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 Hendry County, Florida

How To Use This Soil Survey

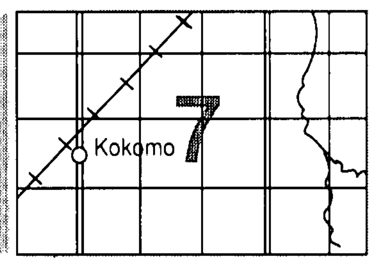
General Soil Map

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

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

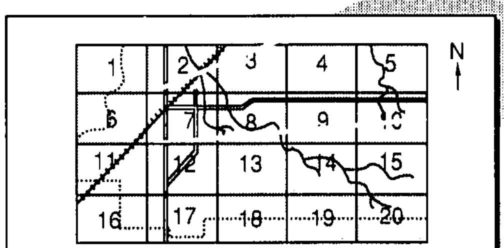
Detailed Soil Maps

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



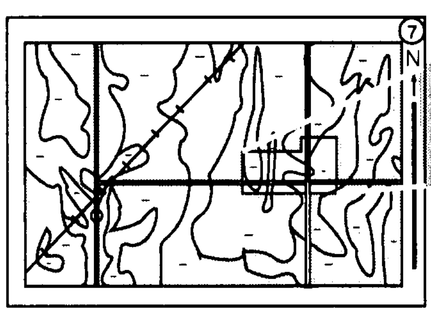
MAP SHEET

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



INDEX TO MAP SHEETS

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



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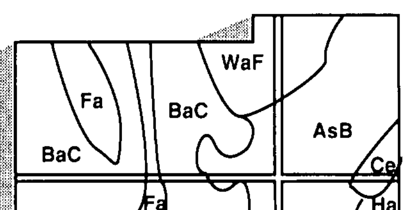

AREA OF INTEREST

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

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

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

Major fieldwork for this soil survey was completed in 1985. Soil names and descriptions were approved in 1986. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1985. This soil survey was made cooperatively by the Soil Conservation Service; the University of Florida, Institute of Food and Agricultural Sciences, Agricultural Experiment Stations, and Soil Science Department; and the Florida Department of Agriculture and Consumer Services. The survey is part of the technical assistance furnished to the Hendry County Soil and Water Conservation District. Additional assistance was provided by the Florida Department of Transportation.

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

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

Cover: Native range, such as this Slough range site in an area of Pineda fine sand, provides much of the forage in Hendry County.

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Issued December 1990

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Summary of Tables

Foreword

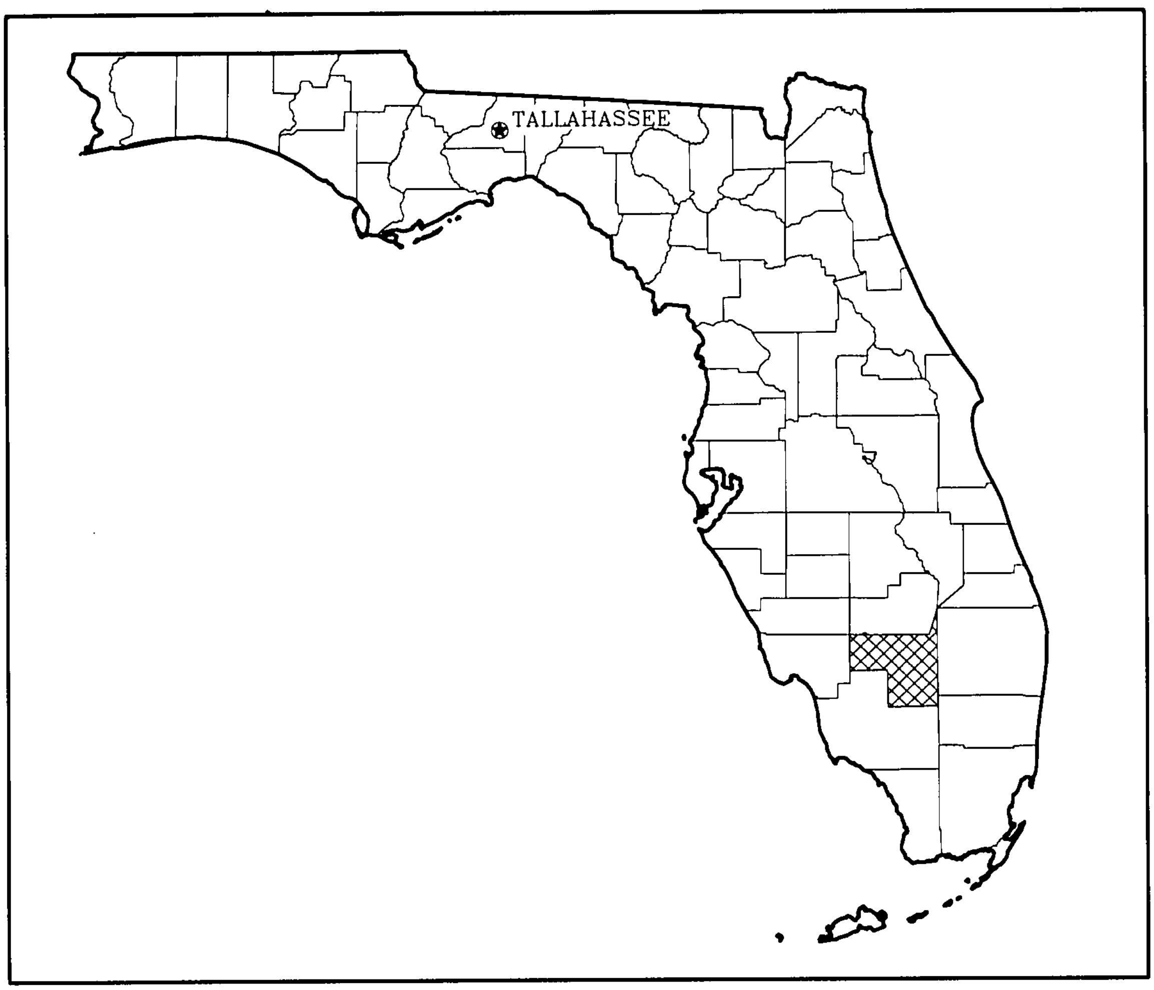
This soil survey contains information that can be used in land-planning programs in Hendry County, Florida. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the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

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

T. Niles Glasgow
State Conservationist
Soil Conservation Service



Location of Hendry County in Florida.

Soil Survey of Hendry County, Florida

By David J. Belz, Lewis J. Carter, David A. Dearstyne, and John D. Overing,
Soil Conservation Service

Others participating in the fieldwork were Allen Moore, Craig Peters, and James A. Wolfe; and on winter detail, Robert Lisante, Ronald W. Luethe, Eugene McCleod, and Thomas Weber

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

HENDRY COUNTY is in the south-central part of the Florida Peninsula. It is bordered on the north by Glades County and Lake Okeechobee, on the east by Palm Beach and Broward Counties, on the south by Collier County, and on the west by Lee County.

The county covers 774,013 acres, or about 1,210 square miles. La Belle, the county seat, is in the northwestern corner of the county. Cattle farming and citrus are the largest industries.

General Nature of the County

This section gives general information about the climate, history and development, geology, water resources, farming, and transportation facilities in Hendry County.

Climate

Table 1 gives data on temperature and precipitation for the survey area as recorded at La Belle in the period 1974 to 1984.

In winter the average temperature is 58.8 degrees F. The average daily minimum temperature is 49.0 degrees. In summer the average temperature is 81.4 degrees. The average daily maximum temperature is 91.9 degrees.

The total annual precipitation is about 49 inches. Of this, nearly 36 inches, or about 73 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 11 inches.

History and Development

Ernest W. Hall, professor of Florida history, Edison Community College, helped prepare this section.

Hendry County, Florida's 63rd county, and Collier County to the south were created out of Lee County by an act of the Florida Legislature in May 1923. The county's name honors Captain Francis Asbury Hendry. Captain Hendry owned thousands of acres of ranch land in the Fort Thompson area. He laid out the townsite of La Belle.

The Caloosa Indians inhabited southwest Florida at the time of Florida's discovery by Ponce de Leon in April 1513. They controlled the area from Charlotte Harbor to Cape Sable and from the Gulf of Mexico to and including Lake Okeechobee. These Indians fiercely resisted the Spanish; consequently, Spanish rule in colonial Florida had very little impact on southwest Florida. The Caloosas had about 60 villages, were nonagricultural, and lived mainly on fish, shellfish, wild berries, roots, and fresh game. They were moundbuilders, and many mounds of various sizes are throughout southwest Florida. The Caloosas dug a canal from Lake Flirt (now a dry lakebed east of La Belle) to a large mound at Ortona. The canal and mound are still visible. The Caloosas had a high-level social structure. They used atlatls and spears with stone projectile points and made tools and ornaments of shell and bone and pottery with artistic designs. Because of diseases, such as smallpox and measles, the Caloosas became extinct about 250 years after the Spanish first came to Florida.

