Ponding, depth to rock.	Ponding, fast intake, soil blowing.	Wetness, depth to rock.
48----------------- St. Augustine	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty.	Droughty.

TABLE 13.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Grassed waterways
49----------------- Felda	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, cutbanks cave.	Ponding, droughty, fast intake.	Wetness, droughty.
50----------------- Oldsmar	Severe: seepage, piping, wetness.	Severe: seepage, piping, wetness.	Severe: cutbanks cave, slow refill.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.
51----------------- Floridana	Severe: seepage.	Severe: ponding.	Severe: slow refill, cutbanks cave.	Ponding, percs slowly.	Ponding, fast intake, soil blowing.	Wetness, percs slowly.
53----------------- Myakka	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, cutbanks cave.	Ponding, droughty, fast intake.	Wetness, droughty.
55----------------- Cocoa	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, soil blowing.	Droughty, depth to rock.
56----------------- Isles	Severe: seepage.	Severe: seepage, wetness, excess salt.	Severe: cutbanks cave.	Flooding, cutbanks cave, excess salt.	Wetness, droughty.	Wetness, excess salt, droughty.
57----------------- Boca	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: depth to rock, cutbanks cave.	Depth to rock, flooding, cutbanks cave.	Wetness, fast intake, depth to rock.	Wetness, excess salt, depth to rock.
59. Urban land						
61----------------- Orsino	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Deep to water	Droughty, fast intake, soil blowing.	Droughty.
62----------------- Winder	Moderate: seepage.	Severe: seepage, ponding.	Severe: slow refill, cutbanks cave.	Ponding, percs slowly.	Ponding, droughty, fast intake.	Wetness, droughty, percs slowly.
63----------------- Malabar	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.
64:						
Hallandale--------	Moderate: depth to rock.	Severe: seepage, piping, wetness.	Severe: depth to rock, cutbanks cave.	Depth to rock, cutbanks cave.	Wetness, droughty, fast intake.	Wetness, droughty, depth to rock.
Urban land.						
66----------------- Caloosa	Severe: seepage.	Moderate: hard to pack, wetness.	Severe: slow refill, cutbanks cave.	Percs slowly---	Wetness, droughty, fast intake.	Droughty, percs slowly.
67:						
Smyrna------------	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.
Urban land.						

TABLE 13.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Grassed waterways
69----------------- Matlacha	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Droughty.
70----------------- Heights	Severe: seepage.	Severe: wetness.	Moderate: slow refill.	Cutbanks cave	Wetness, fast intake, soil blowing.	Wetness.
72----------------- Bradenton	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.
73----------------- Pineda	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, percs slowly, cutbanks cave.	Ponding, droughty, fast intake.	Wetness, droughty, percs slowly.
74----------------- Boca	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: depth to rock, cutbanks cave.	Depth to rock, cutbanks cave.	Wetness, fast intake, depth to rock.	Wetness, depth to rock.
75----------------- Hallandale	Severe: seepage, depth to rock.	Severe: thin layer, seepage, wetness.	Severe: depth to rock, cutbanks cave.	Depth to rock, cutbanks cave.	Wetness, fast intake, depth to rock.	Wetness, depth to rock, droughty.
76----------------- Electra	Severe: seepage.	Severe: seepage, piping.	Severe: slow refill, cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Droughty.
77----------------- Pineda	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave, slow refill.	Percs slowly, cutbanks cave.	Wetness, fast intake, droughty.	Wetness, droughty.
78----------------- Chobee	Moderate: seepage.	Severe: ponding, piping, seepage.	Severe: slow refill, cutbanks cave.	Ponding, percs slowly, cutbanks cave.	Ponding, soil blowing, percs slowly.	Wetness, percs slowly.

TABLE 14.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated. Some soils have Unified classifications and USDA textures that are supplementary to those shown. In general, the dominant classifications and textures are shown, and the others are inferred]

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
2----------------- Canaveral	0-15	Fine sand---------	SP	A-3	0	100	100	90-100	1-4	---	NP
	15-80	Fine sand, sand, coarse sand.	SP	A-3	0	70-100	70-95	65-90	1-3	---	NP
4:											
Canaveral--------	0-15	Fine sand---------	SP	A-3	0	100	100	90-100	1-4	---	NP
	15-80	Fine sand, sand, coarse sand.	SP	A-3	0	70-100	70-95	65-90	1-3	---	NP
Urban land.											
5----------------- Captiva	0-6	Fine sand---------	SP-SM, SM	A-3, A-2-4	0	100	80-90	80-90	5-15	---	NP
	6-15	Sand, fine sand	SP, SP-SM	A-3	0	100	85-95	85-95	2-10	---	NP
	15-26	Coarse sand, sand, fine sand.	SP	A-3	0	100	80-90	75-85	1-4	---	NP
	26-30	Coarse sand, sand, fine sand.	SP	A-1-b, A-3	0	65-75	45-55	40-55	1-4	---	NP
	30-80	Coarse sand, sand, fine sand.	SP	A-3	0	100	95-100	95-100	1-4	---	NP
6----------------- Hallandale	0-2	Fine sand---------	SP, SP-SM	A-3	0	100	100	90-100	2-6	---	NP
	2-7	Fine sand, sand	SP, SP-SM	A-3	0	100	100	90-100	2-6	---	NP
	7-12	Fine sand, sand	SP, SP-SM	A-3	0	100	100	90-100	2-6	---	NP
	12	Weathered bedrock	---	---	---	---	---	---	---	---	---
7:											
Matlacha---------	0-40	Gravelly fine sand.	SP, SP-SM	A-3	0-15	70-85	70-85	60-80	2-10	---	NP
	40-80	Fine sand---------	SP, SP-SM	A-3	0	100	100	85-100	2-10	---	NP
Urban land.											
8----------------- Hallandale	0-2	Fine sand---------	SP-SM	A-3	0	100	100	90-100	5-10	---	NP
	2-16	Fine sand, sand	SP-SM	A-3, A-2-4	0	100	100	85-95	7-12	---	NP
	16-19	Fine sand, sand	SM, SP-SM	A-2-4	0	100	100	85-95	10-18	---	NP
	19	Weathered bedrock	---	---	---	---	---	---	---	---	---
9----------------- EauGallie	0-22	Sand--------------	SP, SP-SM	A-3	0	100	100	80-98	2-5	---	NP
	22-27	Sand, fine sand	SP-SM, SM	A-3, A-2-4	0	100	100	80-98	5-20	---	NP
	27-58	Sand, fine sand, loamy sand.	SP, SP-SM	A-3, A-2-4	0	100	100	80-98	2-12	---	NP
	58-80	Sandy loam, fine sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4, A-2-6	0	100	100	80-98	20-35	<40	NP-20
10---------------- Pompano	0-80	Fine sand---------	SP, SP-SM	A-3, A-2-4	0	100	100	75-100	1-12	---	NP
11---------------- Myakka	0-26	Fine sand---------	SP, SP-SM	A-3	0	100	100	85-100	2-10	---	NP
	26-63	Sand, fine sand, loamy fine sand.	SM, SP-SM	A-3, A-2-4	0	100	100	85-100	5-20	---	NP
	63-80	Sand, fine sand	SP, SP-SM	A-3	0	100	100	85-100	2-8	---	NP
12---------------- Felda	0-22	Fine sand---------	SP, SP-SM	A-3	0	100	100	90-99	2-5	---	NP
	22-38	Sandy loam, fine sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4, A-2-6	0	100	100	90-99	15-35	<40	NP-15
	38-80	Sand, fine sand, loamy sand.	SP, SP-SM	A-3, A-2-4	0	100	100	80-99	2-12	---	NP

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	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	
13---------------- Boca	0-3	Fine sand--------	SP, SP-SM	A-3, A-2-4	0	100	100	80-99	2-12	---	NP
	3-25	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-99	2-12	---	NP
	25-30	Sandy loam, sandy clay loam, fine sandy loam.	SC	A-2-4, A-6, A-2-6	0	100	100	80-99	17-40	16-37	5-20
	30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
14---------------- Valkaria	0-2	Fine sand--------	SP, SP-SM	A-3	0	100	75-100	75-98	2-10	---	NP
	2-7	Sand, fine sand	SP, SP-SM	A-3	0	100	75-100	75-98	2-10	---	NP
	7-80	Sand, fine sand	SP, SP-SM	A-3	0	100	75-100	75-98	3-10	---	NP
15---------------- Estero	0-5	Muck--------------	PT	---	---	---	---	---	---	---	---
	5-13	Fine sand, sand	SP, SP-SM	A-3, A-2-4	0	100	100	85-95	2-12	---	NP
	13-33	Fine sand, sand	SP, SP-SM	A-3	0	100	100	85-95	2-5	---	NP
	33-55	Fine sand, sand	SP, SP-SM	A-3, A-2-4	0	100	100	85-95	2-12	---	NP
	55-80	Fine sand, sand	SP, SP-SM	A-3	0	100	100	80-95	2-5	---	NP
16---------------- Peckish	0-9	Mucky fine sand	SP, SP-SM	A-3	0	100	100	95-100	2-10	---	NP
	9-36	Sand, fine sand	SP-SM	A-3	0	100	100	95-100	5-10	---	NP
	36-48	Sand, fine sand	SP-SM, SM	A-3, A-2-4	0	100	100	95-100	5-14	---	NP
	48-61	Sand, fine sand	SP-SM	A-3	0	100	100	95-100	5-10	---	NP
17---------------- Daytona	0-43	Sand--------------	SP, SP-SM	A-3	0	100	100	70-95	2-10	---	NP
	43-50	Sand, fine sand, coarse sand.	SP-SM	A-3, A-2-4	0	100	100	70-95	5-12	---	NP
	50-80	Sand, fine sand, coarse sand.	SP, SP-SM	A-3	0	100	100	70-95	4-10	---	NP
18---------------- Matlacha	0-23	Gravelly fine sand.	SP-SM	A-3, A-2-4	0-15	70-85	70-85	60-80	5-12	---	NP
	23-44	Fine sand--------	SP, SP-SM	A-3	0	100	100	85-100	2-10	---	NP
	44-48	Fine sandy loam, sandy clay loam.	SC, SM-SC	A-2-4	0	100	100	80-99	25-35	25-30	5-10
	48	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
19---------------- Gator	0-29	Muck--------------	PT	A-8	---	---	---	---	---	---	---
	29-34	Fine sand	SP-SM	A-3, A-2-4	0	100	100	80-99	5-12	---	NP
	34-80	Stratified fine sand to fine sandy loam.	SP-SM, SM, SM-SC	A-3, A-2-4	0	100	100	80-99	5-25	<25	NP-7
20---------------- Terra Ceia	0-53	Muck--------------	PT	A-8	---	---	---	---	---	---	---
	53-80	Sand, fine sand, loamy sand.	SP, SP-SM	A-3, A-2-4	0	100	100	80-90	2-12	---	NP
22. Beaches											
23---------------- Wulfert	0-12	Muck--------------	PT	---	---	---	---	---	---	---	---
	12-36	Muck--------------	PT	---	---	---	---	---	---	---	---
	36-80	Sand, fine sand	SP-SM, SM	A-3, A-2-4	0	100	100	85-100	5-18	---	NP
24---------------- Kesson	0-6	Fine sand--------	SP-SM	A-3, A-2-4	0	100	100	95-100	5-12	---	NP
	6-23	Sand, fine sand	SP, SP-SM	A-3	0	90-100	90-100	90-100	2-10	---	NP
	23-38	Sand, fine sand	SP, SP-SM	A-3	0	70-100	65-95	60-95	2-10	---	NP
	38-80	Sand, fine sand	SP, SP-SM	A-3	0	90-100	90-100	90-100	2-10	---	NP

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	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	
25:											
St. Augustine---	0-51	Sand-------------	SP, SP-SM	A-3, A-2-4	0	100	100	80-95	2-12	---	NP
	51-80	Muck-------------	PT	---	0	---	---	---	---	---	---
Urban land.											
26--------------- Pineda	0-36	Fine sand--------	SP, SP-SM	A-3	0	100	100	80-95	2-5	---	NP
	36-54	Sandy loam, fine sandy loam, sandy clay loam.	SC, SM-SC, SM	A-2-4, A-2-6	0	100	100	80-95	15-35	20-30	4-12
	54-80	Sand, loamy sand	SP-SM, SM	A-3, A-2-4	0	100	100	80-95	4-15	---	NP
27--------------- Pompano	0-80	Fine sand--------	SP, SP-SM	A-3, A-2-4	0	100	100	75-100	1-12	---	NP
28--------------- Immokalee	0-9	Sand-------------	SP, SP-SM	A-3	0	100	100	70-100	2-10	---	NP
	9-36	Fine sand, sand	SP, SP-SM	A-3	0	100	100	70-100	2-10	---	NP
	36-55	Fine sand, sand	SP-SM, SM	A-3, A-2-4	0	100	100	70-100	5-21	---	NP
	55-80	Fine sand, sand	SP, SP-SM	A-3	0	100	100	70-100	2-10	---	NP
29--------------- Punta	0-4	Fine sand--------	SP, SP-SM	A-3	0	100	100	85-100	2-10	<30	NP
	4-57	Fine sand, sand	SP, SP-SM	A-3	0	100	100	85-100	1-8	<30	NP
	57-80	Fine sand, sand	SP-SM, SM	A-3, A-2-4	0	100	100	85-100	5-15	<30	NP
33--------------- Oldsmar	0-42	Sand-------------	SP, SP-SM	A-3	0	100	100	80-100	2-10	---	NP
	42-47	Fine sand, sand, loamy fine sand.	SM, SP-SM	A-2-4, A-3	0	100	100	80-100	5-20	---	NP
	47-58	Fine sandy loam, sandy loam, sandy clay loam.	SM-SC, SC	A-2-4, A-2-6	0	100	100	85-100	20-35	20-35	5-15
	58-80	Sand, loamy fine sand.	SM, SP-SM	A-2-4, A-3	0	100	100	80-100	5-20	---	NP
34--------------- Malabar	0-17	Fine sand--------	SP, SP-SM	A-3	0	100	100	80-90	2-10	---	NP
	17-42	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-90	3-12	---	NP
	42-59	Sandy clay loam, fine sandy loam, sandy loam.	SC, SM-SC	A-2, A-4, A-6	0	100	100	80-90	22-40	20-40	4-15
	59-80	Sand, fine sand, loamy fine sand.	SP-SM, SM	A-3, A-2-4	0	100	100	80-90	5-20	---	NP
35--------------- Wabasso	0-24	Sand-------------	SP, SP-SM	A-3	0	100	100	95-100	2-10	---	NP
	24-28	Sand, fine sand, loamy sand.	SP-SM, SM	A-3, A-2-4	0	100	100	95-100	5-20	---	NP
	28-62	Sandy loam, fine sandy loam, sandy clay loam.	SC, SM-SC	A-2-4, A-2-6	0	100	100	95-100	20-35	20-30	5-13
	62-80	Sand, fine sand, loamy sand.	SP-SM, SM	A-3, A-2-4	0	100	100	95-100	5-20	---	NP
36:											
Immokalee--------	0-6	Sand-------------	SP, SP-SM	A-3	0	100	100	70-100	2-10	---	NP
	6-37	Fine sand, sand	SP, SP-SM	A-3	0	100	100	70-100	2-10	---	NP
	37-70	Fine sand, sand	SP-SM, SM	A-3, A-2-4	0	100	100	70-100	5-21	---	NP
	70-80	Fine sand, sand	SP, SP-SM	A-3	0	100	100	70-100	2-10	---	NP
Urban land.											
37--------------- Satellite	0-3	Fine sand--------	SP	A-3	0	100	100	60-95	1-4	---	NP
	3-80	Coarse sand, sand, fine sand.	SP	A-3	0	100	100	60-95	1-4	---	NP

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	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	
38 Isles	0-6	Fine sand	SP, SP-SM	A-3	0	100	100	85-100	2-10	---	NP
	6-33	Sand, fine sand	SP-SM	A-3, A-2-4	0	100	100	85-100	5-12	---	NP
	33-51	Fine sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4, A-2-6	0	100	90-100	85-95	20-30	<30	NP-15
	51	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
39 Isles	0-5	Fine sand	SP, SP-SM	A-3	0	100	100	85-100	2-10	---	NP
	5-21	Sand, fine sand	SP-SM	A-3, A-2-4	0	100	100	85-100	5-12	---	NP
	21-47	Fine sandy loam, sandy loam.	SM-SC, SC, SM	A-2-4, A-2-6	0	100	100	90-100	15-30	<30	NP-15
	47	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
40 Anclote	0-22	Sand	SP, SP-SM	A-3, A-2-4	0	100	95-100	85-100	2-12	---	NP
	22-80	Sand, fine sand, loamy fine sand.	SP, SP-SM, SM	A-3, A-2-4	0	100	95-100	85-100	2-20	---	NP
41 Valkaria	0-5	Fine sand	SP, SP-SM	A-3	0	100	75-100	75-98	2-10	---	NP
	5-38	Sand, fine sand	SP, SP-SM	A-3	0	100	75-100	75-98	3-10	---	NP
	38-80	Sand, fine sand	SP, SP-SM	A-3	0	100	75-100	75-98	2-10	---	NP
42 Wabasso	0-19	Sand	SP-SM, SM	A-3, A-2-4	0	100	100	70-100	5-25	---	NP
	19-23	Sand, fine sand, loamy fine sand.	SM	A-2-4	0	100	100	70-100	13-25	---	NP
	23-37	Sand, fine sand	SP-SM, SM	A-3, A-2-4	0	100	100	70-100	5-25	---	NP
	37-51	Fine sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4, A-2-6 A-6, A-4	0	100	100	60-100	30-50	<40	NP-25
	51	Weathered bedrock	---	---	---	---	---	---	---	---	---
43 Smyrna	0-13	Fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	2-12	---	NP
	13-18	Sand, fine sand, loamy fine sand.	SM, SP-SM	A-3, A-2-4	0	100	100	80-100	5-20	---	NP
	18-80	Sand, fine sand	SP, SP-SM	A-3	0	100	100	80-100	2-10	---	NP
44 Malabar	0-7	Fine sand	SP, SP-SM	A-3	0	100	100	80-90	2-10	---	NP
	7-28	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-90	3-12	---	NP
	28-44	Sand, fine sand	SP, SP-SM	A-3	0	100	100	80-90	2-10	---	NP
	44-67	Sandy clay loam, fine sandy loam, sandy loam.	SC, SM-SC	A-2, A-4, A-6	0	100	100	80-90	22-40	20-40	4-15
	67-80	Sand, fine sand, loamy fine sand.	SP-SM, SM	A-3, A-2-4	0	100	100	80-90	5-20	---	NP
45 Copeland	0-8	Sandy loam	SP-SM, SM	A-3, A-2-4	0	100	100	80-100	5-15	---	NP
	8-20	Sandy loam, fine sandy loam. sandy clay loam.	SM-SC, SC	A-2-4, A-2-6	0	100	100	80-100	20-35	17-37	5-20
	20-28	Marl	SM, SM-SC	A-2-4	0	75-95	70-85	65-80	20-35	<20	NP-7
	28	Weathered bedrock	---	---	---	---	---	---	---	---	---
48 St. Augustine	0-30	Sand	SP, SP-SM	A-3	0	85-95	80-95	80-90	2-5	---	NP
	30-80	Sand, fine sand, loamy fine sand.	SP-SM, SM	A-3, A-2-4	0	85-95	80-95	80-90	5-15	---	NP
49 Felda	0-35	Fine sand	SP, SP-SM	A-3	0	100	100	90-99	2-5	---	NP
	35-52	Sandy loam, fine sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4, A-2-6	0	100	100	90-99	15-35	<40	NP-15
	52-80	Sand, fine sand, loamy sand.	SP, SP-SM	A-3, A-2-4	0	100	100	80-99	2-12	---	NP