The Seminoles were Creek Indians who first began migrating to north Florida from Georgia and Alabama about 1750. They came into the Okeechobee, Big Cypress, and Everglades regions because of the Second and Third Seminole Wars, in which more than 4,000 Seminoles were sent to what is now Oklahoma. About 200 to 300 Seminoles stayed in the swamps of south Florida. As part of the war effort for Indian removal, more than 100 U.S. Army forts were established south of the Suwannee River. A number of forts were activated from time to time in the areas near Lake Okeechobee, the Caloosahatchee River, and the Big Cypress Swamp. Some of these forts included Fort Denaud; Fort T.B. Adams; Fort Simmons, which was established when the river silted up at Fort Denaud; Fort Thompson; and Fort Shackleford. At the conclusion of the Third Seminole War in 1858, forts in southwest Florida were deactivated and all military action ceased.

After the Indian wars about 200 Seminoles remained in the Glades, the Big Cypress Swamp, and near Lake Okeechobee. They number about 1,500 today. Four reservations were established: the Brighten Reservation, for the Mucsogee-speaking Cow Creek Seminoles, just north and west of Moore Haven in Glades County; the Big Cypress Reservation in southeastern Hendry County where mostly Hichiti-speaking Mikasuki Seminoles reside; a small reservation on the east coast near Hollywood; and a reservation recently established just east of Forty Mile Bend on the Tamiami Trail.

During the Civil War, Fort Myers was occupied by Union troops, and in February 1865, the southernmost land battle of the war was fought. The Union force withdrew from Fort Myers soon after the battle was won.

Until the 1880's, Lake Flirt, 2 miles east of the present city of La Belle, was the headwaters of the Caloosahatchee River. Fort Thompson was along the western shore of the river. Hamilton Disston, the saw manufacturer, purchased 4 million acres of south Florida land and water from the state in 1881, for $1 million. Part of the deal was Disston's promise to dig a canal from the Caloosahatchee River through Lake Flirt and Lake Hicpochee to Lake Okeechobee. To accomplish this, Disston arranged to have a 48-foot-wide canal dredged from east of La Belle to Lake Okeechobee. This canal drained Lake Flirt and lowered Lake Okeechobee several feet, exposing lakeside muckland for future farming. This canal was entirely incorporated in a much larger flood-control canal completed in 1936. A small part of the Disston Canal is still in existence at the Oxbow Golf Course at Port La Belle.

The Caloosahatchee River has always been an important avenue of transportation. Until the advent of roads, regularly scheduled steamboats and other craft were used to haul goods and passengers from Punta Rassa and Fort Myers to Fort Thompson and often to Moore Haven. The river, however, was not always a benefactor. During wet periods and when hurricanes dumped large amounts of water in the river valley, about 500 bends in the river between Fort Myers and La Belle prevented rapid drainage, which often caused flooding. Notable floods occurred in 1873, 1878, 1908, 1910, 1912, 1922, 1924, 1929, 1930, and 1936.

In 1936, the Federal Government completed the canal project along the Caloosahatchee River from east of Fort Myers to Fort Thompson and widened the Disston Canal from Fort Thompson to Lake Okeechobee to eliminate the recurring floods and the resulting hardship. In the 1960's, this canal was made much wider along its entire length. Floods no longer plague the Caloosahatchee Valley, but the beauty of the meandering river is no longer present. An example of what the river once was can be viewed from the highway between La Belle and Fort Denaud south of the river at the old Terrel Gardens.

Hurricanes have made their impact on southwest Florida. Major hurricanes occurred in 1873, 1878, 1910, 1926, and 1928. The great loss of life along the shores of Lake Okeechobee in the 1926 and 1928 hurricanes caused the Federal Government to construct the Hoover Dike around the lake in the 1930's. Today the lake no longer threatens human life even in the greatest of storms. The last major storm, Hurricane Donna in 1960, caused tremendous damage but no loss of life in Hendry County.

From late in the 1860's into the 1880's, settlers began migrating to the Caloosahatchee River area around Alva, Fort Denaud, and Fort Thompson. Large cattle herds were maintained in the Fort Thompson area south of the Caloosahatchee River. Alva and Fort Denaud depended upon citrus, pineapples, and small farms as well as cattle. Many settlers established 160-acre homesteads on prime land along the river as well as in the Devil's Garden and Felda regions. Others purchased plots north and south of the river. The early settlers grew sugarcane for cane syrup. In the 1920's, the sugar industry was established in Clewiston, and many thousands of acres of sugarcane was grown in Palm Beach, Glades, and Hendry Counties to supply the mill in Clewiston. Many byproducts from the manufacture of raw sugar add to the importance of the industry.

The communities in Hendry County have had a part in the region's history. Fort Thompson was once an important community, but today it has no houses. In 1886, the community had 50 people. Captain Hendry had his headquarters there and built a large ranch house. Around the turn of the century, he sold most of his property to E.E. Goodno, who established an ice plant and an electrical plant to serve La Belle and to furnish ice for boats plying the river from Lake Okeechobee to Fort Myers. Henry Ford, the automobile manufacturer, eventually acquired the property and in turn sold it to Joe B. Hendry, Sr., who willed it to his daughter, Lois Hendry Barron, the wife of Barney Barron, former mayor of La Belle. The Barrons sold the property to a development corporation, which established Port La Belle.

Fort Denaud was named for a French trapper, Pierre Denaud, who some say once owned the land. Settlers homesteaded the Fort Denaud area as early as 1875, and many citrus groves were established. Fort Denaud once had a general store, post office, and church. Historically, Fort Denaud is one of the most important areas in the county.

La Belle was established by Francis Asbury Hendry and named for his two daughters, Laura and Carrie Belle. Later, E.E. Goodno added improvements and exercised considerable influence on the development of the town. La Belle was incorporated in 1923. It is an important center for citrus, beekeeping, cattle, land management, and truck farming.

Felda was first known as Eddy and could be reached only by a trail through the woods. With the coming of the railroad, the name Felda was selected in honor of Felix and Ida Taylor. It has been a farming community, but crude oil production in the last 20 years has given Felda added importance in the economy of Hendry County and the state of Florida.

Clewiston is the largest town in Hendry County. It was once known as Sand Point. Camps of commercial fishermen and a few scattered farms were on rich muckland nearby. Sand Point was not mentioned in the 1920 census. The mayor of Moore Haven, Mrs. Marian Horwitz O'Brion, was interested in development along the lake shore. In 1921, she prevailed on A.C. Clewis, a Tampa banker, to finance the construction of the Moore Haven and Clewiston Railroad (later merged with the Atlantic Coast Line Railroad) to serve the farms and fishermen of the area. The name Clewiston was selected in honor of that financier. Clewiston was incorporated as a city in 1931. Because the rich muckland was highly suited to sugarcane, Clewiston became the site of a raw sugar mill. The Florida sugar industry is centered in Clewiston. A sugar refinery producing pure white sugar has been added to the industry of the area.

Port La Belle, which is east of La Belle near the dry bed of Lake Flirt, is currently being developed as a residential area.

Geology

Paulette A. Bond, Florida Geological Survey, Bureau of Geology, Department of Natural Resources, helped prepare this section.

Hendry County has been divided into three areas based on its landforms or physiographic features *(5)*. Most of the county lies in the Sandy Flatlands province, which is flanked on the east by the Everglades and on the south by the Big Cypress Swamp (fig. 1).

The Everglades occupy a narrow curved slice in eastern Hendry County that has a maximum width of about 6 miles. The boundary between the Everglades and adjacent physiographic provinces has been defined using vegetation and is placed where the characteristic sedges of the Everglades, including sawgrass, are replaced by true grasses, pines, or cypress *(6)*. The soils in the Everglades are underlain by marl or a surface of eroded marly limestone *(5)*.

The Big Cypress Swamp is an irregularly shaped area in southern Hendry County. The land surface in the Big Cypress Swamp is slightly lower in elevation than that of the Sandy Flatlands. It is characterized by a flat swampy surface punctuated by small areas, called hammocks, that are higher in elevation. Cypress sedges and marsh plants are predominant in the low swampy areas, and bunch grass, palmettos, and pines are on hammocks *(5)*.