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	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	
50---------------- Oldsmar	0-34	Sand---------------	SP, SP-SM	A-3, A-2-4	0	100	100	85-100	2-10	---	NP
	34-49	Fine sand---------	SP, SP-SM	A-3, A-2-4	0	100	100	85-95	2-10	---	NP
	49-60	Sandy loam, fine sandy loam, sandy clay loam.	SC, SM-SC	A-2, A-4, A-6	0	100	100	80-99	25-40	25-40	5-15
	60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
51---------------- Floridana	0-22	Fine sand---------	SP-SM, SM	A-3, A-2-4	0	100	100	80-90	5-25	---	NP
	22-39	Sand, fine sand	SP, SP-SM	A-3	0	100	100	80-90	2-10	---	NP
	39-80	Sandy loam, fine sandy loam, sandy clay loam.	SM-SC, SC	A-2-4, A-2-6	0	100	100	85-95	20-35	20-30	7-16
53---------------- Myakka	0-29	Fine sand---------	SP, SP-SM	A-3	0	100	100	85-100	2-10	---	NP
	29-46	Sand, fine sand, loamy fine sand.	SM, SP-SM	A-3, A-2-4	0	100	100	85-100	5-20	---	NP
	46-80	Sand, fine sand	SP, SP-SM	A-3	0	100	100	85-100	2-8	---	NP
55---------------- Cocoa	0-17	Fine sand---------	SP, SP-SM, SM	A-3, A-2-4	0	100	100	70-90	4-15	<40	NP-10
	17-31	Sand, loamy sand, loamy fine sand.	SP-SM, SM	A-2-4	0	100	100	80-90	10-25	<40	NP-10
	31	Weathered bedrock	---	---	---	---	---	---	---	---	---
56---------------- Isles	0-5	Muck---------------	PT	---	---	---	---	---	---	---	---
	5-11	Sand, fine sand, mucky fine sand.	SP-SM	A-3, A-2-4	0	100	100	88-95	5-12	---	NP
	11-39	Sand, fine sand	SP-SM	A-3, A-2-4	0	100	100	88-95	5-12	---	NP
	39-47	Fine sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4, A-2-6	0	100	100	75-85	15-35	<30	NP-15
	47	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
57---------------- Boca	0-5	Fine sand---------	SP-SM	A-3, A-2-4	0	100	100	80-99	5-12	---	NP
	5-26	Fine sand---------	SP-SM	A-3, A-2-4	0	100	100	80-99	8-12	---	NP
	26-32	Fine sandy loam, sandy clay loam.	SM-SC, SC	A-2-4, A-4	0	100	100	80-99	20-40	25-30	5-10
	32	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
59. Urban land											
61---------------- Orsino	0-16	Fine sand---------	SP	A-3	0	100	100	85-95	1-3	---	NP
	16-80	Sand, fine sand	SP, SP-SM	A-3	0	100	100	85-95	2-7	---	NP
62---------------- Winder	0-16	Sand---------------	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	2-12	---	NP
	16-23	Loamy sand, sandy loam, fine sandy loam.	SM	A-2-4	0	100	100	80-100	15-25	<35	NP-10
	23-80	Sand, fine sand, loamy sand.	SP, SP-SM, SM	A-3, A-2-4, A-1-B	0	60-80	50-75	40-70	3-20	<35	NP-10
63---------------- Malabar	0-17	Fine sand---------	SP, SP-SM	A-3	0	100	100	80-90	2-10	---	NP
	17-37	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-90	3-12	---	NP
	37-49	Sand, fine sand	SP, SP-SM	A-3	0	100	100	80-90	2-10	---	NP
	49-68	Fine sandy loam, sandy clay loam.	SC, SM-SC, SM	A-2, A-4, A-6	0	100	100	80-90	20-40	<35	NP-12
	68-80	Sand, fine sand	SP-SM, SP	A-3, A-2-4	0	100	100	80-90	3-12	---	NP

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	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	
64:											
Hallandale-------	0-2	Fine sand--------	SP, SP-SM	A-3	0	100	100	90-100	2-6	---	NP
	2-9	Fine sand, sand	SP, SP-SM	A-3	0	100	100	90-100	2-6	---	NP
	9	Weathered bedrock	---	---	---	---	---	---	---	---	---
Urban land.											
66---------------- Caloosa	0-27	Fine sand--------	SP, SP-SM	A-3	0	85-95	80-95	80-90	2-10	---	NP
	27-80	Sandy clay, clay, silty clay.	CH, SC, CL, MH	A-6, A-7	0	85-90	80-90	80-90	40-85	38-60	25-36
67:											
Smyrna-----------	0-12	Fine sand--------	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	2-12	---	NP
	12-26	Sand, fine sand, loamy fine sand.	SM, SP-SM	A-3, A-2-4	0	100	100	80-100	5-20	---	NP
	26-80	Sand, fine sand	SP, SP-SM	A-3	0	100	100	80-100	2-10	---	NP
Urban land.											
69---------------- Matlacha	0-35	Gravelly fine sand.	SP, SP-SM	A-3	0-15	70-85	70-85	60-80	2-10	---	NP
	35-80	Fine sand--------	SP, SP-SM	A-3	0	100	100	85-100	2-10	---	NP
70---------------- Heights	0-29	Fine sand--------	SP, SP-SM	A-3	0	100	100	95-98	2-5	---	NP
	29-36	Loamy fine sand, loamy sand.	SP-SM, SM	A-2-4	0	100	100	85-95	10-25	<40	NP-7
	36-42	Cobbly fine sandy loam, cobbly loamy sand.	SM-SC, SM	A-2-4	20-30	100	100	85-95	15-30	<40	NP-7
	42-80	Fine sandy loam, loamy sand.	SM-SC, SM	A-2-4	0	100	100	85-95	20-35	<35	NP-7
72---------------- Bradenton	0-5	Fine sand--------	SP-SM	A-3, A-2-4	0	100	100	80-100	5-12	---	NP
	5-10	Sand, fine sand	SP-SM	A-3, A-2-4	0	100	100	80-100	5-12	---	NP
	10-28	Sandy loam, fine sandy loam, loamy fine sand.	SC, SM-SC	A-2-4, A-2-6	0	100	100	80-100	20-35	<40	4-18
	28-80	Fine sand, loamy fine sand, fine sandy loam.	SP-SM, SM, SM-SC, SC	A-3, A-2-4, A-2-6	0	100	100	80-100	5-35	<40	NP-18
73---------------- Pineda	0-30	Fine sand--------	SP, SP-SM	A-3	0	100	100	80-95	2-5	---	NP
	30-55	Sandy loam, fine sandy loam, sandy clay loam.	SM, SC, SM-SC	A-2-4, A-2-6	0	100	100	80-95	15-35	20-30	4-12
	55-80	Sand, loamy sand	SP-SM, SM	A-3, A-2-4	0	100	100	80-95	5-15	---	NP
74---------------- Boca	0-3	Fine sand--------	SP-SM	A-3, A-2-4	0	100	100	85-100	5-12	---	NP
	3-33	Fine sand--------	SP-SM, SM	A-3, A-2-4	0	100	100	80-95	7-15	---	NP
	33-38	Fine sandy loam, sandy clay loam.	SC, SM-SC	A-2-4, A-4	0	100	100	80-95	25-40	25-30	5-10
	38	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
75---------------- Hallandale	0-2	Fine sand--------	SP-SM	A-3, A-2-4	0	100	100	100	5-12	---	NP
	2-11	Fine sand, sand	SP-SM	A-3, A-2-4	0	100	100	100	5-12	---	NP
	11	Weathered bedrock	---	---	---	---	---	---	---	---	---

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	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	
76----------------- Electra	0-4	Fine sand--------	SP, SP-SM	A-3	0	100	95-100	75-99	3-10	---	NP
	4-43	Sand, fine sand	SP, SP-SM	A-3	0	100	95-100	75-99	3-10	---	NP
	43-66	Sand, fine sand	SP-SM, SM	A-3, A-2-4	0	100	100	80-99	8-15	---	NP
	66-80	Sandy clay loam, sandy clay, fine sandy loam.	SC, SM-SC	A-2, A-4, A-6	0	100	100	80-99	20-45	20-40	4-20
77----------------- Pineda	0-27	Fine sand--------	SP, SP-SM	A-3	0	100	100	85-100	2-10	---	NP
	27-52	Fine sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4, A-2-6	0	100	100	65-85	13-35	<30	NP-15
	52	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
78----------------- Chobee	0-4	Muck-------------	PT	---	0	---	---	---	---	---	---
	4-16	Loamy fine sand	SP-SM, SM	A-2-4	0	100	100	80-99	12-25	<40	NP-10
	16-53	Sandy loam, fine sandy loam, sandy clay loam.	SP-SM, SM, SC, SM-SC	A-2-4, A-2-6, A-6, A-7	0	100	100	85-99	12-45	<45	NP-25
	53-80	Fine sand, loamy sand.	SP-SM, SM	A-2-4	0	100	100	80-99	12-25	<40	NP-10

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
									K	T		
	In	Pct	G/cm^3	In/hr	In/in	pH	Mmhos/cm					Pct
2----------------	0-15	<2	1.25-1.50	>20	0.02-0.05	6.6-8.4	<2	Very low	0.10	5	2	<1
Canaveral	15-80	<2	1.25-1.50	>20	0.02-0.05	6.6-8.4	<2	Very low	0.10			
4:												
Canaveral--------	0-15	<2	1.25-1.50	>20	0.02-0.05	6.6-8.4	<2	Very low	0.10	5	2	<1
	15-80	<2	1.25-1.50	>20	0.02-0.05	6.6-8.4	<2	Very low	0.10			
Urban land.												
5----------------	0-6	1-3	1.30-1.55	6.0-20	0.10-0.15	7.4-7.8	<2	Low--------	0.10	5	2	---
Captiva	6-15	1-3	1.45-1.65	>20	0.05-0.10	7.9-8.4	<2	Low--------	0.10			
	15-26	1-3	1.50-1.65	>20	0.05-0.10	7.9-8.4	<2	Low--------	0.10			
	26-30	1-3	1.55-1.70	>20	<0.05	7.9-8.4	<2	Low--------	0.10			
	30-80	1-3	1.60-1.75	>20	<0.05	7.9-8.4	<2	Low--------	0.10			
6----------------	0-2	<3	1.35-1.45	6.0-20	0.05-0.11	5.1-6.5	<2	Low--------	0.10	2	2	2-5
Hallandale	2-7	<3	1.50-1.60	6.0-20	0.03-0.08	6.1-6.5	<2	Low--------	0.10			
	7-12	<3	1.50-1.60	0.6-6.0	0.03-0.08	5.6-8.4	<2	Low--------	0.10			
	12	---	---	---	---	---	---	-----------	----			
7:												
Matlacha---------	0-40	3-8	1.65-1.75	2.0-6.0	0.05-0.08	5.6-8.4	<2	Low--------	0.10	5	2	---
	40-80	1-2	1.50-1.65	6.0-20	0.03-0.05	5.6-7.3	<2	Low--------	0.17			
Urban land.												
8----------------	0-2	1-3	1.55-1.65	6.0-20	0.03-0.05	7.4-8.4	>16	Low--------	0.10	2	2	1-3
Hallandale	2-16	2-4	1.60-1.70	2.0-6.0	0.05-0.10	7.4-8.4	>16	Low--------	0.10			
	16-19	1-3	1.65-1.75	6.0-20	0.03-0.05	7.4-8.4	>16	Low--------	0.10			
	19	---	---	---	---	---	---	-----------	----			
9----------------	0-22	<5	1.25-1.50	6.0-20	0.02-0.07	4.5-6.0	<2	Low--------	0.10	5	2	2-8
EauGallie	22-27	1-8	1.45-1.60	0.6-6.0	0.15-0.25	4.5-6.5	<2	Low--------	0.15			
	27-58	1-5	1.45-1.65	6.0-20	0.02-0.05	5.1-7.8	<2	Low--------	0.10			
	58-80	13-31	1.55-1.70	0.06-2.0	0.10-0.20	5.1-7.8	<2	Low--------	0.20			
10---------------	0-80	<5	1.30-1.65	6.0-20	0.02-0.05	4.5-7.8	<2	Low--------	0.10	5	2	1-5
Pompano												
11---------------	0-26	<2	1.35-1.55	6.0-20	0.02-0.05	3.6-6.5	<2	Low--------	0.10	5	2	<2
Myakka	26-63	1-8	1.45-1.60	0.6-6.0	0.10-0.20	3.6-6.5	<2	Low--------	0.15			
	63-80	<2	1.48-1.70	6.0-20	0.02-0.10	3.6-6.5	<2	Low--------	0.10			
12---------------	0-22	1-3	1.40-1.55	6.0-20	0.02-0.05	5.1-7.8	<2	Low--------	0.10	5	2	1-4
Felda	22-38	13-30	1.50-1.65	0.6-6.0	0.10-0.15	6.1-7.8	<2	Low--------	0.24			
	38-80	1-10	1.50-1.65	6.0-20	0.02-0.05	6.1-8.4	<2	Low--------	0.10			
13---------------	0-3	<2	1.30-1.55	6.0-20	0.05-0.10	5.1-8.4	<2	Low--------	0.10	5	2	1-3
Boca	3-25	<2	1.50-1.60	6.0-20	0.02-0.05	5.1-8.4	<2	Low--------	0.17			
	25-30	14-30	1.55-1.65	0.6-2.0	0.10-0.15	5.1-8.4	<2	Low--------	0.20			
	30	---	---	---	---	---	---	-----------	----			
14---------------	0-2	1-3	1.35-1.50	6.0-20	0.05-0.10	5.1-7.3	<2	Low--------	0.10	5	1	1-4
Valkaria	2-7	<2	1.45-1.60	6.0-20	0.03-0.08	5.1-7.3	<2	Low--------	0.10			
	7-80	2-5	1.45-1.60	6.0-20	0.05-0.10	5.1-8.4	<2	Low--------	0.10			
15---------------	0-5	---	0.25-0.35	6.0-20	0.20-0.35	6.6-8.4	>16	Low--------	0-10	2	2	---
Estero	5-13	1-6	1.55-1.70	6.0-20	0.10-0.15	6.6-8.4	>16	Low--------	0.10			
	13-33	2-7	1.60-1.70	6.0-20	0.07-0.13	6.6-8.4	>16	Low--------	0.10			
	33-55	2-7	1.55-1.65	2.0-6.0	0.10-0.15	4.5-5.5	>16	Low--------	0.10			
	55-80	1-4	1.60-1.70	6.0-20	0.05-0.10	4.5-5.5	>16	Low--------	0.10			

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Soil reaction	Salinity	Shrink- swell potential	Erosion factors K	Erosion factors T	Wind erodi- bility group	Organic matter
	In	Pct	G/cm3	In/hr	In/in	pH	Mmhos/cm					Pct
16---------------- Peckish	0-9	1-3	1.20-1.45	6.0-20	0.15-0.20	3.6-8.4	>16	Low--------	0.10	5	2	---
	9-36	1-5	1.40-1.55	6.0-20	0.05-0.10	3.6-8.4	>16	Low--------	0.10			
	36-48	2-8	1.55-1.70	6.0-20	0.10-0.15	3.6-8.4	>16	Low--------	0.10			
	48-61	1-4	1.55-1.70	6.0-20	0.05-0.10	3.6-8.4	>16	Low--------	0.10			
17---------------- Daytona	0-43	<1-3	1.20-1.50	>20	0.02-0.05	3.6-6.0	<2	Very low	0.10	5	1	.5-1
	43-50	2-6	1.35-1.60	2.0-6.0	0.10-0.15	3.6-6.0	<2	Very low	0.15			
	50-80	1-4	1.45-1.70	>20	0.02-0.05	3.6-6.0	<2	Very low	0.10			
18---------------- Matlacha	0-23	3-8	1.65-1.75	2.0-6.0	0.05-0.10	5.6-8.4	<2	Low--------	0.10	5	2	---
	23-44	1-2	1.40-1.65	6.0-20	0.03-0.05	5.6-7.3	<2	Low--------	0.17			
	44-48	15-25	1.50-1.70	0.2-0.6	0.10-0.15	6.6-8.4	<2	Low--------	0.20			
	48	---	---	---	---	---	---	-----------	----			
19---------------- Gator	0-29	0-2	0.20-0.30	6.0-20	0.30-0.40	3.6-6.0	>16	Low--------	0-10	2	2	55-80
	29-34	2-7	1.40-1.65	6.0-20	0.10-0.15	5.1-5.5	2-4	Low--------	0.15			
	34-80	3-12	1.60-1.65	0.6-20	0.03-0.15	5.1-8.4	2-4	Low--------	0.24			
20---------------- Terra Ceia	0-53	---	0.15-0.35	6.0-20	0.30-0.50	5.6-8.4	<2	Low--------	0.10	2	2	>60
	53-80	2-10	1.35-1.50	6.0-20	0.02-0.08	5.6-8.4	<2	Low--------	0.10			
22. Beaches												
23---------------- Wulfert	0-12	0-1	0.20-0.40	6.0-20	0.20-0.25	5.6-7.3	>16	-----------	0.10	2	2	---
	12-36	1-5	0.30-0.40	6.0-20	0.10-0.15	3.6-7.3	>16	-----------	0.10			
	36-80	2-5	1.50-1.60	6.0-20	0.02-0.08	3.6-7.3	>16	Low--------	0.17			
24---------------- Kesson	0-6	1-4	1.35-1.50	6.0-20	0.10-0.15	7.4-9.0	>16	Low--------	0.10	5	2	---
	6-23	1-4	1.50-1.65	2.0-20	0.05-0.10	7.4-9.0	>16	Low--------	0.10			
	23-38	1-4	1.55-1.70	2.0-20	0.05-0.15	7.4-9.0	>16	Low--------	0.10			
	38-80	2-8	1.45-1.65	2.0-20	0.05-0.15	7.4-9.0	>16	Low--------	0.10			
25:												
St. Augustine---	0-51	2-5	1.35-1.45	6.0-20	0.05-0.10	7.4-8.4	8-16	Low--------	0.10	5	2	1-3
	51-80	---	0.25-0.35	6.0-20	0.15-0.20	3.6-6.5	>16	Low--------	----			
Urban land.												
26---------------- Pineda	0-36	1-8	1.30-1.60	6.0-20	0.02-0.05	4.5-7.3	<2	Low--------	0.10	5	2	.5-6
	36-54	10-25	1.50-1.70	<0.2	0.10-0.15	5.1-8.4	<2	Low--------	0.24			
	54-80	3-12	1.45-1.60	2.0-6.0	0.02-0.05	5.6-8.4	<2	Low--------	0.10			
27---------------- Pompano	0-80	<5	1.30-1.65	6.0-20	0.02-0.05	4.5-7.8	<2	Low--------	0.10	5	2	1-5
28---------------- Immokalee	0-9	1-5	1.20-1.50	6.0-20	0.05-0.10	3.6-6.0	<2	Low--------	0.10	5	2	1-2
	9-36	1-5	1.45-1.70	6.0-20	0.02-0.05	3.6-6.0	<2	Low--------	0.10			
	36-55	2-7	1.30-1.60	0.6-2.0	0.10-0.25	3.6-6.0	<2	Low--------	0.15			
	55-80	1-5	1.40-1.60	6.0-20	0.02-0.05	3.6-6.0	<2	Low--------	0.10			
29---------------- Punta	0-4	0-4	1.35-1.50	6.0-20	0.05-0.10	4.5-6.0	<2	Low--------	0.10	5	2	1-4
	4-57	0-3	1.50-1.65	6.0-20	0.02-0.05	4.5-6.0	<2	Low--------	0.10			
	57-80	3-8	1.45-1.65	0.6-2.0	0.05-0.10	3.6-5.5	<2	Low--------	0.15			
33---------------- Oldsmar	0-42	<2	1.48-1.61	6.0-20	0.02-0.05	3.6-7.3	<2	Very low	0.10	5	2	1-2
	42-47	2-8	1.42-1.59	0.2-6.0	0.10-0.15	3.6-7.3	<2	Low--------	0.15			
	47-58	15-30	1.60-1.69	<0.2	0.10-0.15	6.1-8.4	<2	Low--------	0.24			
	58-80	2-8	1.42-1.59	0.2-6.0	0.10-0.15	6.1-8.4	<2	Low--------	0.20			
34---------------- Malabar	0-17	<4	1.20-1.55	6.0-20	0.03-0.08	5.1-8.4	<2	Low--------	0.10	5	2	1-2
	17-42	1-5	1.50-1.75	6.0-20	0.05-0.10	5.1-8.4	<2	Low--------	0.10			
	42-59	10-25	1.60-1.70	<0.2	0.10-0.15	5.1-8.4	<2	Low--------	0.24			
	59-80	1-8	1.50-1.70	2.0-20	0.05-0.08	5.1-8.4	<2	Low--------	0.15			
35---------------- Wabasso	0-24	<5	1.25-1.55	6.0-20	0.02-0.05	4.5-6.5	<2	Low--------	0.10	5	2	1-4
	24-28	1-12	1.50-1.75	0.6-2.0	0.10-0.15	4.5-7.3	<2	Low--------	0.15			
	28-62	12-30	1.60-1.80	<0.2	0.10-0.15	5.1-8.4	<2	Low--------	0.24			
	62-80	2-12	1.40-1.70	6.0-20	0.05-0.10	7.4-8.4	<2	Low--------	0.17			