The Sandy Flatlands occupy most of Hendry County. The area is characterized by a blanket of surficial marine sand that is up to about 15 feet thick. The sand

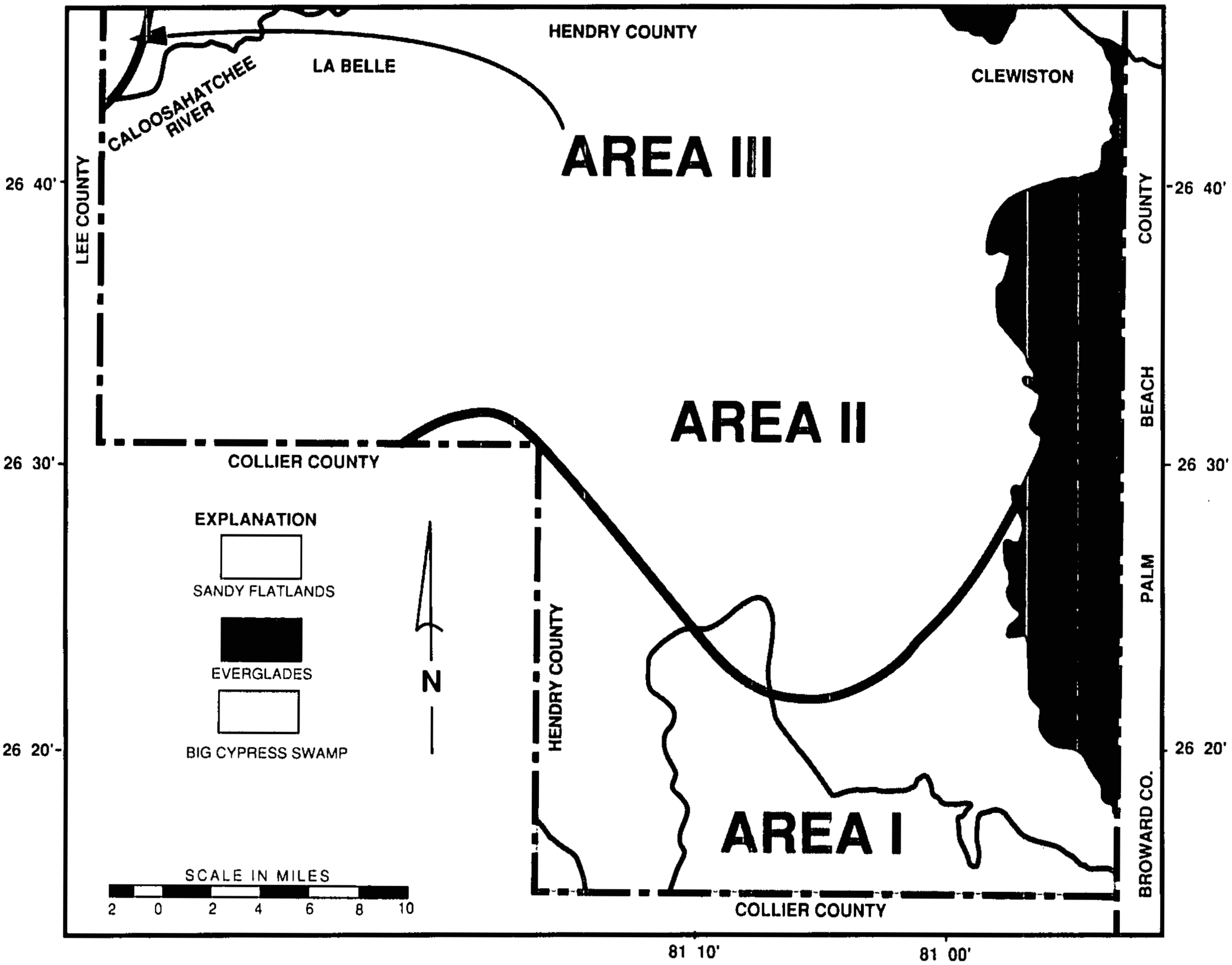


Figure 1.—Hendry County is in the Sandy Flatlands, Everglades, and Big Cypress Swamp physiographic areas and is divided into three areas characterized by differing sinkhole development.

is late Pleistocene marine terraces that were deposited when the sea level fluctuated from about 25 to 70 feet above current sea level *(5)*. White *(14)* alternatively divided the Sandy Flatlands into part of his Caloosahatchee Valley province and Immokalee Rise province. The surficial sand was interpreted as representing an ancient submarine shoal.

Karst landforms, mostly sinkholes, are superimposed on the broad physiographic provinces in Hendry County (see fig. 1). The type of sinkholes that occur in a given area, as well as their mode of development and distribution, depends upon the thickness and nature of material that is underlain by limestone *(9)*. The thickness and nature of cover material are the criteria that have been used to divide Hendry County into regions of variable sinkhole occurrence.

The limestone of the southern part of Hendry County is bare or thinly covered by soil or permeable sand (area I). Water from the surface percolates down through the sand and dissolves the underlying limestone. Particles of soil and sand gradually move downward as the limestone dissolves. Sinkholes form infrequently in these areas and generally are shallow and broad *(9)*.

Central and northern Hendry County are characterized by a somewhat deeper cover of permeable and incohesive sand (area II). The few sinkholes that form in this region are similar to the sinkholes associated with southern Hendry County in that they are shallow and small. They form as covering sand and soil gradually subside into the depressions formed by slowly dissolving limestone *(9)*.

A small area (area III) in the northwest corner of Hendry County is characterized by a thick (more than 200 feet) cover sequence of cohesive sediments interlayered by laterally discontinuous carbonate beds *(9)*. Very few sinkholes form under these conditions, but those that form are potentially deep and broad. Topographic maps for the northwest corner of Hendry County do not have any existing sinkholes of that type.

Stratigraphy

The layered rocks of Hendry County may be roughly grouped into a lower section dominated by carbonates and an upper section dominated by sand and clay (clastic material). The carbonates include the Avon Park Limestone and the Ocala Group Limestones (youngest). The Ocala Group Limestones are in turn overlain by the Suwannee Limestone of Oligocene age and the Tampa Formation, a sandy limestone of Miocene age (fig. 2).

The rocks above the Tampa Formation are characterized by increasing amounts of sand and clay and a somewhat diminished proportion of carbonates. The group of rocks that are more dominated by sand and clay include the Miocene Hawthorn Formation, which is successively overlain by the Tamiami Formation, the Caloosahatchee Marl, and the contemporaneous, locally adjacent Anastasia and Fort Thompson Formations.

The Avon Park Limestone is 200 to 390 feet thick. It consists of limestone and dolomite and is also a part of the Floridan Aquifer. The Ocala Group rocks of the Floridan Aquifer are above the Avon Park Limestone. They consist of limestone and dolomite and are from 150 to 390 feet thick. The Suwannee Limestone is a finely porous limestone that is somewhat crystalline and partly dolomitized. It is up to 570 feet thick and is also part of the Floridan Aquifer system. The Tampa Formation, a sandy limestone, is above the Suwannee Limestone and is 15 to 190 feet thick. It is also part of the Floridan Aquifer system *(5)*.

The Hawthorn Formation lies above the Tampa Formation. It is 300 to 500 feet thick. A limestone layer at the base of this formation is part of the Floridan Aquifer. Above its lower limestone, the Hawthorn Formation is characterized by an extremely variable lithologic makeup consisting mainly of greenish gray sandy marl, green and white plastic clay, silty sand, and quartz pebbles with some finely crystalline permeable limestone *(5)*.

The Tamiami Formation is 30 to 110 feet thick. It consists of sand, marl, shell beds, and limestone *(5)*. It is above the Hawthorn Formation, but the placement of the contact between the two units is subject to interpretation among geologists and may not be consistent between authors. The Tamiami Formation outcrops (fig. 3) in southern and western Hendry County.

The Caloosahatchee Formation is up to 60 feet thick. It lies unconformably above the Tamiami Formation *(5)* and outcrops in central Hendry County adjacent to and to the east of the outcrop of the Tamiami Formation *(13)*. The Caloosahatchee Formation is a mixture of unconsolidated sand, sandy marl, and shell material *(5)*.

The Fort Thompson Formation outcrops along the eastern boundary of Hendry County *(13)*. It is up to 15 feet thick and is described lithologically as marine shell beds that alternate with beds of freshwater marl *(5)*.

A small outcrop of the Anastasia Formation is in the northwest corner of Hendry County *(13)*. The formation is up to 15 feet thick and consists of sand, marl, and shell beds *(5)*. It is contemporaneous with the Fort Thompson Formation. The Anastasia Formation as mapped in Hendry County is not a coquina, the lithology described at the type locality for the formation.

The formations that outcrop in Hendry County (Tamiami, Caloosahatchee, Fort Thompson, and Anastasia) are blanketed by up to 15 feet of quartz sand that was deposited during ancient high sea level stands.

Ground-Water Resources

The most productive aquifer in northern Hendry County is the Floridan Aquifer. This aquifer has permeable zones as deep as 1,200 feet. At most places it yields water by artesian flow. Water from limestone deeper than 800 feet generally is highly mineralized *(4)*.

Shallow aquifers in Hendry County are mainly the limestone, shell bed, and sand of the upper part of the Hawthorn Formation and the Tamiami Formation. The units of the surficial aquifer range in depth from 40 to about 300 feet. The water of the shallow aquifers generally is of good quality. Both shallow aquifers and the Floridan Aquifer are used for irrigation. The choice of aquifers is based on individual crops and their tolerance for mineralized water *(4)*.

Economic Geology

Hendry County has commercial sand, limestone, and oil production. Sand is produced from formations near the surface and is used in a variety of construction and

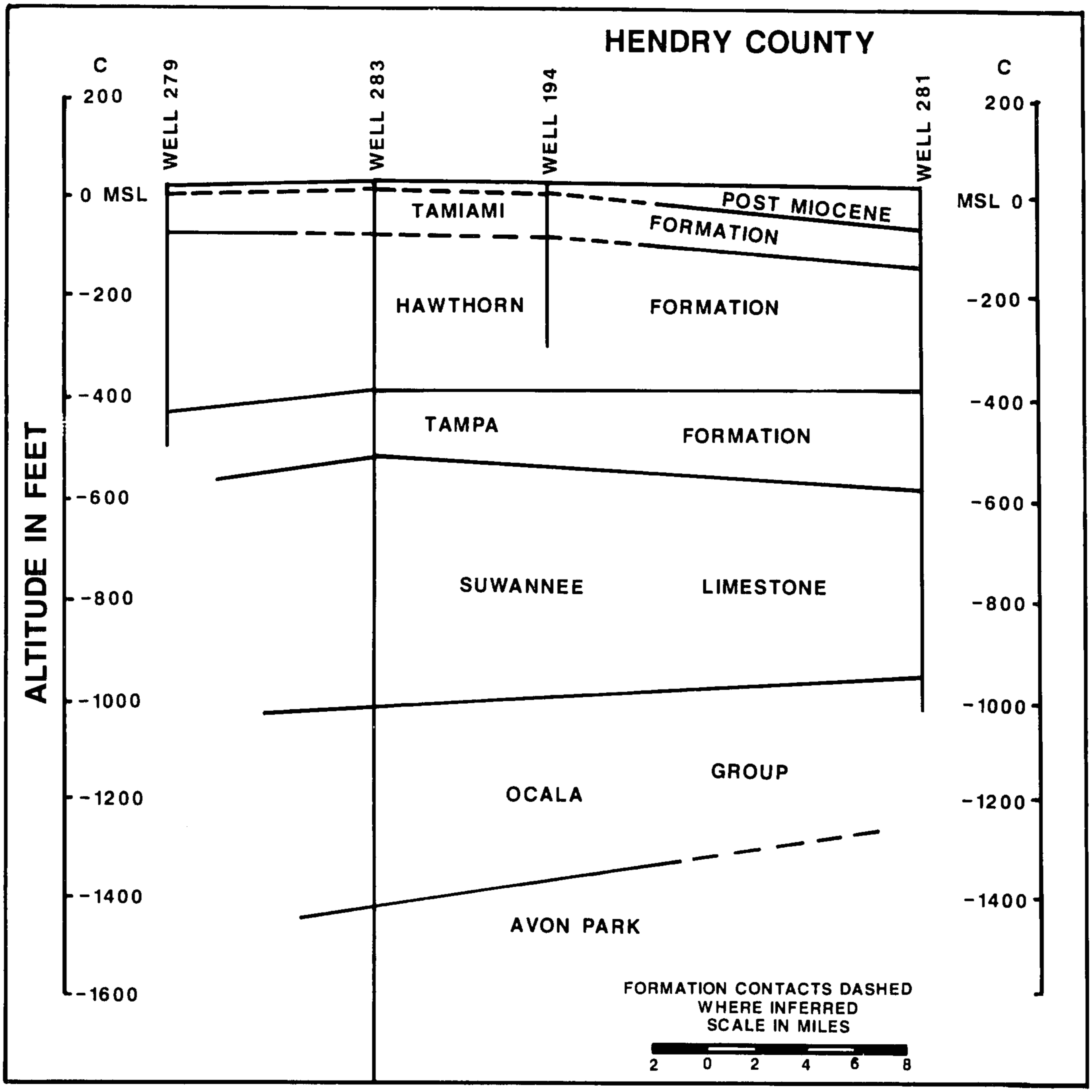


Figure 2.—A geologic section extending from west to east shows the stratigraphic layers in Hendry County. The location of section C-C′ is shown in figure 3.

industrial applications. Potential sand producing units include the Fort Thompson, Caloosahatchee, and Tamiami Formations *(8)*. Limestone can also be mined from these formations. General uses for limestone include crushed stone, dimension stone, and soil conditioning *(7)*. The active oil fields are the Sunoco-Felda field in Hendry and Collier Counties and the Mid-Felda and Townsend Canal fields in Hendry County.

These fields produce oil from the Sunniland Formation of Cretaceous age *(3)*.

Soil suitability for various uses is normally based on evaluations of properties in the soil. Interpretations in this soil survey are made as to the effects these properties could have on use. Many geologic features that are not expressed in the soil may significantly affect the suitability of a soil for a particular use. Individual sites should be evaluated by onsite examination and testing. In many cases, special planning, design, and construction techniques can be used to overcome geologic problems where they are identified and evaluated.

Water Resources

The Caloosahatchee River is the major permanent stream in Hendry County. It is part of the Okeechobee

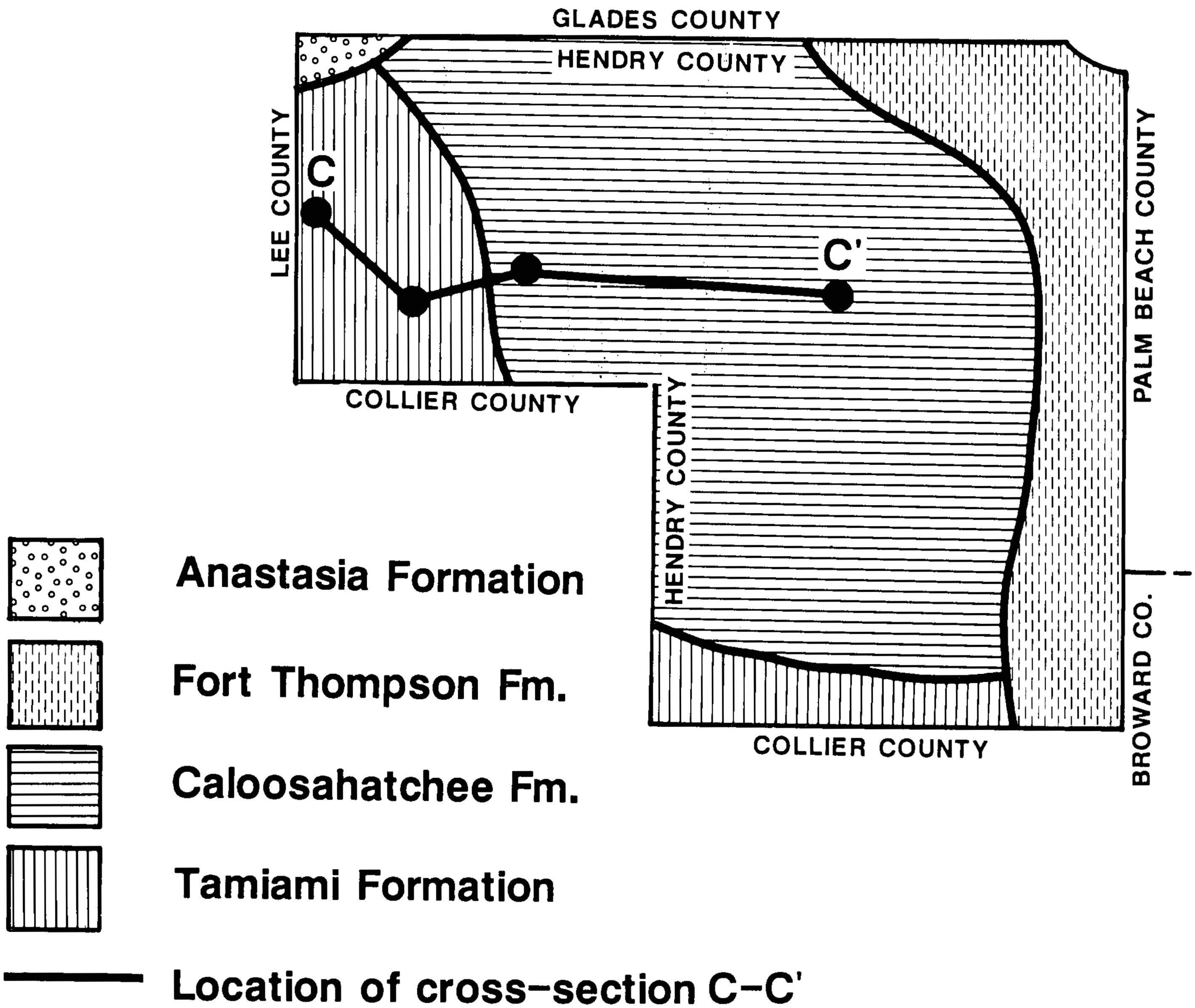


Figure 3.—The surficial geologic formations in Hendry County.

Waterway, a navigable canal that crosses the state and passes through Lake Okeechobee. Many small streams and constructed drains give access into the Caloosahatchee River. The Okaloacoochee Slough is an extremely large, wide, natural drainage system in southwestern Hendry County.

Farming

The soils and climate of Hendry County are favorable for farming and agricultural industries including vegetable crops, citrus, and cattle. Vegetable crops, such as tomatoes, eggplant, peppers, and cucumbers, are the main crops grown. The main fruits are watermelon, oranges, and grapefruit. Sugarcane is also an important crop.