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Soil reaction	Salinity	Shrink- swell potential	Erosion factors		Wind erodi- bility group	Organic matter
									K	T		
	In	Pct	G/cm3	In/hr	In/in	pH	Mmhos/cm					Pct
36:												
Immokalee--------	0-6	1-5	1.20-1.50	6.0-20	0.05-0.10	3.6-6.0	<2	Low--------	0.10	5	2	1-2
	6-37	1-5	1.45-1.70	6.0-20	0.02-0.05	3.6-6.0	<2	Low--------	0.10			
	37-70	2-7	1.30-1.60	0.6-2.0	0.10-0.25	3.6-6.0	<2	Low--------	0.15			
	70-80	1-5	1.40-1.60	6.0-20	0.02-0.05	3.6-6.0	<2	Low--------	0.10			
Urban land.												
37---------------- Satellite	0-3	1-3	1.10-1.45	>20	0.02-0.10	4.5-7.8	<2	Very low	0.10	5	2	.5-2
	3-80	.5-2	1.35-1.55	>20	0.02-0.05	4.5-7.8	<2	Very low	0.10			
38---------------- Isles	0-6	1-2	1.35-1.55	6.0-20	0.05-0.10	5.1-7.3	<2	Low--------	0.10	2	2	1-2
	6-33	2-3	1.50-1.65	6.0-20	0.05-0.10	5.1-7.3	<2	Low--------	0.10			
	33-51	15-23	1.65-1.75	0.6-2.0	0.12-0.18	5.6-8.4	<2	Low--------	0.20			
	51	---	---	---	---	---	---	----------	----			
39---------------- Isles	0-5	1-2	1.35-1.55	6.0-20	0.05-0.10	5.1-7.3	<2	Low--------	0.10	2	2	1-2
	5-21	2-3	1.50-1.65	6.0-20	0.05-0.10	5.1-7.3	<2	Low--------	0.10			
	21-47	15-22	1.65-1.75	0.6-2.0	0.12-0.18	5.6-8.4	<2	Low--------	0.20			
	47	---	---	---	---	---	---	----------	----			
40---------------- Anclote	0-22	2-8	1.30-1.45	6.0-20	0.10-0.15	5.1-8.4	<2	Low--------	0.15	5	2	2-10
	22-80	1-13	1.50-1.65	6.0-20	0.03-0.10	5.1-8.4	<2	Low--------	0.10			
41---------------- Valkaria	0-5	1-3	1.35-1.50	6.0-20	0.05-0.10	5.1-7.3	<2	Low--------	0.10	5	1	1-4
	5-38	2-5	1.45-1.60	6.0-20	0.05-0.10	5.1-8.4	<2	Low--------	0.10			
	38-80	1-5	1.45-1.60	6.0-20	0.03-0.08	5.1-8.4	<2	Low--------	0.10			
42---------------- Wabasso	0-19	1-6	1.35-1.55	6.0-20	0.02-0.07	3.6-5.5	<2	Low--------	0.10	4	2	2-5
	19-23	1-8	1.45-1.60	0.6-2.0	0.10-0.15	4.5-7.3	<2	Low--------	0.15			
	23-37	1-6	1.50-1.65	6.0-20	0.05-0.10	5.6-8.4	<2	Low--------	0.10			
	37-51	12-32	1.60-1.70	0.06-0.2	0.10-0.15	7.4-8.4	<2	Low--------	0.24			
	51	---	---	---	---	---	---	----------	----			
43---------------- Smyrna	0-13	1-6	1.35-1.45	6.0-20	0.03-0.07	3.6-7.3	<2	Low--------	0.10	5	2	1-5
	13-18	3-8	1.35-1.45	0.6-6.0	0.10-0.20	3.6-7.3	<2	Low--------	0.15			
	18-80	1-6	1.50-1.65	6.0-20	0.03-0.07	4.5-5.5	<2	Low--------	0.10			
44---------------- Malabar	0-7	<4	1.20-1.55	6.0-20	0.03-0.08	5.1-8.4	<2	Low--------	0.10	5	2	1-2
	7-28	1-5	1.50-1.75	6.0-20	0.05-0.10	5.1-8.4	<2	Low--------	0.10			
	28-44	1-5	1.50-1.70	6.0-20	0.02-0.05	5.1-8.4	<2	Low--------	0.10			
	44-67	10-25	1.60-1.70	<0.2	0.10-0.15	5.1-8.4	<2	Low--------	0.24			
	67-80	1-8	1.50-1.70	2.0-20	0.05-0.08	5.1-8.4	<2	Low--------	0.15			
45---------------- Copeland	0-8	3-12	1.30-1.50	6.0-20	0.10-0.15	6.1-7.3	<2	Low--------	0.10	2	2	2-6
	8-20	15-30	1.55-1.70	0.6-2.0	0.10-0.15	7.4-8.4	<2	Low--------	0.24			
	20-28	10-18	1.55-1.70	0.6-6.0	0.05-0.10	7.4-8.4	<2	Low--------	0.24			
	28	---	---	---	---	---	---	----------	----			
48---------------- St. Augustine	0-30	<2	1.30-1.40	6.0-20	0.02-0.05	6.1-8.4	<2	Low--------	0.10	5	2	1-3
	30-80	4-8	1.40-1.55	6.0-20	0.05-0.10	6.1-8.4	<2	Low--------	0.15			
49---------------- Felda	0-35	1-3	1.40-1.55	6.0-20	0.02-0.05	5.1-7.8	<2	Low--------	0.10	4	2	1-4
	35-52	13-30	1.50-1.65	0.6-6.0	0.10-0.15	6.1-7.8	<2	Low--------	0.24			
	52-80	1-10	1.50-1.65	6.0-20	0.02-0.05	6.1-8.4	<2	Low--------	0.17			
50---------------- Oldsmar	0-34	1-3	1.40-1.65	6.0-20	0.05-0.10	4.5-6.0	<2	Low--------	0.10	5	2	1-2
	34-49	1-3	1.40-1.65	0.2-0.6	0.05-0.10	4.5-5.5	<2	Low--------	0.15			
	49-60	15-35	1.50-1.70	0.06-0.2	0.10-0.15	5.1-7.8	<2	Low--------	0.24			
	60	---	---	---	---	---	---	----------	----			
51---------------- Floridana	0-22	3-10	1.40-1.49	6.0-20	0.10-0.20	4.5-8.4	<2	Low--------	0.10	5	2	6-15
	22-39	1-7	1.52-1.53	6.0-20	0.05-0.10	4.5-8.4	<2	Low--------	0.10			
	39-80	15-30	1.60-1.69	<0.2	0.10-0.20	4.5-8.4	<2	Low--------	0.24			
53---------------- Myakka	0-29	<2	1.36-1.44	6.0-20	0.02-0.05	3.6-6.5	<2	Low--------	0.10	5	2	1-2
	29-46	2-8	1.47-1.59	0.6-6.0	0.10-0.15	3.6-6.5	<2	Low--------	0.15			
	46-80	<2	1.48-1.61	6.0-20	0.02-0.05	3.6-6.5	<2	Low--------	0.10			

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Soil reaction	Salinity	Shrink- swell potential	Erosion factors K	Erosion factors T	Wind erodi- bility group	Organic matter
	In	Pct	G/cm3	In/hr	In/in	pH	Mmhos/cm					Pct
55---------------- Cocoa	0-17	2-5	1.35-1.60	6.0-20	0.02-0.05	5.6-7.8	<2	Low--------	0.10	3	2	1-3
	17-31	4-10	1.45-1.65	6.0-20	0.05-0.10	5.6-7.8	<2	Low--------	0.15			
	31	---	---	---	---	---	---	----------	----			
56---------------- Isles	0-5	0-1	0.20-0.30	6.0-20	0.10-0.15	5.1-7.3	>16	Low--------	0.10	2	2	20-30
	5-11	1-2	1.35-1.45	6.0-20	0.05-0.14	5.1-7.3	8-16	Low--------	0.10			
	11-39	2-4	1.50-1.70	6.0-20	0.05-0.08	5.1-7.3	4-8	Low--------	0.10			
	39-47	15-22	1.60-1.75	0.6-2.0	0.12-0.18	5.6-8.4	2-4	Low--------	0.24			
	47	---	---	---	---	---	---	----------	----			
57---------------- Boca	0-5	1-2	1.35-1.45	6.0-20	0.05-0.10	7.9-9.0	8-16	Low--------	0.10	2	2	1-3
	5-26	1-3	1.45-1.55	6.0-20	0.05-0.10	7.4-9.0	8-16	Low--------	0.17			
	26-32	15-23	1.60-1.70	0.6-2.0	0.10-0.15	7.4-8.4	8-16	Low--------	0.20			
	32	---	---	---	---	---	---	----------	----			
59. Urban land												
61---------------- Orsino	0-16	<1	1.35-1.55	>20	0.02-0.08	3.6-6.0	<2	Low--------	0.10	5	2	<1
	16-80	<2	1.35-1.55	>20	0.02-0.08	3.6-6.0	<2	Low--------	0.10			
62---------------- Winder	0-16	1-6	1.40-1.65	6.0-20	0.03-0.08	5.6-7.8	<2	Low--------	0.10	5	2	.1-2
	16-23	10-18	1.45-1.65	0.06-0.2	0.06-0.10	6.1-7.8	<2	Low--------	0.20			
	23-80	6-13	1.40-1.65	6.0-20	0.03-0.10	7.4-8.4	<2	Low--------	0.24			
63---------------- Malabar	0-17	1-3	1.40-1.55	6.0-20	0.03-0.05	5.1-6.5	<2	Low--------	0.10	5	2	1-2
	17-37	1-5	1.50-1.70	6.0-20	0.05-0.10	6.1-7.3	<2	Low--------	0.10			
	37-49	1-3	1.40-1.55	6.0-20	0.03-0.05	6.1-7.3	<2	Low--------	0.10			
	49-68	15-30	1.55-1.75	0.2-0.6	0.10-0.15	6.1-7.3	<2	Low--------	0.24			
	68-80	1-3	1.40-1.55	6.0-20	0.03-0.05	6.1-7.3	<2	Low--------	0.10			
64: Hallandale-------	0-2	<3	1.35-1.45	6.0-20	0.05-0.11	5.1-6.5	<2	Low--------	0.10	2	2	2-5
	2-9	<3	1.50-1.60	6.0-20	0.03-0.08	6.1-6.5	<2	Low--------	0.10			
	9	---	---	---	---	---	---	----------	----			
Urban land.												
66---------------- Caloosa	0-27	1-6	1.30-1.40	6.0-20	0.02-0.05	6.1-8.4	<2	Low--------	0.10	5	2	1-3
	27-80	40-60	1.60-1.70	<0.06	0.15-0.20	6.1-8.4	<2	High-------	0.32			
67: Smyrna-----------	0-12	1-6	1.35-1.45	6.0-20	0.03-0.07	3.6-7.3	<2	Low--------	0.10	5	2	1-5
	12-26	3-8	1.35-1.45	0.6-6.0	0.10-0.20	3.6-7.3	<2	Low--------	0.15			
	26-80	1-6	1.50-1.65	6.0-20	0.03-0.07	4.5-5.5	<2	Low--------	0.10			
Urban.												
69---------------- Matlacha	0-35	3-8	1.65-1.75	2.0-6.0	0.05-0.08	5.6-8.4	<2	Low--------	0.10	5	2	---
	35-80	1-2	1.50-1.65	6.0-20	0.03-0.05	5.6-7.3	<2	Low--------	0.17			
70---------------- Heights	0-29	1-5	1.45-1.70	6.0-20	0.05-0.08	6.1-7.3	<2	Low--------	0.10	5	2	1-2
	29-36	7-15	1.75-1.85	0.6-6.0	0.10-0.16	6.6-9.0	<2	Low--------	0.15			
	36-42	7-15	1.80-1.90	0.2-2.0	0.12-0.18	6.6-9.0	<2	Low--------	0.20			
	42-80	11-18	1.65-1.75	0.06-0.2	0.12-0.20	6.6-9.0	<2	Low--------	0.15			
72---------------- Bradenton	0-5	1-6	1.30-1.50	6.0-20	0.08-0.12	5.1-7.3	<2	Low--------	0.10	5	2	2-8
	5-10	1-6	1.50-1.70	6.0-20	0.03-0.07	5.1-7.3	<2	Low--------	0.20			
	10-28	10-18	1.55-1.70	0.6-2.0	0.10-0.15	5.6-8.4	<2	Low--------	0.24			
	28-80	1-18	1.55-1.70	0.6-6.0	0.03-0.10	7.4-8.4	<2	Low--------	0.24			
73---------------- Pineda	0-30	1-8	1.30-1.60	6.0-20	0.02-0.05	4.5-7.3	<2	Low--------	0.10	5	2	.5-6
	30-55	10-25	1.50-1.70	<0.2	0.10-0.15	5.1-8.4	<2	Low--------	0.24			
	55-80	3-12	1.45-1.60	2.0-6.0	0.02-0.05	5.6-8.4	<2	Low--------	0.10			
74---------------- Boca	0-3	1-2	1.35-1.45	6.0-20	0.05-0.10	5.6-7.3	<2	Low--------	0.10	5	2	1-3
	3-33	1-2	1.40-1.65	6.0-20	0.03-0.05	6.6-8.4	<2	Low--------	0.17			
	33-38	15-25	1.65-1.75	0.6-2.0	0.10-0.15	6.6-8.4	<2	Low--------	0.20			
	38	---	---	---	---	---	---	----------	----			

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Soil reaction	Salinity	Shrink- swell potential	Erosion factors K	Erosion factors T	Wind erodi- bility group	Organic matter
	In	Pct	G/cm3	In/hr	In/in	pH	Mmhos/cm					Pct
75---------------- Hallandale	0-2	1-2	1.20-1.40	6.0-20	0.03-0.05	6.1-7.3	<2	Low--------	0.10	2	2	1-2
	2-11	2-3	1.45-1.55	6.0-20	0.05-0.08	6.6-7.8	<2	Low--------	0.10			
	11	---	---	---	---	---	---	-----------	----			
76---------------- Electra	0-4	1-6	1.40-1.55	6.0-20	0.05-0.10	3.6-6.5	<2	Very low	0.10	5	2	1-2
	4-43	1-6	1.45-1.70	6.0-20	0.02-0.07	3.6-6.5	<2	Very low	0.10			
	43-66	1-6	1.50-1.70	0.6-2.0	0.10-0.15	3.6-5.5	<2	Very low	0.15			
	66-80	18-38	1.60-1.75	<0.2	0.10-0.15	3.6-5.5	<2	Very low	0.28			
77---------------- Pineda	0-27	1-3	1.40-1.65	6.0-20	0.02-0.05	5.6-6.5	<2	Low--------	0.15	5	2	1-2
	27-52	17-35	1.65-1.75	0.06-0.2	0.10-0.15	6.6-7.8	<2	Low--------	0.24			
	52	---	---	---	---	---	---	-----------	----			
78---------------- Chobee	0-4	---	0.15-0.35	6.0-20	0.30-0.50	5.1-6.5	<2	Low--------	0.10	2	2	25-35
	4-16	0-15	1.45-1.50	2.0-6.0	0.10-0.15	5.6-7.3	<2	Low--------	0.15			
	16-53	10-30	1.40-1.45	<0.2	0.12-0.17	5.6-8.4	<2	Low--------	0.15			
	53-80	0-15	1.45-1.50	2.0-6.0	0.10-0.15	5.6-7.3	<2	Low--------	0.15			

TABLE 16.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "frequent," "brief," and "apparent" are explained in the text. The symbol > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated]