Livestock production consists mainly of beef cattle. A combination of native range and improved pasture is used. Some supplemental feeding is needed, especially during dry periods.

Throughout the county, several areas that were once native range are being converted to housing developments. This is especially evident between Goodno and La Belle.

Transportation Facilities

Several county, state, and federal highways provide access between population centers in Hendry County and between Hendry County and the rest of the state. Several interstate trucking companies serve the county. Passenger rail service is available at Sebring. There also is a freight line through the county. Bus service is available to Fort Myers and West Palm Beach connecting with nationally scheduled bus service. Scheduled airline service is available at the Southwest Regional Airport in Fort Myers. The airports in La Belle and Clewiston are used mainly by private and corporate aircraft.

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 length and shape of slopes, the general pattern of drainage, the kinds of crops and native plants growing on the soils, and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material from which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, the landforms, relief, climate, and the natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with 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 are generally collected for laboratory analyses and for engineering tests. Soil scientists interpreted the data from these analyses and tests as well as the field-observed characteristics and the soil properties in terms of expected behavior of the soils under different uses. Interpretations for all of the soils were field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and new interpretations sometimes are developed to meet local needs. Data were assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management were assembled from farm records and from field or plot experiments on the same kinds of soil.

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

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

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by several kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond their 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 a building or other structure. The soils in any one map unit differ from place to place in depth, drainage, and other characteristics that affect management.

Soils of the Flatwoods

The five associations in this group consist of nearly level, poorly drained soils in broad areas of flatwoods that are interspersed with sloughs and freshwater marshes. Some of these soils have a dark sandy subsoil, some are sandy throughout, some have a loamy subsoil, and some have a dark loamy surface layer. Limestone is near the surface in some of the soils.

1. Oldsmar-Wabasso Association

Nearly level, poorly drained, sandy soils that have a sandy and loamy subsoil with organic staining in the sandy layers

This association is in the southern and central parts of the western third of Hendry County and in the central part of the county. It occurs as large areas of low flatwoods interspersed with sloughs, poorly defined drainageways, and many small depressions. The natural vegetation is South Florida slash pine, cabbage palm, saw palmetto, waxmyrtle, pineland threeawn, chalky bluestem, and other native grasses.

This association makes up about 153,658 acres, or 20 percent of the county. It is about 55 percent Oldsmar and similar soils, 15 percent Wabasso soils, and 30 percent soils of minor extent. Some small areas of these soils are underlain by limestone at a depth of 40 to 80 inches. Some small or medium areas are predominantly one or the other of the two major soils.

Typically, the Oldsmar soils have a very dark gray sand surface layer about 6 inches thick. The subsurface layer is light gray sand to a depth of about 32 inches and grayish brown sand to a depth of about 38 inches. The subsoil to a depth of about 40 inches is black sand that is coated with organic matter. It is dark reddish brown sand to a depth of about 50 inches, dark grayish brown sandy clay loam to a depth of about 70 inches, and olive gray sandy clay loam to a depth of 80 inches. Immokalee soils have similar interpretations to Oldsmar soils and are included with the Oldsmar soils in this association.

Typically, the Wabasso soils have a dark gray sand surface layer about 6 inches thick. The subsurface layer to a depth of about 25 inches is light gray sand. The subsoil to a depth of about 30 inches is black sand that is coated with organic matter. It is dark grayish brown sandy clay loam to a depth of about 40 inches and gray sandy clay loam to a depth of about 58 inches. The substratum to a depth of 80 inches is grayish brown loamy sand that has lenses of sand and sandy loam.

The minor soils are Boca, Malabar, Pineda, Riviera, Holopaw, Chobee, and Winder soils.

Most of the soils in this association are used for native or improved pasture. Small or medium areas are in citrus and vegetable crops. If water control is adequate, these soils are moderately well suited or well suited to citrus and vegetable crops. Limitations affecting most urban uses are severe. Drainage is needed to overcome wetness, and fill material is needed to make most areas suitable for building sites.

2. Immokalee-Basinger-Myakka Association

Nearly level, poorly drained soils that are sandy throughout and have organic staining in the subsoil

This association is in the north-central, central, and south-central parts of Hendry County. It is in broad flatwood areas interspersed with grassy sloughs and shallow depressions. Areas of this association are primarily native range. Natural vegetation is South Florida slash pine, saw palmetto, fetterbush lyonia, pineland threeawn, chalky bluestem, and other native grasses. Water-tolerant plants, such as flags and various sedges, are in the lower areas.

This association makes up about 139,322 acres, or 18 percent of the county. It is about 45 percent Immokalee and similar soils, 25 percent Basinger soils, 15 percent Myakka soils, and 15 percent soils of minor extent.

Typically, the Immokalee soils have a very dark gray sand surface layer about 5 inches thick. The subsurface layer is gray sand to a depth of about 25 inches and light gray sand to a depth of about 40 inches. The subsoil to a depth of about 70 inches is sand. The upper part is black and is stained with organic matter. The lower part is dark brown. The substratum is light brownish gray sand to a depth of 80 inches or more. Oldsmar soils have similar interpretations to Immokalee soils and are included with the Immokalee soils in this association.

Typically, the Basinger soils have a very dark gray sand surface layer about 6 inches thick. The subsurface layer to a depth of about 25 inches is light brownish gray sand. The subsoil is dark yellowish brown sand to a depth of about 50 inches. The substratum is light brownish gray sand to a depth of 80 inches. Pompano and Valkaria soils have similar interpretations to Basinger soils and are included with the Basinger soils in this association.

Typically, the Myakka soils have a very dark gray sand surface layer about 6 inches thick. The subsurface layer to a depth of about 26 inches is gray sand. The subsoil to a depth of about 60 inches is sand. It is black in the upper part and dark brown in the lower part. The substratum to a depth of 80 inches or more is grayish brown sand.

The minor soils are Malabar, Holopaw, Riviera, Pineda, Delray, and Chobee soils.

Most of the soils in this association are used for improved or native pasture. Small areas are used for citrus, vegetables, and sugarcane. Under natural conditions, these soils are poorly suited to cultivated crops. If water control is adequate, they are moderately well suited to a variety of vegetables, citrus, and sugarcane. Drainage is needed to overcome wetness in areas used for urban development, and fill material is needed to make some areas suitable for building sites.

3. Tuscawilla-Chobee Association

Nearly level, poorly drained, sandy and loamy soils that have a loamy subsoil

This association is dominantly bordering the Okaloacoochee Slough in the central part of Hendry County and the Caloosahatchee River in the northwestern part. It is in long, relatively narrow flatwood areas interspersed with many small ponds. The natural vegetation is dominantly South Florida slash pine, saw palmetto, cabbage palm, waxmyrtle, and chalky bluestem.

This association makes up about 16,186 acres, or 2 percent of the county. It is about 70 percent Tuscawilla soils, 20 percent Chobee soils, and 10 percent soils of minor extent.

Typically, the Tuscawilla soils have a dark gray fine sand surface layer about 4 inches thick. The subsurface layer to a depth of about 8 inches is gray fine sand. The subsoil is dark grayish brown sandy clay loam to a depth of about 15 inches; light gray, calcareous sandy clay loam to a depth of about 39 inches; and light gray, calcareous fine sandy loam to a depth of about 56 inches. The substratum is white, calcareous loam to a depth of 80 inches or more.

Typically, the Chobee soils have a black fine sandy loam surface layer about 9 inches thick. The next layer to a depth of about 13 inches is gray fine sandy loam. The subsoil to a depth of about 68 inches is light gray, calcareous sandy clay loam. The substratum to a depth of 80 inches is light gray, calcareous fine sandy loam.

The minor soils are Boca, Hallandale, Jupiter, Oldsmar, Pineda, Riviera, and Wabasso soils.

Most of the soils in this association are used for native range. Some areas are used for improved pasture, vegetables, citrus, or urban development. These soils are poorly suited to cultivated crops except where water control is adequate. Simple surface drainage is needed to make them suitable for improved pasture. Limitations affecting most urban uses are severe. Water control and fill material are needed to make most areas suitable for building sites.

4. Wabasso Association

Nearly level, poorly drained, sandy soils that have a sandy and loamy subsoil with organic staining in the sandy layer

This association is primarily in a few areas along the Okaloacoochee Slough and Twelve-Mile Slough in the west-central and central parts of Hendry County. It occurs as large areas of low flatwoods interspersed with sloughs, poorly defined drainageways, and many small depressions. The natural vegetation is South Florida slash pine, cabbage palm, live oak, saw palmetto, waxmyrtle, and various grasses.

This association makes up about 9,246 acres, or 1 percent of the county. It is about 75 percent Wabasso soils and 25 percent soils of minor extent. In some areas these soils are underlain by limestone at a depth of 40 to 80 inches.

Typically, the Wabasso soils have a dark gray sand surface layer about 6 inches thick. The subsurface layer to a depth of about 25 inches is light gray sand. The subsoil to a depth of about 30 inches is black sand that is coated with organic matter. It is dark grayish brown sandy clay loam to a depth of about 40 inches and gray sandy clay loam to a depth of about 58 inches. The substratum to a depth of 80 inches is grayish brown loamy sand that has lenses of sand and sandy loam.

The minor soils are Boca, Malabar, Pineda, Riviera, Holopaw, Chobee, and Winder soils.

Most of the soils in this association are used for native pasture. Small areas are in improved pasture or vegetable crops. If water control is adequate, these soils are moderately well suited or well suited to citrus and vegetable crops. Limitations affecting most urban uses are severe. Drainage is needed to overcome wetness, and fill material is needed to make most areas suitable for building sites.

5. Ochopee-Rock Outcrop Association

Nearly level, poorly drained, sandy soils that are underlain by limestone at a depth of less than 20 inches and areas of limestone outcrop

This association is in the southwestern and south-central parts of Hendry County. It is in broad, low flatwood areas interspersed with small, narrow sloughs and common small depressions. The natural vegetation is waxmyrtle, saw palmetto, cabbage palm, slash pine, and various grasses and shrubs. Cypress, sawgrass, pickerelweed, and other grasses and sedges are in the wet areas.

This association makes up about 5,743 acres, or 1 percent of the county. It is about 65 percent Ochopee and similar soils, 20 percent Rock outcrop, and 15 percent soils of minor extent.

Typically, the Ochopee soils have a dark grayish brown fine sandy loam surface layer about 6 inches thick. The subsoil is grayish brown fine sandy loam to a depth of about 10 inches. It is underlain by hard limestone. Hallandale soils have similar interpretations to Ochopee soils and are included with the Ochopee soils in this association.

The Rock outcrop part of this association is hard, fractured limestone.

The minor soils are Jupiter, Boca, Riviera, Holopaw, Margate, Chobee, and Gentry soils.

Most areas of this association are in native vegetation. Even if drainage improvements are made, most areas would not be suitable for cultivation because of the shallow depth to rock. If drainage is adequate, some areas may be suitable for improved pasture. Limitations affecting most urban uses are severe.

Soils of the Sloughs and Flatwoods

The three associations in this group consist mainly of nearly level, poorly drained soils in sloughs and on flatwoods. The soils in sloughs are sandy and have a loamy subsoil; some are underlain by limestone. In flatwood areas, some soils have a dark sandy subsoil layer and a loamy subsoil layer, some have a loamy subsoil that is underlain by limestone, and others are sandy and are underlain by limestone at a shallow depth.

6. Malabar-Pineda-Oldsmar Association

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

This association is in most areas of Hendry County except for the Everglades along the eastern boundary and the southwestern part of the county. It is extensive in the northwestern and north-central parts of the county. This association is on broad, low flats and in flatwood areas interspersed with grassy sloughs and depressions. The natural vegetation is slash pine, saw palmetto, waxmyrtle, and various grasses. Fireflags, pickerelweed, sawgrass, and various grasses and sedges are in wet areas.

This association makes up about 53,052 acres, or 7 percent of the county. It is about 35 percent Malabar and similar soils, 25 percent Pineda soils, 20 percent Oldsmar and similar soils, and 20 percent soils of minor extent.

Typically, the Malabar soils have a dark grayish brown sand surface layer about 5 inches thick. The subsurface layer to a depth of about 15 inches is light brownish gray sand. The subsoil is sand to a depth of about 45 inches. In sequence downward, it is very pale brown, brownish yellow, light yellowish brown, and light brownish gray. The subsoil is gray sandy clay loam to a depth of about 55 inches and gray sandy loam to a depth of about 65 inches. The substratum is light gray stratified sand and loamy sand to a depth of 80 inches or more. Holopaw soils have similar interpretations to Malabar soils and are included with the Malabar soils in this association.

Typically, the Pineda soils have a black fine sand surface layer about 2 inches thick. The subsurface layer to a depth of about 14 inches is gray and light gray fine sand. The subsoil is yellowish brown and light yellowish brown fine sand to a depth of about 30 inches. To a depth of about 50 inches, it is gray sandy clay loam that has vertical intrusions of light yellowish brown fine sand. The substratum is gray sandy loam to a depth of about 60 inches, gray sandy clay loam to a depth of about 75 inches, and white sand to a depth of 80 inches. Calcium carbonate nodules make up about 50 percent of the white sand layer.

Typically, the Oldsmar soils have a very dark gray sand surface layer about 6 inches thick. The subsurface layer to a depth of about 38 inches is sand. It is light gray in the upper part and grayish brown in the lower part. The subsoil extends to a depth of about 80 inches. In sequence downward, it is black sand, dark reddish brown sand, dark grayish brown sandy clay loam, and olive gray sandy clay loam. In some areas limestone is below a depth of 40 inches. Immokalee soils have similar interpretations to Oldsmar soils and are included with the Oldsmar soils in this association.

The minor soils are Basinger, Boca, Chobee, Delray, and Gentry soils.

Most of the soils in this association are used for improved pasture or native range. In some areas they are used for citrus and cultivated crops. These soils are severely limited for most agricultural uses because of the high water table; however, if water control is adequate, these soils are well suited to truck crops, citrus, and improved pasture. Limitations affecting most urban uses are severe. Drainage is needed to overcome wetness, and fill material is needed to make some areas suitable for building sites.

7. Boca-Riviera-Pineda Association

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

This association is in the northwestern, central, and southwestern parts of Hendry County. It occurs as small or medium areas of flatwoods and hammocks interspersed with grassy and lightly wooded sloughs, depressions, and marshes. The natural vegetation is South Florida slash pine, cabbage palm, live oak, saw palmetto, pineland threeawn, chalky bluestem, and other native grasses. Pickerelweed and many grasses, sedges, and flags are in the wetter areas along with occasional willow, maple, and cypress trees.

This association makes up about 108,361 acres, or 14 percent of the county. It is about 25 percent Boca soils, 25 percent Riviera soils, 20 percent Pineda soils, and 30 percent soils of minor extent.

Typically, the Boca soils have a sand surface layer about 7 inches thick. It is very dark gray in the upper part and gray in the lower part. The subsurface layer to a depth of about 27 inches is light gray fine sand. The subsoil is dark grayish brown fine sand to a depth of about 28 inches and grayish brown fine sandy loam to a depth of about 33 inches. It is underlain by limestone that is discontinuous and that has many fractures and solution basins.

Typically, the Riviera soils have a very dark gray fine sand surface layer about 4 inches thick. The subsurface layer to a depth of about 26 inches is fine sand. It is gray in the upper part and light gray in the lower part. The subsoil to a depth of about 32 inches is gray sandy loam that has vertical intrusions of light gray sand. Below that it is gray sandy clay loam to a depth of about 50 inches and gray sandy loam to a depth of about 70 inches. The substratum to a depth of 80 inches or more is gray sandy clay loam that has a few calcium carbonate fragments.

Typically, the Pineda soils have a fine sand surface layer about 8 inches thick. It is black in the upper part and gray in the lower part. The subsurface layer to a depth of about 14 inches is light gray fine sand. The subsoil is yellowish brown fine sand to a depth of about 25 inches. The next layer to a depth of 30 inches is light yellowish brown fine sand. Below that to a depth of about 50 inches the subsoil is gray sandy clay loam that has vertical intrusions of light yellowish brown fine sand. The substratum is gray sandy loam to a depth of about 60 inches and gray sandy clay loam to a depth of about 75 inches. Below that to a depth of about 80 inches it is white sand that has about 50 percent calcium carbonate nodules.

The minor soils are Wabasso and Oldsmar soils.

Most of the soils in this association are used for improved or native pasture, although significant areas are used for citrus or residential development. If water control is adequate, these soils can be used for citrus or vegetable production. Limitations affecting most urban uses are severe. Drainage is needed to overcome wetness, and fill material and some rock removal are needed to make most areas suitable for building sites.

8. Hallandale-Riviera-Holopaw Association

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

This association is in the southwestern and south-central parts of Hendry County. It is on broad, low flatwoods and hammocks interspersed with sloughs, ponds, and marshy areas. The natural vegetation is saw palmetto, cabbage palm, live oak, waxmyrtle, and other shrubs and grasses. Cypress, willow, sawgrass, pickerelweed, elephantears, and various wetland grasses and sedges are in the wetter areas.

This association makes up about 52,152 acres, or 7 percent of the county. It is about 45 percent Hallandale soils, 15 percent Riviera soils that have a limestone substratum, 10 percent Holopaw soils that have a limestone substratum, and 30 percent soils of minor extent.

Typically, the Hallandale soils have a dark gray sand surface layer about 4 inches thick. The underlying material to a depth of about 16 inches is brown sand. It is underlain by hard, fractured limestone that has many solution basins.

Typically, the Riviera soils have a black sand surface layer about 5 inches thick. The subsurface layer to a depth of about 35 inches is light brownish gray sand. The subsoil to a depth of about 50 inches is olive gray sandy clay loam and sandy loam. Fractured limestone is at a depth of about 50 inches.