Map symbol and soil name	Hydro-logic group	Flooding			High water table			Bedrock		Subsidence		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hard-ness	Ini-tial	Total	Uncoated steel	Concrete
					Ft			In		In	In		
2 Canaveral	C	None	---	---	1.0-3.0	Apparent	Jun-Nov	>60	---	---	---	Moderate	Low.
4:													
Canaveral	C	None	---	---	1.0-3.0	Apparent	Jun-Nov	>60	---	---	---	Moderate	Low.
Urban land.													
5 Captiva	B/D	None	---	---	0-0.5	Apparent	Jun-Oct	>60	---	---	---	Low	Low.
6 Hallandale	B/D	None	---	---	0-1.0	Apparent	Jun-Nov	7-20	Soft	---	---	High	Low.
7:													
Matlacha	C	None	---	---	2.0-3.0	Apparent	Jun-Oct	>60	---	---	---	High	Low.
Urban land.													
8 Hallandale	D	Frequent	Very long	Jan-Dec	0-1.5	Apparent	Jan-Dec	7-20	Soft	---	---	High	Moderate.
9 EauGallie	B/D	None	---	---	0-1.0	Apparent	Jun-Oct	>60	---	---	---	High	Moderate.
10 Pompano	B/D	None	---	---	0-1.0	Apparent	Jun-Nov	>60	---	---	---	High	Moderate.
11 Myakka	B/D	None	---	---	0-1.0	Apparent	Jun-Nov	>60	---	---	---	High	High.
12 Felda	B/D	None	---	---	0-1.0	Apparent	Jul-Mar	>60	---	---	---	High	Moderate.
13 Boca	B/D	None	---	---	0-1.0	Apparent	Jun-Feb	24-40	Soft	---	---	High	Moderate.
14 Valkaria	B/D	None	---	---	0-1.0	Apparent	Jun-Sep	>60	---	---	---	High	Moderate.
15 Estero	D	Frequent	Very long	Jan-Dec	0-1.0	Apparent	Jan-Dec	>60	---	---	---	High	High.
16 Peckish	D	Frequent	Very long	Jan-Dec	0-0.5	Apparent	Jan-Dec	>60	---	---	---	High	High.
17 Daytona	B	None	---	---	3.5-5.0	Apparent	Jul-Nov	>60	---	---	---	Moderate	High.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table			Bedrock		Subsidence		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Initial	Total	Uncoated steel	Concrete
					Ft			In		In	In		
18----------------- Matlacha	C	None---------	---	---	2.0-3.0	Apparent	Jun-Oct	40-60	Hard	---	---	High------	Low.
19*---------------- Gator	D	None---------	---	---	+1-0	Apparent	Jun-Mar	>60	---	2-6	20-28	High------	High.
20*---------------- Terra Ceia	B/D	None---------	---	---	+1-1.0	Apparent	Jan-Dec	>60	---	16-20	50-60	Moderate	Moderate.
22. Beaches													
23----------------- Wulfert	D	Frequent-----	Very long	Jan-Dec	0-0.5	Apparent	Jan-Dec	>60	---	16-18	24-36	High------	High.
24----------------- Kesson	D	Frequent-----	Very long	---	0-0.5	Apparent	Jan-Dec	>60	---	---	---	High------	Low.
25: St. Augustine----	B	None---------	---	---	2.0-3.0	Apparent	Jun-Oct	>60	---	---	---	High------	Moderate.
Urban land.													
26----------------- Pineda	B/D	None---------	---	---	0-1.0	Apparent	Jun-Nov	>60	---	---	---	High------	Low.
27*---------------- Pompano	B/D	None---------	---	---	+2-1.0	Apparent	Jun-Feb	>60	---	---	---	High------	Moderate.
28----------------- Immokalee	B/D	None---------	---	---	0-1.0	Apparent	Jun-Nov	>60	---	---	---	High------	High.
29----------------- Punta	B/D	None---------	---	---	0-1.0	Apparent	Jun-Nov	>60	---	---	---	High------	High.
33----------------- Oldsmar	B/D	None---------	---	---	0-1.0	Apparent	Jun-Feb	>60	---	---	---	Moderate	High.
34----------------- Malabar	B/D	None---------	---	---	0-1.0	Apparent	Jun-Nov	>60	---	---	---	High------	Low.
35----------------- Wabasso	B/D	None---------	---	---	0-1.0	Apparent	Jun-Oct	>60	---	---	---	Moderate	High.
36: Immokalee---------	B/D	None---------	---	---	0-1.0	Apparent	Jun-Nov	>60	---	---	---	High------	High.
Urban land.													
37----------------- Satellite	A	None---------	---	---	1.0-3.5	Apparent	Jun-Nov	>60	---	---	---	Low-------	Moderate.
38----------------- Isles	B/D	None---------	---	---	0-1.0	Apparent	Jun-Oct	40-72	Soft	---	---	High------	Low.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Map symbol and soil name	Hydro-logic group	Flooding			High water table			Bedrock		Subsidence		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hard-ness	Ini-tial	Total	Uncoated steel	Concrete
					Ft			In		In	In		
39*: Isles	D	None	---	---	+1.-1.0	Apparent	Jun-Dec	40-72	Soft	---	---	High	Low.
40*: Anclote	B/D	None	---	---	+2-0	Apparent	Jun-Mar	>60	---	---	---	High	Moderate.
41*: Valkaria	B/D	None	---	---	+2-1.0	Apparent	Jun-Sep	>60	---	---	---	High	Moderate.
42: Wabasso	B/D	None	---	---	0-1.0	Apparent	Jun-Oct	40-80	Hard	---	---	Moderate	Moderate.
43: Smyrna	B/D	None	---	---	0-1.0	Apparent	Jul-Oct	>60	---	---	---	High	High.
44*: Malabar	B/D	None	---	---	+2-1.0	Apparent	Jun-Nov	>60	---	---	---	High	Low.
45*: Copeland	D	None	---	---	+2-1.0	Apparent	Jul-Apr	20-50	Soft	---	---	High	Low.
48: St. Augustine	C	None	---	---	1.5-3.0	Apparent	Jul-Oct	>60	---	---	---	High	High.
49*: Felda	D	None	---	---	+2-1.0	Apparent	Jun-Dec	>60	---	---	---	High	High.
50: Oldsmar	B/D	None	---	---	0-1.0	Apparent	Jun-Oct	60-72	Hard	---	---	High	Low.
51*: Floridana	D	None	---	---	+2-1.0	Apparent	Jun-Feb	>60	---	---	---	Moderate	Low.
53*: Myakka	D	None	---	---	+2-1.0	Apparent	Jun-Feb	>60	---	---	---	High	High.
55: Cocoa	A	None	---	---	>6.0	---	---	20-40	Hard	---	---	Low	Low.
56: Isles	D	Frequent	Very long	Jan-Dec	0-1.0	Apparent	Jan-Dec	42-72	Soft	---	---	High	High.
57: Boca	D	Frequent	Very long	Jan-Dec	0-1.5	Apparent	Jan-Dec	24-40	Soft	---	---	High	High.
59. Urban land													
61: Orsino	A	None	---	---	3.5-5.0	Apparent	Jun-Dec	>60	---	---	---	Low	Moderate.
62*: Winder	D	None	---	---	+2-1.0	Apparent	Jun-Dec	>60	---	---	---	High	Low.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Map symbol and soil name	Hydro-logic group	Flooding			High water table			Bedrock		Subsidence		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hard-ness	Ini-tial	Total	Uncoated steel	Concrete
					Ft			In		In	In		
63------------------ Malabar	B/D	None---------	---	---	0-1.0	Apparent	Jun-Oct	>60	---	---	---	High------	Low.
64: Hallandale--------	B/D	None---------	---	---	0-1.0	Apparent	Jun-Nov	7-20	Soft	---	---	High-----	Low.
Urban land.													
66------------------ Caloosa	C	None---------	---	---	2.5-3.5	Apparent	Jul-Oct	>60	---	---	---	High------	High.
67: Smyrna------------	B/D	None---------	---	---	0-1.0	Apparent	Jul-Oct	>60	---	---	---	High------	High.
Urban land.													
69------------------ Matlacha	C	None---------	---	---	2.0-3.0	Apparent	Jun-Oct	>60	---	---	---	High------	Low.
70------------------ Heights	B/D	None---------	---	---	0-1.0	Apparent	Jun-Oct	>60	---	---	---	High------	Low.
72------------------ Bradenton	B/D	None---------	---	---	0-1.0	Apparent	Jun-Dec	>60	---	---	---	High------	Low.
73*----------------- Pineda	D	None---------	---	---	+2-1.0	Apparent	Jun-Dec	>60	---	---	---	High------	Low.
74------------------ Boca	B/D	None---------	---	---	0-1.0	Apparent	Jun-Oct	24-40	Hard	---	---	High------	Moderate.
75------------------ Hallandale	B/D	None---------	---	---	0-1.0	Apparent	Jun-Oct	2-20	Soft	---	---	High------	Low.
76------------------ Electra	C	None---------	---	---	2.0-3.5	Apparent	Jul-Oct	>60	---	---	---	Low-------	High.
77------------------ Pineda	B/D	None---------	---	---	0-1.0	Apparent	Jun-Nov	40-80	Soft	---	---	High------	Low.
78*----------------- Chobee	B/D	None---------	---	---	+2.-1.0	Apparent	Jun-Dec	>60	---	---	---	High------	High.

* In the "High water table--Depth" column, 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.

TABLE 17.--DEPTH TO WATER IN SELECTED SOILS

[Monthly readings are based on an average of two readings, which are taken on the first and middle of each month for the 2- or 3-year period]

Soil name	Year	Month											
		Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
		In	In	In	In	In	In	In	In	In	In	In	In
Immokalee[1]	77-79	28	28	29	39	37	36	26	23	24	35	40	36
Immokalee[2]	77-79	40	32	38	46	39	50	37	26	16	32	43	46
Boca[2]	77-79	23	23	19	30	23	28	10	10	4	14	31	30
Canaveral[2]	77-79	36	33	36	43	42	51	48	41	31	29	41	42
Felda[1]	78-79	2	5	9	23	16	15	25	9	19	14	27	32
Felda[2, 3]	77-79	36	21	19	37	39	41	11	+7	+11	3	35	42
Malabar[1]	77-79	35	33	30	40	38	49	39	33	30	35	42	40
Orsino[2]	77-79	73	74	75	75	74	79	70	62	60	68	74	73
Pineda[2, 3]	77-79	44	34	30	45	36	56	20	5	+2	15	42	48
Pompano[2]	77-79	24	24	27	36	30	32	12	10	4	16	28	30
Satellite[2]	77-79	45	41	49	52	53	60	44	31	30	40	52	53

1 Soil monitored in Charlotte County, Florida.
2 Soil monitored in Lee County, Florida.
3 A plus sign preceding the depth indicates that the water table is above the surface of the soil.

TABLE 18.--PHYSICAL ANALYSES OF SELECTED SOILS

[All of the soils sampled are the typical pedon for the series. See the section "Soil Series and Their Morphology" for location of pedons sampled. Dashes indicate that data are not available]

Soil name and sample number	Depth	Horizon	Particle-size distribution: Sand: Very coarse (2-1 mm)	Sand: Coarse (1-0.5 mm)	Sand: Medium (0.5-0.25 mm)	Sand: Fine (0.25-0.1 mm)	Sand: Very fine (0.1-0.05 mm)	Sand: Total (2.0-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm)	Hydraulic Conductivity	Bulk Density (field moisture)	Water content: 1/10 bar	Water content: 1/3 bar	Water content: 15 bar
	Cm										Cm/hr	G/cm^3	Pct (wt)	Pct (wt)	Pct (wt)
Anclote sand: (S81FL-071-26)	0-20	A11	0.0	2.5	41.2	40.5	4.6	88.8	6.7	4.5	---	---	---	---	---
	20-56	A12	0.0	3.2	53.1	34.2	2.5	93.0	5.1	1.9	---	---	---	---	---
	56-102	C1	0.0	2.7	46.5	42.6	5.4	97.2	2.3	0.5	---	---	---	---	---
	102-203	C2	0.0	3.2	47.6	43.4	3.6	97.8	1.6	0.6	---	---	---	---	---
Boca fine sand: (S78FL-071-9)	0-8	A1	0.0	2.2	17.7	73.1	6.4	99.4	0.0	0.6	41.1	1.36	5.6	4.1	2.9
	8-23	A21	0.0	2.9	18.5	71.0	6.4	98.8	0.8	0.4	34.8	1.43	4.9	3.7	2.3
	23-36	A22	0.0	3.6	19.3	70.1	5.8	98.8	0.8	0.4	28.7	1.56	3.5	2.7	1.5
	36-64	B1	0.0	3.0	17.1	70.9	6.1	97.1	1.3	1.6	19.3	1.60	3.8	2.0	0.6
	64-76	B2tg	0.2	2.8	16.9	58.8	4.7	83.4	2.0	14.6	0.3	1.73	17.8	15.8	7.1
Bradenton fine sand*: (S81FL-071-27)	0-13	Ap	0.0	1.0	20.6	64.9	7.8	94.3	3.6	2.6	15.3	1.45	11.2	7.0	2.5
	13-25	A2	0.0	1.9	33.5	57.3	5.1	97.8	1.6	0.6	15.1	1.63	4.3	2.2	0.5
	25-46	B21tg	0.0	1.0	18.1	48.5	6.3	73.9	5.4	20.7	0.1	1.48	24.1	21.9	10.0
	46-71	B22tg	0.0	1.2	21.2	55.0	7.4	84.8	3.7	11.5	0.5	1.59	16.3	12.9	5.9
	71-84	IIC1ca	---	---	---	---	---	---	---	---	---	---	---	---	---
	84-114	IIC2ca	0.4	2.2	22.6	54.6	7.2	87.0	4.0	9.0	3.5	1.65	14.5	10.5	4.8
	114-145	IIIC3	0.2	2.0	28.2	59.2	4.8	94.4	1.6	4.0	13.4	1.54	9.2	6.0	2.4
	145-155	IVC4	0.1	1.7	43.3	52.3	1.7	99.1	0.2	0.7	48.0	1.57	3.0	1.4	0.2
	155-180	IVC5	0.0	2.3	73.4	23.2	0.2	99.1	0.3	0.6	67.0	1.59	2.2	1.1	0.1
	180-203	IVC6	0.0	4.5	55.9	38.3	0.6	99.3	0.2	0.5	---	---	---	---	---
Canaveral fine sand: (S77FL-071-2)	0-18	A11	0.4	3.1	10.3	72.1	9.7	95.6	1.1	3.3	---	---	---	---	---
	18-38	A12	0.4	3.7	9.9	75.4	7.7	97.1	1.5	1.4	80.1	1.32	8.3	6.5	1.5
	38-56	C1	2.0	3.2	11.5	73.2	3.4	93.3	5.3	1.4	162.1	1.44	4.9	3.8	1.9
	56-91	C2	0.2	2.3	13.5	80.3	1.7	98.0	1.1	0.9	76.9	1.35	8.6	7.6	1.9
	91-130	C3	3.5	16.2	19.4	57.5	1.5	98.1	1.4	0.5	124.8	1.38	3.9	2.9	1.3
	130-162	C4	2.4	8.6	11.7	72.9	2.8	98.4	1.0	0.6	---	---	---	---	---
Captiva fine sand: (S77FL-071-3)	0-15	A1	0.1	0.6	4.0	80.7	4.8	90.2	7.2	2.6	---	---	---	---	---
	15-38	C1	0.2	1.0	3.7	82.7	4.7	92.3	5.3	2.4	33.8	1.50	10.7	7.5	3.1
	38-66	C2	0.7	4.3	11.8	77.7	2.9	97.6	0.0	2.6	25.9	1.61	7.8	5.4	2.1
	66-76	C3	2.2	7.7	7.5	76.7	4.2	98.3	0.0	1.7	---	---	---	---	---
	76-137	C4g	0.2	0.8	2.4	89.0	6.2	98.6	0.0	1.4	---	---	---	---	---
Cocoa fine sand*: (S78FL-071-19)	0-8	A1	0.0	0.7	8.2	80.9	7.5	97.3	1.2	1.5	52.6	1.19	10.1	7.3	2.4
	8-33	A2	0.4	1.5	8.9	80.1	7.1	98.0	1.8	0.2	30.9	1.46	4.6	3.3	1.4
	33-43	B11	0.3	1.4	9.3	80.1	7.1	98.2	0.0	1.8	33.2	1.46	4.2	3.3	1.1
	43-68	B12	0.3	1.2	9.4	80.4	6.8	98.1	1.1	0.8	33.5	1.31	4.7	3.3	0.6
	68-79	B2t	0.0	1.0	8.5	76.5	6.6	92.6	2.4	5.0	23.7	1.46	5.6	3.6	1.5

See footnote at end of table.

TABLE 18.--PHYSICAL ANALYSES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Particle-size distribution: Sand: Very coarse (2-1 mm)	Sand: Coarse (1-0.5 mm)	Sand: Medium (0.5-0.25 mm)	Sand: Fine (0.25-0.1 mm)	Sand: Very fine (0.1-0.05 mm)	Sand: Total (2.0-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm)	Hydraulic Conductivity	Bulk Density (field moisture)	Water content: 1/10 bar	Water content: 1/3 bar	Water content: 15 bar
	Cm										Cm/hr	G/cm^3	-----Pct (wt)----		
Daytona sand: (S78FL-071-21)	0-10	A1	0.0	4.9	48.4	38.4	6.8	98.5	1.0	0.5	32.2	1.47	6.6	4.1	2.0
	10-41	A21	0.1	5.2	49.1	38.0	6.4	98.8	1.2	0.0	41.4	1.43	4.2	3.2	1.3
	41-109	A22	0.0	4.8	45.9	39.9	7.8	98.4	1.6	0.0	44.7	1.61	3.6	2.4	1.9
	109-127	B2h	0.0	5.1	42.5	39.3	7.1	94.0	4.1	1.9	40.7	1.33	20.9	14.8	2.8
	127-193	B3	0.0	4.6	40.6	43.8	8.4	97.4	1.5	1.1	32.9	1.57	5.7	3.7	1.1
EauGallie sand*: (S81FL-015-12)	0-10	A1	0.0	16.0	55.6	23.0	1.4	96.0	2.6	1.4	40.7	1.45	9.4	7.1	2.2
	10-23	A21	0.1	14.1	56.0	23.4	1.9	95.5	3.8	0.7	38.1	1.50	5.8	4.0	1.0
	23-56	A22	0.2	14.5	53.5	27.5	2.8	98.5	4.0	0.5	47.3	1.56	5.4	4.3	0.7
	56-68	B2h	0.1	11.5	46.8	28.7	3.7	90.8	2.8	6.4	0.1	1.49	23.5	20.4	3.4
	68-104	B3	0.1	4.0	29.8	35.1	7.9	76.9	18.8	4.3	15.1	1.57	11.0	9.0	4.4
	104-114	A'21	0.3	10.7	41.2	27.3	3.5	83.0	12.8	4.2	7.0	1.72	7.0	4.9	1.6
	114-147	A'22	0.2	13.2	45.1	31.4	2.2	92.1	0.9	7.0	0.0	1.80	10.7	8.5	4.4
	147-203	B'2t	0.1	9.0	36.7	29.7	4.6	80.1	0.3	19.6	0.2	1.82	13.0	11.4	6.2
Estero muck: (S77FL-071-7)	0-13	Oa	---	---	---	---	---	---	---	---	---	---	---	---	---
	13-21	A11	0.0	1.9	20.5	58.7	12.9	94.0	0.0	6.0	---	---	---	---	---
	21-33	A12	0.0	2.6	20.1	60.5	12.2	95.4	2.8	1.8	6.3	1.68	10.0	5.5	1.1
	33-49	A21	0.0	2.3	21.6	61.7	11.0	96.6	2.5	0.9	15.1	1.72	7.0	3.2	0.4
	49-84	A22	0.0	2.4	19.4	60.6	11.2	93.6	5.7	0.7	24.0	1.68	6.6	3.4	0.5
	84-99	B21h	0.0	2.2	18.9	62.8	10.7	94.6	3.0	2.4	---	---	---	---	---
	99-109	B22h	0.0	2.6	19.8	62.1	10.0	94.5	3.1	2.4	---	---	---	---	---
	109-140	B3	0.0	2.3	19.9	65.1	9.7	97.0	1.8	1.2	---	---	---	---	---
Felda fine sand*: (S78FL-015-3)	0-20	Ap	0.0	0.1	5.8	72.1	18.8	96.8	1.0	2.2	11.6	1.47	9.3	4.8	2.1
	20-28	A21	0.1	0.2	4.6	70.5	21.9	97.3	1.1	1.6	6.2	1.59	7.9	4.2	1.7
	28-56	A22	0.0	0.2	5.0	69.7	19.0	93.9	1.6	4.5	4.7	1.67	9.5	5.1	2.1
	56-96	B2tg	0.2	0.2	3.8	53.8	24.2	82.2	10.3	7.5	2.7	1.60	19.3	13.4	8.7
	96-152	C1g	0.0	0.1	4.8	65.6	18.6	89.1	2.9	8.0	2.2	1.69	16.9	8.3	3.9
	152-168	C2g	0.0	0.2	4.2	65.2	20.0	89.6	2.6	7.8	---	---	---	---	---
	168-203	C3g	0.0	0.4	9.1	66.5	15.7	91.7	1.7	6.6	---	---	---	---	---
Floridana sand: (S81FL-071-25)	0-15	A11	0.0	2.0	39.5	47.5	4.6	93.6	2.8	3.6	10.1	0.91	53.8	40.1	12.4
	15-56	A12	0.0	1.6	39.6	44.8	5.0	91.0	6.5	2.5	8.9	1.37	29.2	24.4	3.6
	56-99	A2	0.0	1.8	44.4	46.9	4.6	97.7	2.1	0.2	19.4	1.51	10.9	6.3	0.9
	99-137	B2tg	0.0	1.5	34.5	39.3	4.8	80.1	5.5	14.4	0.1	1.77	18.0	15.8	5.4
	137-203	C	0.0	2.4	44.1	44.7	3.5	94.7	2.2	3.1	---	---	---	---	---
Hallandale fine sand: (S78FL-071-10)	0-5	A1	0.0	1.5	15.7	74.2	7.9	99.3	0.1	0.6	45.6	1.22	7.9	5.6	4.2
	5-18	A2	0.0	2.2	18.9	72.5	5.1	98.7	0.9	0.4	35.1	1.37	5.2	3.9	2.0
	18-30	B	0.0	2.1	16.9	71.7	7.0	97.7	1.6	0.7	30.2	1.48	5.1	3.6	1.6

See footnote at end of table.