Typically, the Holopaw soils have a dark grayish brown sand surface layer about 6 inches thick. The subsurface layer to a depth of about 40 inches is sand. It is brown in the upper part, pale brown in the next part, and light gray in the lower part. The subsoil extends to a depth of about 60 inches. The upper part is brown sand, and the lower part is gray sandy loam that has calcium carbonates. Fractured limestone is at a depth of about 60 inches.

The minor soils are Boca, Chobee, Gentry, Jupiter, and Margate soils.

Most areas of this association are in native vegetation. Some areas are abandoned farmland, and others are improved pasture. The soils in this association are severely limited for most agricultural uses because of the shallow depth to bedrock and the high water table. If water control is adequate, the deeper soils are suited to certain truck crops. Drainage is needed to overcome the wetness. Fill material and rock removal are needed to make some areas suitable for building sites.

Soils of the Everglades

The two associations in this group consist mainly of nearly level, poorly drained and very poorly drained soils that are underlain by limestone. Some of the soils are sandy throughout, some are organic, and others have a thin muck surface layer.

9. Margate Association

Nearly level, poorly drained, sandy soils that are underlain by limestone

This association is in the eastern part of Hendry County. It is in a broad, low-lying area on the fringe of the Everglades. The main vegetation is improved pasture grasses and sugarcane.

This association makes up about 40,328 acres, or 5 percent of the county. It is about 70 percent Margate and similar soils and 30 percent soils of minor extent.

Typically, the Margate soils have a black sand surface layer about 10 inches thick. The subsurface layer to a depth of about 18 inches is brown sand. The subsoil to a depth of about 24 inches is pale brown sand. The substratum to a depth of about 30 inches is light yellowish brown gravelly sand. It is underlain by hard limestone. Hallandale soils have similar interpretations to Margate soils and are included with the Margate soils in this association.

The minor soils are Basinger, Boca, Dania, Delray, Immokalee, Lauderhill, and Riviera soils.

Most of the soils in this association are used for improved pasture or sugarcane. Drainage and water control have been established in most of the area. Under natural conditions, these soils are not suited to cultivated crops because of wetness and the shallow depth to bedrock. If water control is adequate, these soils are suited to sugarcane, truck crops, and improved pasture. Limitations affecting most urban uses are severe. Water control and fill material are needed to make this area suitable for building sites.

10. Plantation-Lauderhill-Dania Association

Nearly level, very poorly drained soils that are underlain by limestone; some are sandy with a thin muck surface layer and some are organic

This association is on the fringe of the Everglades in eastern Hendry County. It is dominantly freshwater marshes that are drained and cultivated. Vegetation is mainly sugarcane and improved pasture grasses.

This association makes up about 46,042 acres, or 6 percent of the county. It is about 36 percent Plantation soils, 36 percent Lauderhill soils, 15 percent Dania soils, and 13 percent soils of minor extent.

Typically, the Plantation soils have a black muck surface layer about 12 inches thick. It is underlain by sand to a depth of about 39 inches. The sand is black in the upper part and pale brown in the lower part. It is underlain by hard limestone.

Typically, the Lauderhill soils have a muck surface layer about 35 inches thick. It is black to a depth of about 24 inches, dark reddish brown to a depth of about 31 inches, and black below that depth. The muck layer is underlain by hard limestone.

Typically, the Dania soils have a muck surface layer about 14 inches thick. It is black in the upper part and dark reddish brown in the lower part. The underlying material to a depth of 18 inches is very dark gray fine sand. It is underlain by hard limestone.

The minor soils are Pahokee, Terra Ceia, Okeelanta, and Margate soils.

Most areas of this association have been cleared and are used for sugarcane. Some areas are in improved pasture. Drainage and water control have been established in most areas. Under natural conditions, the soils in this association are not suited to cultivated crops because of wetness and the shallow depth to bedrock. If water control is adequate, these soils are suited to sugarcane, truck crops, and improved pasture. Limitations affecting most urban uses are severe. Water control, muck removal, and fill material are needed to make most areas suitable for building sites.

Soils of the Sloughs and Freshwater Marshes

The three associations in this group consist mainly of nearly level, poorly drained and very poorly drained soils in sloughs and freshwater marshes. Some have a loamy subsoil, some are sandy throughout, some are organic, some have a loamy surface layer, some have a dark colored loamy surface layer, and some are underlain by limestone.

11. Winder-Chobee-Gator Association

Nearly level, poorly drained and very poorly drained, sandy, loamy, and organic soils that have a loamy subsoil

This association is mainly in the Okaloacoochee Slough, Graham Marsh, and Devil's Garden Slough, which are freshwater marshes in central Hendry County. The natural vegetation is sawgrass, pickerelweed, willow, and other water-tolerant vegetation.

This association makes up about 39,355 acres, or 5 percent of the county. It is about 40 percent Winder soils, 30 percent Chobee soils, 15 percent Gator soils, and 15 percent soils of minor extent.

Typically, the Winder soils have a gray fine sand surface layer about 8 inches thick. The subsurface layer to a depth of about 19 inches is very pale brown fine sand. The subsoil to a depth of about 30 inches is light gray sandy clay loam. The substratum is greenish gray sandy clay loam to a depth of about 40 inches, light gray sandy clay loam to a depth of about 60 inches, and greenish gray loamy sand to a depth of 80 inches.

Typically, the Chobee soils have a black fine sandy loam surface layer about 9 inches thick. The next layer to a depth of about 13 inches is gray fine sandy loam. The subsoil to a depth of about 68 inches is light gray, calcareous sandy clay loam. The substratum to a depth of 80 inches is light gray, calcareous fine sandy loam.

Typically, the Gator soils have a black muck surface layer about 32 inches thick. The underlying material is black sandy loam to a depth of about 35 inches and gray sandy clay loam to a depth of 51 inches or more.

The minor soils are Delray, Gentry, Holopaw, Pineda, and Riviera soils.

Most areas of this association are in natural vegetation. Under natural conditions, the soils in this association are poorly suited to cultivated crops. Limitations affecting most urban uses are severe.

12. Holopaw-Basinger Association

Nearly level, poorly drained, sandy soils that have a loamy subsoil or that are sandy throughout; some are underlain by limestone

This association is mainly in the southeastern part of Hendry County. It is in small or medium areas of broad, low, grassy flats and cypress stands interspersed with small cypress heads, ponds, and some flatwoods. The natural vegetation is chalky bluestem and other grasses, cypress, pickerelweed, South Florida slash pine, saw palmetto, and cabbage palm. Thick stands of cypress, elephantears, pickerelweed, sawgrass, and other various grasses and sedges are in the wetter areas.

This association makes up about 77,480 acres, or 10 percent of the county. It is about 60 percent Holopaw soils, 25 percent Basinger soils, and 15 percent soils of minor extent.

Typically, the Holopaw soils have a dark gray sand surface layer about 5 inches thick. The subsurface layer to a depth of about 48 inches is sand. It is light brownish gray to a depth of about 15 inches, light gray to a depth of about 34 inches, and light brownish gray below that depth. The subsoil to a depth of about 65 inches is grayish brown sandy clay loam. The substratum to a depth of 80 inches is grayish brown sandy loam that has many carbonate nodules.

Typically, the Basinger soils have a very dark gray sand surface layer about 6 inches thick. The subsurface layer to a depth of about 25 inches is light brownish gray sand. The subsoil is dark yellowish brown sand to a depth of about 50 inches. The substratum is light brownish gray sand to a depth of 80 inches.

The minor soils are Pineda, Riviera, Margate, Oldsmar, Immokalee, Boca, Gentry, and Delray soils.

Most of the soils in this association are used for improved or native pasture. These soils are severely limited for most agricultural uses by the high water table. If water control is adequate, these soils are well suited to truck crops, citrus, and improved pasture. Limitations affecting most urban uses are severe. Drainage is needed to overcome wetness, and fill material is needed to make some areas suitable for building sites.

13. Riviera-Hallandale-Boca Association

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

This association is mainly in the southeastern part of Hendry County. It is in long, narrow sloughs and depressions. Natural vegetation is cypress, waxmyrtle, maidencane, and ferns.

This association makes up about 33,088 acres, or 4 percent of the county. It is about 35 percent Riviera soils, 25 percent Hallandale soils, 10 percent Boca soils, and 30 percent soils of minor extent.

Typically, the Riviera soils have a very dark gray fine sand surface layer about 4 inches thick. The subsurface layer to a depth of about 26 inches is fine sand. It is gray in the upper part and light gray in the lower part. The subsoil to a depth of about 32 inches is gray sandy loam that has vertical intrusions of light gray sand. It is gray sandy clay loam to a depth of about 50 inches and gray sandy loam to a depth of about 70 inches. The substratum to a depth of 80 inches or more is gray sandy clay loam that has a few calcium carbonate fragments.

Typically, the Hallandale soils have a dark gray sand surface layer about 4 inches thick. The underlying material to a depth of about 16 inches is brown sand. It is underlain by hard, fractured limestone that has many solution basins.