TABLE 18.--PHYSICAL ANALYSES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Particle-size distribution: Sand: Very coarse (2-1 mm)	Sand: Coarse (1-0.5 mm)	Sand: Medium (0.5-0.25 mm)	Sand: Fine (0.25-0.1 mm)	Sand: Very fine (0.1-0.05 mm)	Sand: Total (2.0-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm)	Hydraulic Conductivity	Fulk Density (field moisture)	Water content: 1/10 bar	Water content: 1/3 bar	Water content: 15 bar
	Cm										Cm/hr	G/cm^3	-----Pct (wt)	-----	-----
Heights fine sand: (S78FL-015-1)	0-10	A1	0.0	1.1	23.7	53.3	19.3	97.4	1.6	1.0	8.9	1.49	10.7	6.1	3.0
	10-46	A2	0.0	1.9	24.8	52.6	18.3	97.6	2.0	0.4	12.1	1.58	5.1	2.4	1.5
	46-53	B11	0.0	2.0	23.7	51.8	19.1	96.6	2.3	1.1	2.7	1.66	8.2	4.9	0.9
	53-74	B12ca	0.1	2.1	21.1	51.5	20.5	95.3	3.3	1.4	5.8	1.65	7.8	3.9	0.7
	74-91	B21tca	0.4	2.2	20.6	41.6	16.4	81.2	11.0	7.8	0.1	1.81	16.1	14.5	6.6
	91-107	B2tca	0.2	2.2	21.2	42.8	16.2	82.6	10.1	7.3	0.7	1.84	14.7	12.7	7.7
	107-127	B23tgca	0.1	1.9	22.6	43.1	11.4	79.1	2.5	18.4	0.1	1.73	18.9	17.5	9.0
	127-203	Cg	0.0	2.9	24.5	49.4	10.1	86.9	1.3	11.8	---	---	---	---	---
Immokalee sand: (S78FL-071-20)	0-10	A11	0.0	7.7	54.5	30.1	5.3	97.6	1.2	1.2	35.1	1.40	12.2	9.8	3.0
	10-23	A12	0.0	5.7	53.7	33.4	5.0	97.8	2.2	0.0	38.5	1.53	6.1	4.2	1.5
	23-41	A21	0.0	5.4	45.1	39.5	8.2	98.2	1.7	0.1	30.9	1.60	4.7	3.2	1.5
	41-91	A22	0.0	5.7	51.4	35.6	6.0	98.7	1.0	0.3	37.8	1.64	3.5	2.4	1.0
	91-127	B21h	0.0	5.3	41.8	38.0	6.7	91.8	3.6	4.6	0.4	1.64	18.9	13.8	3.5
	127-140	B22h	0.0	4.6	45.3	34.0	4.9	88.8	5.2	6.0	2.2	1.64	13.5	10.5	4.3
	140-175	B3&Bh	0.0	4.6	41.5	41.6	7.8	95.5	1.5	3.0	26.9	1.63	6.5	4.6	2.0
	175-203	C	0.1	4.6	41.5	41.9	7.6	95.7	2.9	1.4	---	---	---	---	---
Isles muck: (S78FL-015-5)	0-10	Oa	---	---	---	---	---	---	---	---	---	---	---	---	---
	10-25	A1	0.5	2.8	15.8	61.4	16.3	96.8	0.2	3.0	---	---	---	---	---
	25-96	A2	0.2	2.7	14.5	62.0	13.2	92.6	3.6	3.8	---	---	---	---	---
	96-117	B2tg	0.3	2.7	12.1	54.3	12.4	81.8	3.0	15.2	---	---	---	---	---
Kesson fine sand: (S77FL-071-4)	0-15	A1	0.6	1.9	4.4	77.0	9.0	92.9	4.6	2.5	---	---	---	---	---
	15-25	C1	2.6	9.6	8.9	69.3	4.8	95.2	1.4	3.4	---	---	---	---	---
	25-33	C2	0.3	1.8	4.8	84.0	4.9	94.8	0.9	4.3	---	---	---	---	---
	33-58	C3	0.3	2.1	4.9	84.0	3.9	95.2	1.0	3.8	12.1	1.60	12.0	7.3	3.4
Malabar fine sand*: (S78FL-015-4)	0-13	A1	0.1	0.1	5.5	67.3	26.5	99.5	0.0	0.5	10.7	1.30	14.9	9.9	6.2
	13-25	A21	0.0	0.2	5.1	65.7	27.2	98.2	1.5	0.3	14.3	1.53	6.5	3.3	2.3
	25-43	A22	0.0	0.1	4.7	66.3	27.2	98.3	1.2	0.5	13.3	1.57	5.7	2.3	1.4
	43-84	B11r	0.0	0.1	5.4	69.3	23.4	98.2	1.2	0.6	15.9	1.55	5.5	2.0	0.8
	84-107	B21r	0.0	0.2	4.5	67.5	25.5	97.7	1.3	1.0	7.2	1.58	7.1	3.5	3.0
	107-130	B21tg	0.0	0.2	5.4	52.0	25.2	82.8	10.0	7.2	0.0	1.70	18.1	15.6	5.8
	130-150	B22tg	0.1	0.2	5.7	57.9	20.0	83.9	1.8	14.3	0.5	1.74	18.6	15.2	7.0
	150-203	B3g	0.0	0.2	6.1	61.8	20.0	88.1	1.5	10.4	0.1	1.80	16.7	13.7	7.0

See footnote at end of table.

TABLE 18.--PHYSICAL ANALYSES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Particle-size distribution: Sand: Very coarse (2-1 mm)	Sand: Coarse (1-0.5 mm)	Sand: Medium (0.5-0.25 mm)	Sand: Fine (0.25-0.1 mm)	Sand: Very fine (0.1-0.05 mm)	Sand: Total (2.0-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm)	Hydraulic Conductivity	Pulk Fensity (field moisture)	Water content: 1/10 bar	Water content: 1/3 bar	Water content: 15 bar
	Cm										Cm/hr	G/cm^3	-----Pct (wt)----		
Myakka fine sand: (S78FL-071-22)															
	0-8	A1	0.0	0.2	5.5	87.9	4.5	98.1	1.2	0.7	57.8	1.31	9.4	6.9	4.1
	8-15	A21	0.0	0.2	5.6	87.0	4.5	97.3	2.6	0.1	38.1	1.36	6.9	5.0	2.5
	15-66	A22	0.0	0.2	6.3	87.9	4.6	99.0	0.5	0.5	30.9	1.44	4.8	3.1	1.9
	66-76	B21h	0.0	0.1	5.5	82.7	3.9	92.2	4.7	3.1	26.5	1.44	20.2	13.3	2.7
	76-89	B22h	0.0	0.3	5.6	85.5	4.1	95.5	3.6	0.9	7.0	1.46	16.8	11.3	2.4
	89-132	B23h	0.0	0.2	2.8	87.9	4.3	95.2	2.1	2.7	2.2	1.54	18.4	12.7	3.1
	132-160	B24h	0.0	0.1	0.5	92.6	5.3	98.5	0.7	0.8	9.2	1.54	9.2	6.1	1.4
	160-203	B3&Bh	0.0	0.1	0.7	91.8	5.5	98.1	0.9	1.0	---	---	---	---	---
Oldsmar sand: (S78FL-071-16)															
	0-8	A1	0.1	4.8	53.7	37.0	3.5	99.1	0.0	0.9	34.2	1.34	10.4	7.7	4.6
	8-33	A21	0.0	3.3	50.2	40.3	4.2	98.0	1.7	0.3	25.8	1.56	5.3	3.6	2.1
	33-107	A22	0.1	5.3	50.4	38.0	4.5	98.3	0.0	1.7	27.9	1.69	2.9	2.2	1.2
	107-119	B2h	0.0	3.8	41.9	40.7	5.9	92.3	3.9	3.8	0.4	1.70	14.7	11.6	3.6
	119-135	B21tg	0.0	3.1	37.3	35.8	5.0	81.2	2.9	15.9	0.1	1.70	19.9	18.0	7.3
	135-147	B22tg	0.1	3.5	36.2	36.9	5.3	82.0	2.8	15.7	0.1	1.76	17.9	15.8	6.9
	147-203	C	0.1	5.0	38.4	43.1	7.2	93.8	1.8	4.4	---	---	---	---	---
Orsino fine sand: (S78FL-071-18)															
	0-5	A1	0.0	0.3	11.8	82.7	4.1	98.9	0.6	0.5	---	---	---	---	---
	5-13	A21	0.0	0.3	11.5	81.9	4.0	97.7	1.5	0.8	---	---	---	---	---
	13-41	A22	0.0	0.4	11.6	83.3	4.0	99.3	0.4	0.3	34.5	1.45	3.9	3.1	1.2
	41-66	B21&Bh	0.0	0.4	13.1	81.5	3.3	98.3	0.6	1.1	53.2	1.48	4.2	2.5	0.8
	66-94	B22&Bh	0.0	0.4	10.9	83.6	3.4	98.3	0.6	1.1	58.5	1.46	3.7	2.6	0.7
	94-117	C1	0.0	0.4	12.1	82.3	3.7	98.5	0.3	1.2	61.1	1.46	3.9	2.6	0.5
	117-165	C2	0.0	0.4	10.3	83.7	4.2	98.6	0.5	0.9	41.4	1.53	3.5	2.1	0.4
	165-203	C3	0.0	0.3	10.4	84.7	3.9	99.3	0.4	0.3	39.4	1.59	3.5	2.1	0.5
Peckish mucky fine sand: (S77FL-071-5)															
	0-10	A11	---	---	---	---	---	---	---	---	---	---	---	---	---
	10-15	A12	---	---	---	---	---	---	---	---	---	---	---	---	---
	15-23	A13	---	---	---	---	---	---	---	---	---	---	---	---	---
	23-31	A21	0.0	2.2	17.8	65.5	9.5	95.0	1.1	3.9	---	---	---	---	---
	31-64	A22	0.0	2.1	17.4	65.7	10.3	95.5	1.8	2.7	21.3	1.50	13.4	7.7	1.5
	64-91	A23	0.0	2.0	18.4	66.2	9.4	96.0	1.6	2.4	---	---	---	---	---
	91-109	B2h	0.1	1.8	16.4	66.8	9.1	94.2	0.1	5.7	---	---	---	---	---
	109-122	B3&Bh	0.0	2.1	18.7	66.9	7.9	95.6	0.8	3.6	---	---	---	---	---
	122-155	C	0.0	1.6	12.7	72.8	9.8	96.9	1.7	1.4	---	---	---	---	---
Pompano fine sand: (S78FL-071-14)															
	0-10	A1	0.0	0.8	8.5	83.3	6.6	99.2	0.0	0.8	34.5	1.48	4.1	3.4	2.0
	10-30	C1	0.0	0.1	10.0	82.7	5.4	99.2	0.2	0.6	33.2	1.46	3.4	2.8	1.7
	30-51	C2	0.0	0.9	8.4	82.1	5.6	97.0	2.7	0.3	30.9	1.57	3.1	2.2	1.2
	51-74	C3	0.0	0.8	8.2	84.4	5.9	99.3	0.1	0.6	36.8	1.52	2.9	2.3	1.5
	74-112	C4	0.0	0.9	8.2	83.9	6.0	99.0	0.4	0.6	35.5	1.63	3.0	2.0	1.5
	112-203	C5	0.0	1.1	10.5	81.5	5.8	98.9	0.6	0.5	---	---	---	---	---

See footnote at end of table.

TABLE 18.--PHYSICAL ANALYSES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Particle-size distribution: Sand: Very coarse (2-1 mm)	Sand: Coarse (1-0.5 mm)	Sand: Medium (0.5-0.25 mm)	Sand: Fine (0.25-0.1 mm)	Sand: Very fine (0.1-0.05 mm)	Sand: Total (2.0-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm)	Hydraulic Conductivity	Bulk density (field moisture)	Water content: 1/10 bar	Water content: 1/3 bar	Water content: 15 bar
	Cm										Cm/hr	G/cm^3	-----Pct (wt)----		
Punta fine sand: (S78FL-015-6)	0-10	A1	0.0	0.6	13.7	78.4	6.1	98.8	0.6	0.6	44.7	1.32	9.1	6.4	3.0
	10-28	A21	0.0	0.6	13.9	78.5	6.1	99.1	0.2	0.7	42.1	1.52	4.4	3.0	2.0
	28-89	A22	0.0	0.7	14.9	78.4	5.4	99.4	0.1	0.5	40.1	1.54	3.1	2.4	1.4
	89-145	A22	0.0	0.8	13.8	78.7	5.8	99.1	0.3	0.6	45.6	1.58	3.0	2.1	1.3
	145-211	B2h	0.0	0.7	11.5	71.6	6.2	90.0	2.7	7.3	1.8	1.44	23.2	17.7	4.6
Satellite fine sand: (S77FL-071-8)	0-8	A1	0.0	0.3	19.8	75.3	4.3	99.7	0.0	0.3	---	---	---	---	---
	8-76	C1	0.0	0.4	24.5	71.7	3.1	99.7	0.0	0.3	62.4	1.45	4.3	3.8	1.7
	76-165	C2	0.0	0.3	17.7	77.0	4.1	99.1	0.7	0.2	65.0	1.50	3.3	2.6	1.6
	165-216	C3	0.0	0.4	17.4	77.6	4.0	99.4	0.3	0.3	---	---	---	---	---
Smyrna fine sand*: (S78FL-015-7)	0-10	A1	0.1	0.8	8.7	79.6	6.6	95.8	3.3	0.9	23.0	1.37	5.4	2.0	2.2
	10-33	A2	0.1	0.1	1.2	81.5	8.2	98.1	1.1	0.8	23.0	1.54	4.4	2.8	1.2
	33-38	B21h	0.2	1.7	6.5	79.1	7.4	94.9	2.5	2.6	13.5	1.38	13.6	10.5	2.5
	38-46	B22h	0.1	1.3	6.8	78.2	7.2	93.6	3.2	3.2	11.3	1.37	14.3	11.3	3.1
	46-56	B3&Bh	0.1	1.4	6.9	79.8	6.6	94.8	2.8	2.4	15.9	1.49	9.1	6.8	2.3
	56-94	C1	0.1	1.1	6.7	81.8	7.9	97.6	1.3	1.1	24.6	1.58	5.1	3.5	0.7
	94-124	C2	0.1	0.8	5.2	79.2	7.6	92.9	1.5	5.6	7.9	1.60	10.4	6.8	2.5
	124-140	C3	0.1	0.5	5.3	80.3	12.5	98.7	0.5	0.8	30.2	1.53	4.9	2.7	0.4
	140-203	C4	0.1	0.5	4.8	82.3	10.1	97.8	0.4	1.8	8.5	1.61	7.8	4.1	1.2
Terra Ceia muck: (S80FL-015-10)	0-20	Oa1	---	---	---	---	---	---	---	---	13.5	0.21	341.1	298.0	39.0
	20-89	Oa2	---	---	---	---	---	---	---	---	100.1	0.14	503.0	427.5	45.9
	89-112	Oa3	---	---	---	---	---	---	---	---	43.3	0.10	660.3	500.5	45.5
	112-135	Oa4	---	---	---	---	---	---	---	---	23.0	0.16	481.3	368.1	41.1
	135-142	IIC1	0.2	1.2	10.2	57.3	9.4	78.2	19.1	2.7	31.5	0.70	70.6	49.6	11.1
	142-150	IIC2	0.0	1.2	12.9	70.8	11.6	96.5	2.3	1.2	10.5	1.49	10.6	6.5	1.3
	150-160	IIC3	0.0	1.1	12.4	61.5	11.4	86.4	4.6	9.0	0.7	1.50	26.2	22.9	10.7
	160-180	IIC4	0.0	1.0	11.0	55.1	10.7	77.8	5.9	16.3	1.6	1.46	28.6	25.3	13.6
	180-203	IIC5	0.0	0.9	9.9	56.2	13.9	80.9	5.5	13.6	0.0	1.60	22.6	19.3	10.6
Valkaria fine sand: (S78FL-071-13†	0-5	A1	0.0	0.6	17.3	77.4	4.3	99.6	0.0	0.4	30.6	1.53	3.9	2.5	1.0
	5-18	A2	0.0	0.5	15.1	78.8	4.1	98.5	0.9	0.6	40.1	1.54	3.2	2.0	0.9
	18-41	B211r	0.0	0.5	16.7	77.9	3.7	98.8	0.8	0.4	39.9	1.58	2.8	1.9	0-6
	41-51	B221r	0.0	0.6	17.4	77.2	3.6	98.8	0.7	0.5	25.6	1.58	3.3	1.8	0.5
	51-66	B231r	0.0	0.6	17.8	73.0	3.2	94.6	1.7	3.7	4.7	1.66	6.5	4.8	2.4
	66-94	B311r	0.0	0.5	15.3	78.0	3.6	97.4	1.6	1.0	29.3	1.57	3.2	2.1	0.8
	94-130	B321r	0.0	1.0	24.4	69.6	2.0	97.0	1.2	1.8	21.7	1.59	4.6	3.1	0.9
	130-137	B331r	0.0	0.8	15.6	77.0	2.0	95.4	1.6	3.0	---	---	---	---	---
	137-203	B341r	0.0	0.2	11.2	85.8	2.0	99.2	0.2	0.6	---	---	---	---	---

See footnote at end of table.

TABLE 18.--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 (2.0-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm)	Hydraulic Conductivity	Bulk Density (field moisture)	Water content: 1/10 bar	1/3 bar	15 bar
	Cm										Cm/hr	G/cm³	-----Pct (wt)----		
Wabasso sand: (S78FL-071-15)															
	0-15	Ap	0.0	3.8	37.6	44.5	13.0	98.9	0.7	0.4	13.5	1.53	8.0	4.6	2.8
	15-43	A21	0.0	2.9	31.1	48.6	15.6	98.2	1.4	0.4	14.7	1.65	4.2	2.3	1.8
	43-61	A22	0.0	2.7	31.8	48.3	15.5	98.3	1.4	0.3	17.5	1.62	4.3	2.4	1.5
	61-71	B2h	0.1	2.8	27.7	48.0	16.8	95.4	2.5	2.1	6.2	1.69	6.3	3.6	1.1
	71-91	B231tg	0.0	2.2	24.8	31.0	13.2	71.2	3.0	25.8	1.1	1.43	33.8	31.9	14.1
	91-157	B22tg	0.0	3.4	28.2	33.6	11.6	76.8	2.2	21.0	5.3	1.60	25.0	23.8	12.7
	157-203	Cg	0.0	0.5	8.5	68.1	8.5	85.6	1.4	13.0	---	---	---	---	---
Winder sand*: (S80FL-015-8)															
	0-8	A1	0.0	2.4	37.4	41.1	16.9	97.8	1.1	1.1	12.8	1.66	7.6	4.1	1.4
	8-33	A2	0.0	5.5	44.7	36.3	12.0	98.5	0.9	0.6	20.3	1.67	4.3	2.6	0.4
	33-41	B&A	0.0	4.9	42.0	34.4	12.2	93.5	3.0	3.5	0.6	1.78	11.9	7.9	2.7
	41-58	B2tg	0.3	4.5	36.8	28.0	8.9	78.5	2.6	18.9	2.7	1.52	25.9	24.2	10.1
	58-74	B3g	0.0	4.3	43.6	32.9	9.2	90.0	1.6	8.4	0.8	1.75	13.8	8.7	2.8
	74-89	C1	0.0	4.6	43.9	33.5	10.0	92.0	2.0	6.0	1.5	1.77	12.3	7.0	2.1
	89-104	C2	0.1	5.0	44.0	31.9	9.9	90.9	2.5	6.6	1.8	1.73	12.1	7.8	2.4
	104-135	C3	0.2	4.2	40.9	29.4	9.4	84.1	3.0	12.9	0.7	1.71	17.6	15.4	6.2
	135-165	C4	0.0	7.4	50.8	32.6	7.2	98.0	0.6	1.4	---	---	---	---	---
Wulfert muck: (S77FL-071-6)															
	0-5	Oa1	---	---	---	---	---	---	---	---	---	---	---	---	---
	5-30	Oa2	---	---	---	---	---	---	---	---	---	---	---	---	---
	30-91	Oa3	---	---	---	---	---	---	---	---	---	---	---	---	---
	91-152	IIC	0.0	0.5	4.4	79.3	5.5	89.7	8.1	2.2	---	---	---	---	---

*The soil is a taxadjunct to the series. See the soil series description in the section "Soil Series and Their Morphology" for an explanation of those characteristics of the soil that are outside the range of the series.

TABLE 19.—CHEMICAL ANALYSES OF SELECTED SOILS

[All of the soils sampled are the typical pedon for the series. See the section "Soil Series and Their Morphology" for location of pedons sampled. Dashes indicate that data are not available]

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: H2O (1:1)	pH: CaCl2 (1:2)	pH: KCl (1:1)	Pyrophosphate extractable: C	Pyrophosphate extractable: Fe	Pyrophosphate extractable: Al	Citrate dithionite extractable: Fe	Citrate dithionite extractable: Al
	Cm		Milliequivalents/100 grams of soil							Pct	Pct	Mmho /cm				Pct	Pct	Pct	Pct	Pct
Anclote sand: (S81FL-071-26)	0-20	A11	9.25	0.28	0.07	0.02	9.62	4.67	14.29	67	2.76	0.17	5.5	5.4	5.1	—	—	—	—	—
	20-56	A12	6.25	0.16	0.03	0.01	6.45	4.37	10.82	60	1.22	0.15	5.4	5.1	4.9	—	—	—	—	—
	56-102	C1	1.05	0.04	0.02	0.00	1.11	0.62	1.73	64	0.28	0.06	5.8	5.6	5.3	—	—	—	—	—
	102-203	C2	0.83	0.03	0.02	0.00	0.88	0.38	1.26	70	0.08	0.02	6.7	6.7	6.4	—	—	—	—	—
Boca fine sand: (S78FL-071-9)	0-8	A1	0.50	0.08	0.04	0.02	0.64	1.72	2.36	27	0.98	0.03	5.6	4.7	4.5	—	—	—	—	—
	8-23	A21	0.15	0.03	0.04	0.01	0.23	0.89	1.12	21	0.42	0.02	5.6	4.5	4.4	—	—	—	—	—
	23-36	A22	0.05	0.02	0.03	0.01	0.11	1.72	1.83	6	0.12	0.01	5.9	5.0	4.8	—	—	—	—	—
	36-64	B1	0.60	0.04	0.04	0.01	0.69	1.24	1.93	36	0.20	0.03	6.8	6.2	6.2	—	—	—	—	—
	64-76	B2tg	13.25	0.32	0.06	0.04	13.67	1.81	15.48	88	0.34	0.12	7.8	7.2	7.0	—	—	—	0.01	0.02
Bradenton fine sand*: (S81FL-071-27)	0-13	Ap	1.93	0.91	0.06	0.64	3.54	3.90	7.44	48	1.70	0.50	5.5	5.0	4.8	—	—	—	—	—
	13-25	A2	0.20	0.13	0.03	0.13	0.49	0.97	1.46	34	0.15	0.60	5.1	4.6	4.1	—	—	—	—	—
	25-46	B21tg	19.50	3.99	0.12	1.64	25.25	11.26	36.51	69	0.71	0.19	5.7	5.2	4.7	—	—	—	0.38	0.11
	46-71	B22tg	15.00	2.02	0.08	0.56	17.66	5.45	23.11	76	0.29	0.15	5.8	5.5	4.9	—	—	—	0.29	0.05
	71-84	IIC1ca	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	84-114	IIC2ca	19.75	0.58	0.09	0.13	20.55	2.78	23.33	88	0.19	0.28	7.7	7.1	6.9	—	—	—	—	—
	114-145	IIIC3	10.75	0.30	0.12	0.03	11.20	1.07	12.27	91	0.08	0.13	8.4	7.8	7.5	—	—	—	—	—
	145-155	IVC4	1.63	0.08	0.07	0.01	1.79	0.37	2.16	83	0.03	0.08	8.6	7.9	7.4	—	—	—	—	—
	155-180	IVC5	1.05	0.09	0.08	0.01	1.23	0.43	1.66	74	0.04	0.08	8.4	7.7	6.8	—	—	—	—	—
	180-203	IVC6	1.10	0.08	0.25	0.01	1.44	0.32	1.75	82	0.04	0.22	8.1	7.7	7.2	—	—	—	—	—
Canaveral fine sand: (S77FL-071-2)	0-18	A11	16.67	1.56	1.04	0.05	19.32	0.83	20.25	95	1.73	1.00	7.6	7.4	7.4	—	—	—	—	—
	18-38	A12	14.17	0.75	1.67	0.04	16.63	0.00	16.63	100	0.40	2.20	7.8	7.7	7.6	—	—	—	—	—
	38-56	C1	15.61	0.48	1.05	0.01	17.15	0.00	17.15	100	0.15	0.95	8.2	7.9	7.9	—	—	—	—	—
	56-91	C2	16.04	0.38	0.91	0.01	17.34	0.00	17.34	100	0.06	0.55	8.4	7.9	8.1	—	—	—	—	—
	91-130	C3	16.48	0.44	0.62	0.01	17.55	0.00	17.55	100	0.04	0.50	8.5	7.9	8.2	—	—	—	—	—
	130-162	C4	15.86	0.40	0.72	0.01	16.99	0.00	16.99	100	0.03	0.60	8.3	7.8	8.3	—	—	—	—	—
Captiva fine sand: (S77FL-071-3)	0-15	A1	21.73	4.39	7.87	0.18	34.17	1.01	35.18	97	2.46	3.30	7.8	7.5	7.7	—	—	—	—	—
	15-38	C1	18.73	1.85	3.79	0.07	24.44	0.00	24.44	100	0.26	3.70	8.2	8.1	8.2	—	—	—	—	—
	38-66	C2	17.17	1.33	2.43	0.03	20.96	0.00	20.96	100	0.08	2.50	8.3	8.1	8.3	—	—	—	—	—
	66-76	C3	15.73	0.80	1.46	0.03	18.02	0.00	18.02	100	0.04	1.65	8.2	8.3	8.4	—	—	—	—	—
	76-137	C4g	14.54	1.68	5.22	0.07	21.51	0.00	21.51	100	0.14	8.85	8.0	8.1	8.1	—	—	—	—	—

See footnote at end of table.

TABLE 19.—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: $CaCl_2$ (1:2)	pH: KCl (1:1)	Pyrophosphate extractable: C	Pyrophosphate extractable: Fe	Pyrophosphate extractable: Al	Citrate dithionite extractable: Fe	Citrate dithionite extractable: Al
	Cm		Milliequivalents/100 grams of soil							Pct	Pct	Mmho /cm				Pct	Pct	Pct	Pct	Pct
Cocoa fine sand*: (S78FL-071-19)	0-8	A1	1.35	0.22	0.04	0.24	1.85	2.29	4.14	45	0.68	0.04	5.7	4.8	4.7	—	—	—	—	—
	8-33	A2	0.11	0.04	0.01	0.04	0.20	0.79	0.99	20	0.15	0.03	5.5	4.9	4.9	—	—	—	—	—
	33-43	B11	0.10	0.02	0.03	0.00	0.15	0.71	0.86	17	0.11	0.02	5.7	5.2	5.0	—	—	—	—	—
	43-68	B12	0.07	0.02	0.01	0.00	0.10	0.74	0.84	12	0.11	0.03	5.4	5.1	4.9	—	—	—	—	—
	68-79	B2t	1.20	0.07	0.05	0.01	1.33	0.94	2.27	59	0.19	0.08	6.2	6.1	5.9	—	—	—	0.13	0.02
Daytona sand: (S78FL-071-21)	0-10	A1	0.53	0.08	0.02	0.01	0.64	3.37	4.01	16	0.73	0.03	5.1	4.3	3.7	—	—	—	—	—
	10-41	A21	0.03	0.02	0.01	0.01	0.07	0.70	0.77	11	0.00	0.01	5.4	4.2	4.0	—	—	—	—	—
	41-109	A22	0.01	0.02	0.02	0.01	0.06	0.49	0.55	11	0.15	0.02	5.3	4.4	4.0	—	—	—	—	—
	109-127	B2h	0.01	0.07	0.08	0.01	0.17	12.45	12.62	1	2.01	0.06	4.4	3.6	3.5	1.37	0.01	0.13	0.10	0.09
	127-193	B3	0.00	0.01	0.01	0.00	0.02	3.98	4.00	1	0.33	0.03	4.9	4.4	4.2	—	—	—	—	—
EauGallie sand*: (S81FL-015-12)	0-10	A1	0.20	0.08	0.06	0.03	0.37	2.57	2.94	13	0.15	0.06	5.6	3.9	3.7	—	—	—	—	—
	10-23	A21	0.08	0.03	0.04	0.01	0.16	1.33	1.49	11	0.36	0.03	5.2	4.0	3.9	—	—	—	—	—
	23-56	A22	0.05	0.02	0.02	0.00	0.09	0.53	0.62	15	0.17	0.02	5.7	4.6	4.3	—	—	—	—	—
	56-68	B2h	0.19	0.08	0.10	0.01	0.38	22.76	23.14	2	2.42	0.08	4.6	4.0	4.0	1.88	0.02	0.39	0.02	0.34
	68-104	B3	0.16	0.04	0.07	0.00	0.27	11.98	12.25	2	1.12	0.04	4.9	4.4	4.3	—	—	—	—	—
	104-114	A'21	0.27	0.04	0.04	0.01	0.36	3.13	3.49	10	0.27	0.02	5.2	4.5	4.5	—	—	—	—	—
	114-147	A'22	0.65	0.14	0.04	0.01	0.84	1.81	2.65	32	0.21	0.02	5.3	4.3	4.3	—	—	—	—	—
	147-203	B'2t	1.50	0.58	0.08	0.01	2.17	3.13	5.30	41	0.23	0.03	5.3	4.2	4.0	—	—	—	0.03	0.03
Estero muck: (S77FL-071-7)	0-13	Oa	29.66	92.58	304.28	5.11	431.63	34.72	466.35	93	26.00	322.00	4.9	5.0	4.9	—	—	—	—	—
	13-21	A11	3.83	11.06	21.95	0.43	37.27	5.08	42.35	88	3.12	39.60	5.2	5.1	5.0	—	—	—	—	—
	21-33	A12	1.58	5.63	9.66	0.17	17.04	0.24	17.28	99	0.48	20.25	6.6	6.5	6.4	—	—	—	—	—
	33-49	A21	1.49	5.87	11.55	0.15	19.06	0.00	19.06	100	0.14	19.85	6.9	6.9	6.6	—	—	—	—	—
	49-84	A22	1.44	5.58	11.62	0.14	18.78	0.00	18.78	100	0.16	20.70	7.4	7.4	7.4	—	—	—	—	—
	84-99	B21h	1.98	7.15	8.46	0.15	17.74	3.02	20.76	85	0.73	36.00	4.8	4.7	4.7	0.59	0.04	0.05	0.06	0.01
	99-109	B22h	3.46	7.48	12.81	0.17	23.92	5.17	29.09	82	0.87	34.20	4.8	4.7	4.6	0.70	0.06	0.08	0.08	0.03
	109-140	B3	2.45	3.73	7.59	0.10	13.87	2.42	16.29	85	0.35	17.50	4.6	4.5	4.4	—	—	—	—	—
Felda fine sand*: (S78FL-015-3)	0-20	Ap	1.05	0.12	0.06	0.01	1.24	2.32	3.56	35	0.82	0.50	7.8	4.9	4.6	—	—	—	—	—
	20-28	A21	0.68	0.03	0.03	0.01	0.75	1.16	1.91	39	0.26	0.03	6.0	5.0	4.6	—	—	—	—	—
	28-56	A22	1.48	0.11	0.05	0.01	1.65	1.50	3.15	52	0.15	0.04	6.2	5.3	4.8	—	—	—	—	—
	56-96	B2tg	7.25	0.62	0.06	0.04	7.97	2.05	10.02	80	0.09	0.06	7.4	6.4	5.8	—	—	—	0.05	0.03
	96-152	C1g	16.50	0.38	0.06	0.03	16.97	1.44	18.41	92	0.49	0.98	7.3	7.1	7.1	—	—	—	—	—
	152-168	C2g	16.25	0.38	0.09	0.06	16.78	1.52	18.30	92	0.40	0.56	7.5	7.3	7.2	—	—	—	—	—
	168-203	C3g	8.28	0.30	0.09	0.04	8.71	1.27	9.98	87	0.24	0.56	7.4	7.2	7.1	—	—	—	—	—

See footnote at end of table.

TABLE 19.—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: $CaCl_2$ (1:2)	pH: KCl (1:1)	Pyrophosphate extractable: C	Pyrophosphate extractable: Fe	Pyrophosphate extractable: Al	Citrate dithionite extractable: Fe	Citrate dithionite extractable: Al
	Cm		Milliequivalents/100 grams of soil							Pct	Pct	Mmho/cm				Pct	Pct	Pct	Pct	Pct
Floridana sand: (S81FL-071-25)	0-15	A11	11.00	0.45	0.13	0.04	11.62	7.74	19.36	60	4.64	0.19	5.3	5.0	5.0	—	—	—	—	—
	15-56	A12	7.00	0.23	0.04	0.01	7.28	5.00	12.28	59	3.05	0.11	5.5	5.1	5.1	—	—	—	—	—
	56-99	A2	8.00	0.03	0.03	0.00	8.06	0.58	8.64	93	0.16	0.05	5.8	5.7	5.3	—	—	—	—	—
	99-137	B2tg	14.50	0.49	0.11	0.04	15.14	4.06	19.20	79	0.43	0.05	6.6	6.0	5.7	—	—	—	0.02	0.02
	137-203	C	20.50	0.09	0.03	0.01	20.63	0.87	21.50	96	0.12	0.03	6.6	6.1	5.7	—	—	—	—	—
Hallandale fine sand: (S78FL-071-10)	0-5	A1	0.65	0.08	0.05	0.02	0.80	3.23	4.03	20	1.01	0.04	5.6	4.5	4.5	—	—	—	—	—
	5-18	A2	0.28	0.04	0.06	0.01	0.39	2.40	2.79	14	0.85	0.06	5.6	4.6	4.6	—	—	—	—	—
	18-30	B	1.05	0.03	0.04	0.01	1.18	1.56	2.69	44	0.58	0.08	6.9	6.7	6.6	—	—	—	—	—
Heights fine sand: (S78FL-015-1)	0-10	A1	1.63	0.25	0.09	0.04	2.01	1.39	3.40	59	1.36	0.12	6.3	5.6	5.5	—	—	—	—	—
	10-46	A2	0.15	0.04	0.04	0.04	0.27	0.25	0.52	52	0.12	0.03	6.8	6.0	5.9	—	—	—	—	—
	46-53	B11	0.63	0.06	0.06	0.01	0.76	0.29	1.05	72	0.08	0.06	7.4	6.6	6.6	—	—	—	—	—
	53-74	B12ca	14.50	0.25	0.25	0.08	15.08	0.00	15.08	100	0.12	0.55	8.5	7.8	8.5	—	—	—	—	—
	74-91	B21tca	17.75	0.97	0.76	0.07	19.55	0.16	19.71	99	0.07	0.58	8.1	7.8	7.8	—	—	—	0.09	0.03
	91-107	B22tca	9.25	0.80	0.37	0.05	10.47	0.82	11.29	93	0.04	0.55	8.2	7.7	7.6	—	—	—	0.08	0.02
	107-127	B23tgca	11.25	0.93	0.06	0.04	12.28	1.23	13.51	91	0.08	0.56	7.8	7.5	7.3	—	—	—	0.08	0.02
	127-203	Cg	4.65	0.53	0.06	0.03	5.27	1.15	6.42	82	0.05	0.30	7.3	7.1	6.8	—	—	—	—	—
Immokalee sand: (S78FL-071-20)	0-10	A11	0.67	0.26	0.05	0.02	1.00	7.00	8.00	13	2.08	0.06	4.3	3.6	3.2	—	—	—	—	—
	10-23	A12	0.12	0.07	0.02	0.01	0.22	2.06	2.28	10	0.80	0.03	4.8	3.8	3.5	—	—	—	—	—
	23-41	A21	0.03	0.02	0.03	0.00	0.08	0.91	0.99	8	0.19	0.03	5.2	4.2	3.9	—	—	—	—	—
	41-91	A22	0.01	0.02	0.03	0.00	0.06	0.55	0.61	10	0.07	0.03	5.9	4.9	4.6	—	—	—	—	—
	91-127	B21h	0.03	0.16	0.13	0.00	0.32	26.14	26.46	1	3.34	0.08	4.2	3.6	3.5	1.84	0.00	0.14	0.08	0.22
	127-140	B22h	0.02	0.06	0.10	0.00	0.18	26.34	26.52	1	2.30	0.06	4.4	4.2	4.0	1.88	0.00	0.36	0.06	0.10
	140-175	B3&Bh	0.01	0.04	0.10	0.00	0.15	7.46	7.61	2	0.50	0.06	4.4	4.4	4.3	—	—	—	—	—
	175-203	C	0.14	0.07	0.10	0.00	0.31	2.33	2.64	12	0.22	0.06	5.0	4.8	4.6	—	—	—	—	—
Isles muck: (S78FL-015-5)	0-10	Oa	13.25	19.78	115.45	2.85	151.33	4.59	155.92	97	16.66	19.06	6.4	6.3	6.2	—	—	—	—	—
	10-25	A1	5.30	13.89	64.55	1.84	85.58	2.26	87.84	97	7.40	13.65	6.1	6.1	5.9	—	—	—	—	—
	25-96	A2	2.45	7.35	24.97	0.93	35.70	1.48	37.18	96	1.63	6.15	5.6	5.6	5.5	—	—	—	—	—
	96-117	B2tg	14.50	7.06	23.01	1.32	45.89	2.58	48.47	95	1.01	3.85	6.9	7.0	6.9	—	—	—	0.10	0.02
Kesson fine sand: (S77FL-071-4)	0-15	A1	17.79	6.69	9.83	0.26	34.57	0.28	34.85	99	1.09	13.65	7.9	8.0	7.9	—	—	—	—	—
	15-25	C1	17.11	2.22	4.03	0.13	23.49	0.00	23.49	100	0.27	3.90	8.3	8.2	8.1	—	—	—	—	—
	25-33	C2	18.54	2.70	6.11	0.16	27.51	0.00	27.51	100	0.19	7.95	8.3	8.2	8.2	—	—	—	—	—
	33-58	C3	18.36	2.49	6.00	0.16	27.01	0.00	27.01	100	0.12	8.25	8.1	8.4	8.1	—	—	—	—	—

See footnote at end of table.

TABLE 19.—CHEMICAL ANALYSES OF SELECTED SOILS—Continued

Soil name and sample number	Depth	Horizon	Extractable bases					Extractable Acidity	Sum of cations	Base Saturation	Organic Carbon	Electrical Conductivity	pH			Pyrophosphate extractable			Citrate dithionite extractable	
			Ca	Mg	Na	K	Sum						H2O (1:1)	CaCl2 (1:2)	KCl (1:1)	C	Fe	Al	Fe	Al
	Cm		Milliequivalents/100 grams of soil							Pct	Pct	Mmho /cm				Pct	Pct	Pct	Pct	Pct
Malabar fine sand*: (S78FL-015-4)	0-13	A1	0.60	0.11	0.07	0.02	0.80	2.46	3.26	25	1.59	0.06	5.3	4.3	4.1	—	—	—	—	—
	13-25	A21	0.12	0.03	0.03	0.01	0.19	0.62	0.81	23	0.30	0.04	5.9	4.9	4.8	—	—	—	—	—
	25-43	A22	0.10	0.03	0.07	0.00	0.20	0.33	0.53	38	0.18	0.06	6.4	5.7	5.8	—	—	—	—	—
	43-84	B11r	0.13	0.02	0.08	0.00	0.23	0.29	0.52	44	0.11	0.06	7.1	6.5	6.3	0.15	0.01	0.01	0.04	0.01
	84-107	B2ir	0.25	0.03	0.09	0.00	0.37	0.33	0.70	53	0.12	0.06	7.1	6.4	6.4	0.10	0.02	0.02	0.09	0.02
	107-130	B21tg	3.78	0.25	0.19	0.02	4.24	1.07	5.31	80	0.40	0.18	6.6	6.0	5.6	—	—	—	0.18	0.04
	130-150	B22tg	4.30	0.35	0.21	0.03	4.89	1.60	6.49	75	0.23	0.26	6.8	5.9	5.5	—	—	—	0.06	0.03
	150-203	B3g	3.65	0.28	0.17	0.04	4.14	1.41	5.55	75	0.17	0.28	6.6	6.4	6.0	—	—	—	—	—
Myakka fine sand: (S78FL-071-22)	0-8	A1	0.33	0.16	0.05	0.02	0.56	4.61	5.17	11	1.39	0.06	4.3	3.6	3.3	—	—	—	—	—
	8-15	A21	0.10	0.07	0.03	0.01	0.21	1.65	1.86	11	0.59	0.04	4.6	3.7	3.5	—	—	—	—	—
	15-66	A22	0.01	0.02	0.02	0.01	0.06	0.82	0.88	7	0.12	0.02	5.6	4.5	4.1	—	—	—	—	—
	66-76	B21h	0.11	0.11	0.13	0.01	0.36	13.87	14.23	3	2.27	0.06	4.4	3.7	3.5	1.24	0.00	0.11	0.09	0.09
	76-89	B22h	0.06	0.07	0.15	0.00	0.28	12.35	12.63	2	1.39	0.06	4.4	3.7	3.6	1.17	0.00	0.12	0.08	0.09
	89-132	B23h	0.08	0.26	0.10	0.00	0.44	17.78	18.22	2	1.94	0.06	4.3	3.6	3.5	1.88	0.00	0.14	0.07	0.11
	132-160	B24h	0.02	0.04	0.02	0.00	0.08	6.31	6.39	1	0.68	0.03	5.0	4.2	4.1	0.57	0.00	0.10	0.09	0.07
	160-203	B3&Bh	0.01	0.02	0.02	0.00	0.05	6.64	6.69	1	0.71	0.06	5.1	4.6	4.5	0.75	0.04	0.33	0.10	0.15
Oldsmar sand: (S78FL-071-16)	0-8	A1	1.08	0.49	0.00	0.05	1.62	9.04	10.66	15	4.12	0.10	4.5	3.7	3.4	—	—	—	—	—
	8-33	A21	0.06	0.04	0.00	0.01	0.11	1.13	1.24	9	0.66	0.04	5.0	3.7	3.5	—	—	—	—	—
	33-107	A22	0.00	0.00	0.00	0.00	0.00	0.14	0.14	—	0.06	0.02	5.3	4.6	4.5	—	—	—	—	—
	107-119	B2h	0.98	0.26	0.00	0.00	1.24	12.63	13.87	9	3.23	0.06	4.5	3.7	3.5	3.26	0.01	0.13	0.05	0.12
	119-135	B21tg	2.30	0.58	0.02	0.01	2.91	13.35	16.26	18	1.78	0.08	4.8	4.1	3.7	—	—	—	0.05	0.16
	135-147	B22tg	4.80	0.74	0.04	0.04	5.62	7.33	12.95	43	0.89	0.12	5.0	4.5	4.0	—	—	—	0.06	0.08
	147-203	C	1.78	0.25	0.00	0.02	2.05	1.30	3.35	61	0.23	0.17	5.3	5.0	4.6	—	—	—	—	—
Orsino fine sand: (S78FL-071-18)	0-5	A1	0.90	0.20	0.03	0.03	1.16	3.55	4.71	25	0.87	0.04	4.9	4.0	3.7	—	—	—	—	—
	5-13	A21	0.14	0.09	0.01	0.01	0.25	2.96	3.21	8	0.52	0.02	4.9	3.7	3.4	—	—	—	—	—
	13-41	A22	0.01	0.02	0.02	0.04	0.09	0.59	0.68	13	0.08	0.02	5.3	4.2	4.0	—	—	—	—	—
	41-66	B21&Bh	0.02	0.02	0.04	0.04	0.12	1.63	1.75	7	0.11	0.03	4.8	4.6	4.5	0.02	0.04	0.03	0.07	0.03
	66-94	B22&Bh	0.02	0.02	0.01	0.02	0.07	1.71	1.78	4	0.14	0.03	4.8	4.7	4.6	0.12	0.05	0.05	0.08	0.04
	94-117	C1	0.01	0.02	0.01	0.02	0.06	1.58	1.64	4	0.11	0.02	5.0	4.8	4.6	—	—	—	—	—
	117-165	C2	0.01	0.02	0.01	0.04	0.08	0.71	0.79	10	0.05	0.03	5.1	4.7	4.6	—	—	—	—	—
	165-203	C3	0.04	0.01	0.00	0.02	0.07	0.39	0.46	15	0.04	0.02	5.0	4.7	4.6	—	—	—	—	—
Peckish mucky fine sand: (S77FL-071-5)	0-10	A11	15.29	46.90	222.07	4.97	289.23	10.76	299.99	96	7.46	222.50	5.0	5.0	4.9	—	—	—	—	—
	10-15	A12	3.68	13.03	51.33	1.38	69.43	2.44	71.86	97	1.94	58.80	4.9	4.9	4.9	—	—	—	—	—
	15-23	A13	5.71	19.74	76.56	1.93	103.94	3.94	107.88	96	2.93	105.00	5.5	5.3	5.2	—	—	—	—	—
	23-31	A21	2.31	7.97	29.11	0.75	40.14	0.97	41.11	98	0.69	31.95	5.7	5.3	5.2	—	—	—	—	—
	31-64	A22	1.41	5.87	16.18	0.45	23.91	0.74	24.65	97	0.42	49.80	4.6	4.6	4.4	—	—	—	—	—
	64-91	A23	1.04	4.79	13.75	0.36	19.94	0.08	20.02	100	0.29	29.75	6.7	7.0	6.7	—	—	—	—	—
	91-109	B2h	1.76	6.00	18.25	0.49	26.50	2.94	29.44	90	0.42	29.25	4.0	4.0	3.9	0.31	0.02	0.02	0.06	0.02
	109-122	B3&Bh	1.23	5.34	10.51	0.41	17.49	1.29	18.78	93	0.33	30.15	4.7	4.7	4.4	0.20	0.03	0.02	0.06	0.02
	122-155	C	1.11	4.60	10.59	0.32	16.62	1.02	17.64	94	0.23	27.45	5.0	4.9	4.7	—	—	—	—	—

See footnote at end of table.

TABLE 19.—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: H2O (1:1)	pH: CaCl2 (1:2)	pH: KCl (1:1)	Pyrophosphate extractable: C	Pyrophosphate extractable: Fe	Pyrophosphate extractable: Al	Citrate dithionite extractable: Fe	Citrate dithionite extractable: Al
	Cm		Milliequivalents/100 grams of soil							Pct	Pct	Mmho /cm				Pct	Pct	Pct	Pct	Pct
Pompano fine sand: (S78FL-071-14)	0-10	A1	0.23	0.03	0.00	0.01	0.27	4.23	4.50	6	0.63	0.03	6.0	4.7	4.6	—	—	—	—	—
	10-30	C1	0.00	0.00	0.00	0.00	0.00	3.55	3.55	—	0.10	0.01	5.9	4.9	4.7	—	—	—	—	—
	30-51	C2	0.01	0.00	0.00	0.00	0.01	3.48	3.49	—	0.04	0.01	6.1	5.2	4.9	—	—	—	—	—
	51-74	C3	0.01	0.00	0.00	0.00	0.01	2.17	2.18	0.5	0.03	0.01	6.6	5.9	5.4	—	—	—	—	—
	74-112	C4	0.04	0.01	0.00	0.00	0.05	2.13	2.18	2	0.03	0.01	7.0	5.9	5.3	—	—	—	—	—
	112-203	C5	0.07	0.01	0.00	0.00	0.08	2.13	2.21	4	0.05	0.01	7.1	6.2	5.9	—	—	—	—	—
Punta fine sand: (S78FL-015-6)	0-10	A1	0.20	0.12	0.03	0.03	0.38	5.01	5.39	7	0.87	0.04	4.8	3.2	3.2	—	—	—	—	—
	10-28	A21	0.02	0.02	0.01	0.01	0.06	0.87	0.93	6	0.23	0.02	4.9	3.5	3.5	—	—	—	—	—
	28-89	A22	0.01	0.02	0.01	0.05	0.09	0.26	0.35	26	0.06	0.02	5.3	4.3	4.3	—	—	—	—	—
	89-145	A22	0.01	0.01	0.04	0.02	0.08	0.26	0.34	24	0.02	0.01	5.6	4.9	4.8	—	—	—	—	—
	145-211	B2h	0.29	0.39	0.02	0.03	0.73	26.06	26.79	3	6.23	0.10	4.1	3.4	3.3	2.76	0.00	0.20	0.04	0.14
Satellite fine sand: (S77FL-071-8)	0-8	A1	0.10	0.05	0.00	0.01	0.16	0.30	0.46	35	0.19	0.04	5.1	3.9	3.6	—	—	—	—	—
	8-76	C1	0.01	0.01	0.00	0.01	0.03	0.40	0.43	7	0.08	0.02	5.7	4.2	3.9	—	—	—	—	—
	76-165	C2	0.01	0.01	0.00	0.00	0.02	0.12	0.14	14	0.01	0.01	6.2	5.5	5.1	—	—	—	—	—
	165-216	C3	0.01	0.01	0.00	0.00	0.02	0.00	0.02	100	0.01	0.04	5.9	4.9	4.4	—	—	—	—	—
Smyrna fine sand*: (S78FL-015-7)	0-10	A1	0.48	0.29	0.03	0.03	1.33	5.13	6.46	21	1.18	0.04	5.4	3.7	3.6	—	—	—	—	—
	10-33	A2	0.04	0.03	0.01	0.01	0.09	0.58	0.67	13	0.14	0.02	5.4	4.1	4.1	—	—	—	—	—
	33-38	B21h	0.30	0.12	0.04	0.01	0.47	8.29	8.76	5	0.97	0.06	5.3	4.4	4.2	0.75	0.01	0.17	0.05	0.12
	38-46	B22h	0.28	0.11	0.03	0.01	0.43	13.03	13.46	3	1.32	0.06	5.4	4.5	4.3	1.01	0.02	0.38	0.04	0.31
	46-56	B3&Bh	0.07	0.04	0.02	0.02	0.15	8.08	8.23	2	0.75	0.05	5.4	4.6	4.4	0.59	0.03	0.32	0.05	0.22
	56-94	C1	0.01	0.02	0.02	0.01	0.06	1.32	1.38	4	0.09	0.03	5.4	4.9	4.7	—	—	—	—	—
	94-124	C2	0.09	0.06	0.04	0.01	0.20	3.95	4.15	5	0.19	0.03	5.4	4.7	4.6	—	—	—	—	—
	124-140	C3	0.03	0.04	0.01	0.02	0.10	0.84	0.94	11	0.05	0.03	5.6	5.0	4.9	—	—	—	—	—
	140-203	C4	0.27	0.18	0.01	0.05	0.51	0.66	1.17	44	0.04	0.03	5.9	5.1	4.8	—	—	—	—	—
Terra Ceia muck: (S80FL-015-10)	0-20	Oa1	15.50	3.33	0.57	0.11	19.51	79.99	99.50	20	52.97	0.29	4.7	4.5	4.2	—	—	—	—	—
	20-89	Oa2	18.25	4.11	0.36	0.02	22.74	76.77	99.51	23	57.54	0.42	4.7	4.4	4.3	—	—	—	—	—
	89-112	Oa3	26.50	7.41	1.69	0.05	35.65	62.65	98.30	36	50.30	1.25	4.4	4.8	4.6	—	—	—	—	—
	112-135	Oa4	23.50	5.76	1.81	0.04	31.11	49.94	76.05	41	46.14	0.75	5.5	5.3	5.1	—	—	—	—	—
	135-142	IIC1	11.25	2.88	0.47	0.04	14.64	11.20	25.84	57	7.26	0.27	5.8	5.4	5.3	—	—	—	0.09	0.00
	142-150	IIC2	1.75	0.44	0.04	0.01	2.24	1.73	3.97	56	0.38	0.14	5.9	5.5	5.6	—	—	—	—	—
	150-160	IIC3	7.00	1.97	0.14	0.09	9.20	2.69	11.89	77	0.29	0.23	7.0	6.4	7.0	—	—	—	0.05	0.00
	160-180	IIC4	11.00	3.87	0.23	0.23	15.33	4.90	20.23	76	0.27	0.14	7.0	6.4	6.6	—	—	—	0.05	0.00
	180-203	IIC5	9.25	3.33	0.21	0.17	12.96	4.14	17.10	76	0.14	0.22	7.1	6.5	6.8	—	—	—	0.05	0.00

See footnote at end of table.

TABLE 19.—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: $CaCl_2$ (1:2)	pH: KCl (1:1)	Pyrophosphate extractable: C	Pyrophosphate extractable: Fe	Pyrophosphate extractable: Al	Citrate dithionite extractable: Fe	Citrate dithionite extractable: Al
	Cm		— Milliequivalents/100 grams of soil —							Pct	Pct	Mmho /cm				Pct	Pct	Pct	Pct	Pct
Valkaria fine sand: (S78FL-071-13)	0-5	A1	0.43	0.04	0.00	0.01	0.48	1.84	2.32	21	1.05	0.03	5.6	4.5	4.3	—	—	—	—	—
	5-18	A2	0.00	0.01	0.00	0.01	0.02	0.61	0.63	3	0.14	0.01	5.6	4.6	4.5	—	—	—	—	—
	18-41	B21ir	0.00	0.00	0.00	0.00	0.00	0.34	0.34	—	0.09	0.01	5.8	4.7	4.6	0.02	0.03	0.03	0.08	0.02
	41-51	B22ir	0.05	0.00	0.00	0.00	0.05	0.41	0.46	11	0.07	0.01	6.0	4.9	4.8	0.04	0.03	0.03	0.09	0.01
	51-66	B23ir	0.22	0.00	0.00	0.00	0.22	0.82	1.04	21	0.13	0.02	5.8	4.9	4.9	0.00	0.05	0.03	0.11	0.01
	66-94	B31ir	0.16	0.01	0.00	0.01	0.18	0.55	0.73	25	0.12	0.01	6.0	5.0	4.7	—	—	—	—	—
	94-130	B32ir	0.15	0.25	0.00	0.01	0.41	3.82	4.23	10	0.15	0.03	5.4	4.5	4.4	—	—	—	—	—
	130-137	B33ir	0.54	0.02	0.00	0.01	0.57	5.25	5.82	10	0.34	0.06	5.5	4.9	4.6	—	—	—	—	—
	137-203	B34ir	0.11	0.01	0.00	0.01	0.13	3.82	3.95	3	0.10	0.04	5.2	4.7	4.5	—	—	—	—	—
Wabasso sand: (S78FL-071-15)	0-15	Ap	0.82	0.08	0.00	0.00	0.90	5.19	6.09	15	1.21	0.05	5.6	4.4	4.4	—	—	—	—	—
	15-43	A21	0.15	0.00	0.00	0.01	0.16	2.66	2.82	6	0.20	0.02	6.3	5.5	5.3	—	—	—	—	—
	43-61	A22	0.12	0.02	0.00	0.01	0.15	2.66	2.81	5	0.07	0.09	6.4	5.9	5.8	—	—	—	—	—
	61-71	B2h	0.74	0.24	0.16	0.05	1.19	6.41	7.60	16	0.50	0.20	5.4	4.8	4.6	0.38	0.04	0.11	0.06	0.03
	71-91	B21tg	2.90	0.99	0.54	0.20	4.63	7.19	11.82	39	1.49	0.55	4.6	4.3	4.0	—	—	—	0.61	0.11
	91-157	B22tg	4.08	1.15	0.44	0.18	5.85	5.20	11.05	53	0.84	0.46	4.8	4.5	4.1	—	—	—	0.29	0.19
	157-203	Cg	4.35	0.62	0.10	0.04	5.12	2.36	7.48	68	0.29	0.37	4.5	4.3	3.8	—	—	—	0.05	0.12
Winder sand*: (S80FL-015-8)	0-8	A1	0.70	0.09	0.04	0.00	0.83	0.56	1.39	60	0.23	0.04	6.4	5.6	5.1	—	—	—	—	—
	8-33	A2	0.18	0.04	0.02	0.00	0.24	0.24	0.48	50	0.03	0.01	6.4	5.7	5.3	—	—	—	—	—
	33-41	B&A	1.22	0.19	0.04	0.00	1.45	0.68	2.13	68	0.18	0.03	6.3	5.7	5.1	—	—	—	—	—
	41-58	B2tg	4.82	0.70	0.10	0.01	5.63	3.54	9.17	61	0.08	0.02	6.2	5.7	5.0	—	—	—	0.33	0.26
	58-74	B3g	2.80	0.42	0.06	0.01	3.29	1.54	4.83	68	0.16	0.07	5.9	5.5	4.8	—	—	—	0.09	0.01
	74-89	C1	2.45	0.35	0.06	0.00	2.86	1.68	4.54	63	0.14	0.15	5.2	4.8	4.2	—	—	—	—	—
	89-104	C2	2.22	0.32	0.09	0.01	2.64	2.11	4.75	56	0.16	0.21	4.8	4.4	3.9	—	—	—	—	—
	104-135	C3	3.37	0.49	0.07	0.01	3.94	4.03	7.97	49	0.06	0.11	4.6	4.2	3.8	—	—	—	—	—
	135-165	C4	0.52	0.06	0.02	0.00	0.60	0.07	0.67	90	0.01	0.09	5.1	4.6	4.2	—	—	—	—	—
Wulfert muck: (S77FL-071-6)	0-5	Oa1	46.85	110.27	314.29	10.50	481.91	27.75	509.66	95	25.21	318.50	6.4	6.4	6.2	—	—	—	—	—
	5-30	Oa2	28.85	90.11	331.69	8.96	459.61	42.98	502.59	91	25.39	350.00	5.1	5.2	5.0	—	—	—	—	—
	30-91	Oa3	18.29	47.72	162.26	4.45	232.72	42.34	275.06	85	16.89	245.00	4.2	4.2	4.0	—	—	—	—	—
	91-152	IIC	4.01	10.73	36.11	1.18	52.03	12.39	64.42	81	2.44	74.25	2.6	2.8	2.6	—	—	—	—	—

* This soil is a taxadjunct to the series. See the soil series description in the section "Soil Series and Their Morphology" for an explanation of those characteristics of the soil that are outside the range of the series.

TABLE 20.--CLAY MINERALOGY OF SELECTED SOILS

[All of the soils sampled are of the typical pedon for the series. See the section "Soil Series and Their Morphology" for location of pedons sampled]

Soil name and sample number	Depth	Horizon	Percentage of clay minerals				
			Montmorillonite	14 Angstrom intergrade	Kaolinite	Gibbsite	Quartz
	Cm						
Anclote sand: (S81FL-071-26)	0-20	A11	26	24	13	0	37
	56-102	C1	42	26	8	0	24
	102-203	C2	26	21	22	0	31
Boca fine sand: (S78FL-071-9)	0-8	A1	0	16	10	0	74
	36-64	B1	0	9	8	6	77
	64-76	B2tg	0	31	19	25	25
Bradenton fine sand[1]: (S81FL-071-27)	0-13	Ap	89	0	4	0	7
	25-46	B21tg	95	0	1	0	4
	84-114	IIC2ca	95	0	1	0	4
	145-155	IVC4	92	0	1	0	7
	180-203	IVC6	94	0	1	0	5
Canaveral fine sand: (S77FL-071-2)	0-18	A11	76	0	14	0	10
	56-91	C2	45	0	7	0	48
	130-162	C4	72	0	6	0	22
Captiva fine sand: (S77FL-071-3)	0-15	A1	tr	0	tr	0	tr
	66-76	C3	64	0	0	0	36
Cocoa fine sand[1, 2]: (S78FL-071-19)	0-8	A1	0	0	0	0	0
	33-43	B11	0	52	17	0	31
	68-79	B2c	0	56	0	0	44
Daytona sand: (S78FL-071-21)	0-10	A1	0	0	29	0	71
	109-127	B2h	0	25	0	0	75
EauGallie sand: (S81FL-015-12)	0-10	A1	0	0	11	0	89
	56-68	B2h	0	26	13	17	44
	147-203	B'2t	0	11	78	0	11
Estero muck: (S77FL-071-7)	13-21	A11	61	0	17	0	23
	84-99	B21h	14	36	18	0	32
	109-140	B3	4	42	15	0	39
Felda fine sand[1]: (S78FL-015-3)	0-20	Ap	12	0	7	0	81
	96-152	C1g	37	0	9	0	54
	168-203	C3g	74	0	4	0	22
Floridana sand: (S81FL-071-35)	0-15	A11	25	26	15	0	34
	99-137	B2tg	83	0	5	0	12
	137-203	C	72	0	8	0	20
Hallandale fine sand: (S78FL-071-10)	0-5	A1	0	10	15	10	65
	18-30	B	0	8	5	8	79

See footnotes at end of table.

TABLE 20.--CLAY MINERALOGY OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Percentage of clay minerals				
			Montmorillonite	14 Angstrom intergrade	Kaolinite	Gibbsite	Quartz
	Cm						
Heights fine sand: (S78FL-015-1)	0-10	A1	21	13	8	0	58
	46-53	B11	23	7	3	0	67
	127-203	Cg	62	13	8	0	17
Immokalee sand: (S78FL-071-20)	0-10	A11	0	41	0	0	59
	91-127	B21h	0	9	23	0	68
	175-203	C	0	38	46	0	16
Isles muck: (S78FL-015-5)	10-25	A1	9	8	8	0	75
	96-117	B2tg	25	29	38	0	8
Kesson fine sand: (S77FL-071-4)	0-15	A1	81	0	9	0	10
	33-58	C3	40	0	8	0	52
Malabar fine sand[1]: (S78FL-015-4)	0-13	A1	5	0	3	0	92
	43-84	B1ir	0	9	2	0	89
	107-130	B21tg	0	24	34	0	42
	150-203	B3g	18	0	82	0	0
Myakka fine sand: (S78FL-071-22)	0-8	A1	0	0	0	0	100
	66-76	B21h	31	0	0	0	69
	160-203	B3&Bh	0	0	0	0	0
Oldsmar sand: (S78FL-071-16)	0-8	A1	0	0	9	0	91
	107-119	B2h	18	4	13	0	65
	119-135	B21tg	15	24	45	0	16
	147-203	C	61	8	9	0	22
Orsino fine sand: (S78FL-071-18)	0-5	A1	0	41	22	0	37
	41-66	B21&Bh	0	54	12	0	34
	66-94	B22&Bh	0	59	15	0	26
	165-203	C3	0	51	12	0	37
Peckish mucky fine sand: (S77FL-071-5)	23-31	A21	48	18	11	0	23
	91-109	B2h	0	33	17	0	50
	122-155	C	0	27	18	0	55
Pompano fine sand: (S78FL-071-14)	0-10	A1	0	17	8	0	75
	51-74	C3	0	32	9	8	51
	112-203	C5	0	33	9	4	54
Punta fine sand: (S78FL-015-6)	0-10	A1	0	0	0	0	100
	145-211	B2h	0	20	0	0	80
Satellite fine sand: (S77FL-071-8)	0-8	A1	30	0	23	0	47
	8-76	C1	0	0	13	0	87
	165-216	C3	12	0	6	0	82
Smyrna fine sand[1]: (S78FL-015-7)	0-10	A1	0	0	0	0	100
	33-38	B21h	0	33	0	0	67
	94-124	C2	0	33	16	27	24
	140-203	C4	20	41	39	0	0

See footnotes at end of table.

TABLE 20.--CLAY MINERALOGY OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Percentage of clay minerals				
			Montmorillonite	14 Angstrom intergrade	Kaolinite	Gibbsite	Quartz
	Cm						
Terra Ceia muck: (S80FL-015-10)	135-142	IIC1	76	0	2	0	22
	150-160	IIC3	90	0	2	0	8
	180-203	IIC5	92	0	0	0	8
Valkaria fine sand: (S78FL-071-13)	0-5	A1	0	0	0	0	100
	18-41	B21ir	0	23	14	0	63
	66-94	B31ir	0	37	13	16	34
	137-203	B34ir	0	29	12	30	29
Wabasso sand: (S78FL-071-15)	0-15	Ap	0	0	12	0	88
	61-71	B2h	0	29	16	0	55
	71-91	B21tg	0	34	50	0	16
	157-203	Cg	0	46	45	0	9
Winder sand[1]: (S80FL-015-8)	0-8	A1	18	17	22	0	43
	41-58	B2tg	27	21	45	0	7
	89-104	C2	55	17	20	0	8
	135-165	C4	46	13	34	0	7
Wulfert muck: (S77FL-071-6)	91-152	IIC	73	0	15	0	12

[1]This soil is a taxadjunct to the series. See the soil series description in the section "Soil Series and Their Morphology" for an explanation of the characteristics that are outside the range of the series.
[2]The A1 horizon is 100 percent amorphous.

TABLE 21.--ENGINEERING INDEX TEST DATA

[All of the soils sampled are the typical pedon for the series. See the section "Soil Series and Their Morphology" for location of pedons sampled. NP means nonplastic]

Soil name, sample number, horizon, and depth in inches	Classification		Particle-size distribution								Liquid Limit	Plasticity Index	Moisture density	
			Percentage passing sieve-----				Percentage smaller than-----							
	AASHTO	Unified	No. 4	No. 10	No. 40	No. 200	.05 mm	.02 mm	.005 mm	.002 mm			Max. Dry Density	Optimum Moisture
											Pct		Lb/ft3	Pct
Boca fine sand[1]:														
(S78FL-071-9)														
A21---------------3 to 9	A-3 (00)	SP	100	100	94	4	0	0	0	0	-	NP	102	14
B2tg-------------25 to 30	A-2-4(00)	SM	100	100	94	17	16	14	12	12	-	NP	116	11
Canaveral fine sand:														
(S77FL-071-2)														
A12---------------7 to 15	A-3 (00)	SP-SM	100	100	92	5	4	2	1	1	-	NP	104	12
C3--------------36 to 51	A-3 (00)	SP	100	100	71	2	1	0	0	0	-	NP	109	9
Captiva fine sand:														
(S77FL-071-3)														
C2--------------15 to 26	A-3 (00)	SP	100	89	81	4	3	2	1	1	-	NP	105	15
C3--------------26 to 30	A-3 (00)	SP	100	64	50	2	1	0	0	0	-	NP	110	11
Cocoa fine sand:														
(S78FL-071-19)														
B12-------------17 to 27	A-3 (00)	SP	100	100	97	3	2	1	1	1	-	NP	101	15
Daytona sand:														
(S78FL-071-21)														
A22-------------16 to 43	A-3 (00)	SP	100	100	85	3	0	0	0	0	-	NP	102	15
B2h-------------43 to 50	A-3 (00)	SP-SM	100	100	84	5	3	0	0	0	-	NP	105	14
Estero muck:														
(S77FL-071-7)														
A22-------------19 to 33	A-3 (00)	SP-SM	100	100	94	5	3	1	0	0	-	NP	101	11
Felda fine sand[2]:														
(S78FL-015-3)														
B2tg------------22 to 38	A-2-4(00)	SM	100	100	100	18	14	11	10	9	-	NP	115	13
Hallandale fine sand:														
(S78FL-071-10)														
B1---------------7 to 12	A-3 (00)	SP	100	100	94	3	0	0	0	0	NP	NP	117	13
Heights fine sand:														
(S78FL-015-1)														
A2---------------4 to 18	A-3 (00)	SP-SM	100	100	96	7	4	1	0	0	NP	NP	106	14
B22tca----------36 to 42	A-2-4(00)	SM	100	100	95	20	17	15	14	14	NP	NP	119	12
Immokalee sand:														
(S78FL-071-20)														
A22-------------16 to 36	A-3 (00)	SP	100	100	86	2	0	0	0	0	NP	NP	102	15
B21h------------36 to 50	A-3 (00)	SP-SM	100	100	88	9	6	2	0	0	NP	NP	107	12

See footnotes at end of table.

TABLE 21.--ENGINEERING INDEX TEST DATA--Continued

Soil name, sample number, horizon, and depth in inches	Classification		Particle-size distribution								Liquid Limit	Plasticity Index	Moisture density	
			Percentage passing sieve-----				Percentage smaller than-----							
	AASHTO	Unified	No. 4	No. 10	No. 40	No. 200	.05 mm	.02 mm	.005 mm	.002 mm			Max. Dry Density	Optimum Moisture
											Pct		Lb/ft3	Pct
Isles muck: (S78FL-015-5)														
A2---------------11 to 39	A-3 (00)	SP-SM	100	100	95	9	6	2	1	1	NP	NP	104	13
Kesson fine sand: (S77FL-071-4)														
C3---------------13 to 23	A-3 (00)	SP-SM	100	100	98	5	4	3	2	2	NP	NP	101	16
Malabar fine sand[3]: (S78FL-015-4)														
B21tg------------42 to 51	A-2-4(00)	SM	100	100	99	19	17	13	12	12	-	NP	114	12
Myakka fine sand: (S78FL-071-22)														
A22---------------6 to 26	A-3 (00)	SP	100	100	99	2	0	0	0	0	-	NP	99	16
B21h-------------26 to 30	A-3 (00)	SP-SM	100	100	100	5	3	2	0	0	NP	NP	101	15
Oldsmar sand[4]: (S78FL-071-16)														
B2h--------------42 to 47	A-3 (00)	SP-SM	100	100	88	7	5	3	3	2	-	NP	106	12
B21tg------------47 to 53	---		---	--	--	--	--	--	--	---	-	--	114	13
Orsino fine sand: (S78FL-071-18)														
B21&Bh-----------16 to 26	A-3 (00)	SP	100	100	99	3	10	0	0	0	-	NP	102	15
Peckish mucky fine sand: (S77FL-071-5)														
A22--------------12 to 25	A-3 (00)	SP-SM	100	100	96	8	5	2	0	0	-	NP	104	13
Pompano fine sand: (S78FL-071-14)														
C2---------------12 to 20	A-3 (00)	SP	100	100	98	2	0	0	0	0	NP	NP	100	15
C4---------------29 to 44	A-3 (00)	SP	100	100	98	2	0	0	0	0	NP	NP	99	17
C5---------------44 to 80	A-3 (00)	SP	100	100	98	3	2	1	0	0	NP	NP	99	17
Punta fine sand: (S78FL-015-6)														
A22--------------11 to 57	A-3 (00)	SP	100	100	98	2	1	0	0	0	NP	NP	98	16
B2h--------------57 to 80	A-3 (00)	SP	100	100	98	4	2	0	0	0	NP	NP	103	13
Satellite fine sand: (S77FL-071-8)														
C1----------------3 to 30	A-3 (00)	SP	100	100	98	1	1	0	0	0	NP	NP	98	16
C2---------------30 to 65	A-3 (00)	SP	100	100	99	2	1	0	0	0	NP	NP	101	16

See footnotes at end of table.

TABLE 21.--ENGINEERING INDEX TEST DATA--Continued

Soil name, sample number, horizon, and depth in inches	Classification		Particle-size distribution								Liquid Limit	Plasticity Index	Moisture density	
			Percentage passing sieve-----				Percentage smaller than-----							
	AASHTO	Unified	No. 4	No. 10	No. 40	No. 200	.05 mm	.02 mm	.005 mm	.002 mm			Max. Dry Density	Optimum Moisture
											Pct		Lb/ft3	Pct
Smyrna fine sand[5]: (S78FL-015-7) B21h-------------13 to 15	A-3 (00)	SP-SM	100	100	98	6	3	0	0	0	NP	NP	101	15
Valkaria fine sand: (S78FL-071-13) B23ir------------20 to 26	A-3 (00)	SP-SM	100	100	98	7	6	6	4	4	NP	NP	106	11
Wabasso sand: (S78FL-071-15)														
B2h--------------24 to 28	A-3 (00)	SP-SM	100	100	94	8	5	3	2	2	NP	NP	111	12
B21tg------------28 to 36	A-2-6(00)	SC	100	100	94	28	27	24	23	23	24	11	111	16

[1] This pedon is considered to be a taxadjunct to the Boca series. The liquid limit and plasticity index of the B2tg horizon are lower than is common for the Boca series.
[2] This soil is considered to be a taxadjunct to the Felda series because the B2tg horizon has a loamy fine sand texture.
[3] This soil is considered to be a taxadjunct to the Malabar series because the family particle size averages sandy rather than loamy.
[4] For the B21tg horizon, only data for moisture density is available.
[5] This soil is considered to be a taxadjunct to the Smyrna series. The Bh horizon is thinner than normal for the Smyrna series.

TABLE 22.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Anclote	Sandy, siliceous, hyperthermic Typic Haplaquolls
Boca	Loamy, siliceous, hyperthermic Arenic Ochraqualfs
*Bradenton	Coarse-loamy, siliceous, hyperthermic Typic Ochraqualfs
Caloosa	Sandy over clayey, siliceous, hyperthermic Typic Udifluvents
Canaveral	Hyperthermic, uncoated Aquic Quartzipsamments
Captiva	Siliceous, hyperthermic Mollic Psammaquents
Chobee	Fine-loamy, siliceous, hyperthermic Typic Argiaquolls
*Cocoa	Sandy, siliceous, hyperthermic Psammentic Hapludalfs
*Copeland	Fine-loamy, siliceous, hyperthermic Typic Argiaquolls
Daytona	Sandy, siliceous, hyperthermic Entic Haplohumods
*EauGallie	Sandy, siliceous, hyperthermic Alfic Haplaquods
*Electra	Sandy, siliceous, hyperthermic Arenic Ultic Haplohumods
Estero	Sandy, siliceous, hyperthermic Typic Haplaquods
*Felda	Loamy, siliceous, hyperthermic Arenic Ochraqualfs
Floridana	Loamy, siliceous, hyperthermic Arenic Argiaquolls
*Gator	Loamy, siliceous, euic, hyperthermic Terric Medisaprists
Hallandale	Siliceous, hyperthermic Lithic Psammaquents
Heights	Sandy, siliceous, hyperthermic Arenic Ochraqualfs
Immokalee	Sandy, siliceous, hyperthermic Arenic Haplaquods
Isles	Loamy, siliceous, hyperthermic Arenic Ochraqualfs
Kesson	Siliceous, hyperthermic Typic Psammaquents
*Malabar	Loamy, siliceous, hyperthermic Grossarenic Ochraqualfs
Matlacha	Sandy, siliceous, hyperthermic Udalfic Arents
Myakka	Sandy, siliceous, hyperthermic Aeric Haplaquods
Oldsmar	Sandy, siliceous, hyperthermic Alfic Arenic Haplaquods
Orsino	Hyperthermic, uncoated Spodic Quartzipsamments
Peckish	Sandy, siliceous, hyperthermic Typic Sulfaquents
Pineda	Loamy, siliceous, hyperthermic Arenic Glossaqualfs
Pompano	Siliceous, hyperthermic Typic Psammaquents
Punta	Sandy, siliceous, hyperthermic Grossarenic Haplaquods
Satellite	Hyperthermic, uncoated Aquic Quartzipsamments
*Smyrna	Sandy, siliceous, hyperthermic Aeric Haplaquods
St. Augustine	Sandy, siliceous, hyperthermic, Udalfic Arents
Terra Ceia	Euic, hyperthermic Typic Medisaprists
Valkaria	Siliceous, hyperthermic Spodic Psammaquents
Wabasso	Sandy, siliceous, hyperthermic Alfic Haplaquods
*Winder	Fine-loamy, siliceous, hyperthermic Typic Glossaqualfs
Wulfert	Sandy or sandy-skeletal, siliceous, euic, hyperthermic Terric Sulfihemists

*The soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series.

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