Typically, the Boca soils have a sand surface layer about 7 inches thick. It is very dark gray in the upper part and gray in the lower part. The subsurface layer to a depth of about 27 inches is light gray fine sand. The subsoil is dark grayish brown fine sand to a depth of about 28 inches and grayish brown fine sandy loam to a depth of about 33 inches. It is underlain by limestone that is discontinuous and that has many fractures and solution basins.

The minor soils are Chobee, Holopaw, Plantation, and Winder soils.

Most of the soils in this association are used for native range. Under natural conditions, these soils are covered by water for 3 to 7 months each year and are poorly suited to cultivated crops. If water control is adequate, they are suited to a variety of vegetable, citrus, and improved pasture crops. Limitations affecting most urban uses are severe.

Detailed Soil Map Units

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

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

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

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

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Holopaw sand, depressional, is one of several phases in the Holopaw 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. Jupiter-Ochopee-Rock outcrop 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. Udorthents is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 2 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations and capabilities for many uses. The Glossary defines many of the terms used in describing the soils.

1—Boca sand. This poorly drained soil is on broad flatwoods, mainly near the edge of ponds and sloughs. Areas of this soil are irregular in shape and range from 5 to 400 acres. Slopes are less than 2 percent.

Typically, this soil has a sand surface layer about 7 inches thick. It is very dark gray in the upper part and gray in the lower part. The subsurface layer to a depth of about 27 inches is light gray fine sand. The subsoil is dark grayish brown fine sand to a depth of about 28 inches and brown fine sandy loam to a depth of about 33 inches. It is underlain by limestone that is discontinuous and that has many fractures and solution basins.

Included with this soil in mapping are small areas of Hallandale, Pineda, Riviera, and Wabasso soils. Also included near the Caloosahatchee River are areas of soils that are moderately well drained but are otherwise similar to the Boca soil. Soils that have an accumulation of secondary carbonates on the sand grains are also included. The included soils make up 5 to 25 percent of the map unit.

Under natural conditions this Boca soil has a high water table within 10 inches of the surface for 2 to 4 months in most years. Permeability is rapid in the surface and subsurface layers and moderate in the subsoil. The organic matter content and natural fertility are low. The available water capacity is low in the surface layer, very low in the subsurface layer, and moderate in the subsoil.

Most areas of this soil are in pasture or native range. Natural vegetation is an open forest of slash pine, cabbage palm, and live oak. The understory is saw palmetto. Pineland threeawn is the most common native grass. Other native grasses that are important for range management are creeping bluestem, chalky bluestem, lopsided indiangrass, and low panicums.

Under natural conditions this soil is poorly suited to cultivated crops because of the wetness and the depth to limestone. The limestone interferes with the construction of water-control systems. With good water-control and soil-improving measures, the soil can be made suitable for crops. The water-control system should remove excess water after periods of heavy rainfall and provide for subsurface irrigation during dry periods.

Citrus can be grown if intensive management practices are used. A water-control system that maintains the water table at a depth of about 4 feet is needed. Planting trees on beds can also lower the effective depth of the water table. Regular applications of fertilizer are needed.

This soil is well suited to improved pasture; however, water-control measures to remove excess surface water after periods of heavy rainfall and regular applications of fertilizer are needed.

Potential productivity is high for South Florida slash pine. The equipment use limitation and seedling mortality are moderate. South Florida slash pine is a recommended tree to plant.

The high water table, the moderate depth to bedrock, and the sandy texture are severe limitations affecting most urban and recreational uses.

The capability subclass is IIIw.

2—Pineda sand, limestone substratum. This poorly drained soil is in sloughs and on low flats in flatwood areas. Areas of this soil are irregular in shape and range from 5 to 500 acres. Slopes are 0 to 2 percent.

Typically, this soil has a sand surface layer about 10 inches thick. It is dark gray in the upper part and grayish brown in the lower part. The subsurface layer to a depth of about 16 inches is light gray sand. The subsoil is yellowish brown sand to a depth of about 32 inches and gray sandy clay loam to a depth of about 49 inches. The substratum to a depth of about 50 inches is light gray calcareous sandy loam. It is underlain by limestone.

Included with this soil in mapping are small areas of Boca, Pineda, Malabar, and Riviera soils. Also included in areas along the Caloosahatchee River are some moderately well drained soils. The included soils make up about 15 to 25 percent of the map unit.

Under natural conditions this Pineda soil has a high water table within 12 inches of the surface for 6 months during most years. Permeability is rapid in the surface and subsurface layers, slow in the subsoil, and moderately rapid in the substratum. The organic matter content and natural fertility are low. The available water capacity is low in the surface layer, subsurface layer, and sandy part of the subsoil; moderate in the loamy part of the subsoil; and variable in the substratum.

Many areas of this soil are in improved pasture or native range. Some areas are used for citrus or vegetables. Natural vegetation is grasses and scattered saw palmetto, slash pine, and cabbage palm. Blue maidencane and chalky bluestem are desirable grasses for range management.

Under natural conditions this soil is not suited to cultivated crops because of the wetness. If a water-control system is used, it is well suited to many fruit and vegetable crops. The water-control system should remove excess water rapidly and provide subsurface irrigation. Good soil management includes crop rotations that keep close-growing cover crops in the cropping system at least two-thirds of the time. All crop residue should be plowed under. Seedbed preparation should include bedding. Crops respond to fertilizer.

If water control is adequate, this soil is well suited to citrus. The water-control system should maintain the water table at a depth of about 4 to 6 feet. Trees should be planted on beds, and a cover crop should be maintained between the trees to help control erosion. Fertilizer should be applied as needed.

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

If surface drainage is adequate, this soil has moderate potential productivity for South Florida slash pine. The equipment use limitation is moderate, and seedling mortality is severe. South Florida slash pine is a recommended tree to plant.

The high water table is a severe limitation affecting urban and recreational uses.

The capability subclass is Vw.

4—Oldsmar sand. This nearly level, poorly drained soil is on broad flatwoods. Areas of this soil are irregular in shape and range from 5 to more than 1,000 acres.

Typically, this soil has a very dark gray sand surface layer about 6 inches thick. The subsurface layer to a depth of about 38 inches is sand. It is light gray in the upper part and grayish brown in the lower part. The subsoil extends to a depth of at least 80 inches. In sequence downward, it is black sand, dark reddish brown sand, dark grayish brown sandy clay loam, and olive gray sandy clay loam.

Included with this soil in mapping are small areas of Basinger, Boca, Holopaw, and Immokalee soils. Also included are soils that have accumulations of calcareous material. The included soils make up less than 25 percent of the map unit.

Under natural conditions this Oldsmar soil has a high water table within 10 inches of the surface for 3 months in most years. During dry periods the high water table is more than 40 inches below the surface. Permeability is rapid in the surface and subsurface layers, moderately rapid to moderately slow in the sandy part of the subsoil, and slow or very slow in the loamy part of the subsoil. The available water capacity is low in the surface and subsurface layers and moderate in the subsoil. Natural fertility and organic matter content are low.

Most areas of this soil are in pasture or native range. Some areas are used for crops or citrus. Natural vegetation is South Florida slash pine, cabbage palm, saw palmetto, waxmyrtle, gallberry, fetterbush lyonia, running oak, dwarf huckleberry, pineland threeawn, blue maidencane, and several species of bluestem.

Under natural conditions this soil is poorly suited to cultivated crops because of the wetness. It is suitable for vegetable crops if a water-control system is used that removes excess water in wet periods and provides subsurface irrigation in dry periods. Good management includes keeping close-growing, soil-improving crops in the rotation and using crop residue and cover crops to protect the soil from erosion. Crops respond to fertilizer.

Under natural conditions this soil is poorly suited to citrus because of the wetness; however, if a well designed drainage system that maintains the water table at a depth of about 4 feet is used, citrus can be grown. Good management includes planting trees on beds to lower the effective depth of the water table and using a close-growing cover crop between the trees to protect the soil from erosion. Lime, fertilizer, and supplemental irrigation in dry periods are needed for maximum yields.

This soil is well suited to pasture. Pangolagrass, bahiagrass, and white clover grow well if properly managed. A simple drainage system is needed to remove excess surface water during periods of heavy rainfall. Lime, fertilizer, and controlled grazing are needed to maintain healthy plants for best yields.

This soil has moderately high potential productivity for pine trees. The major concerns in management are plant competition, seedling mortality, and the equipment use limitation. South Florida slash pine is the preferred tree to plant. A simple drainage system is needed to remove excess surface water.

The high water table and sandy texture are severe limitations affecting urban and recreational uses. A water-control system is required if this soil is developed for urban or recreational uses. Fill material that is 3 feet or more thick or ditches that remove excess surface water are also required. Septic tank absorption fields do not function adequately unless the water table is lowered or fill material is added. The sandy texture and the high water table are severe limitations affecting sites for sanitary landfills. Because cutbanks caving is a hazard in shallow excavations, shoring of side slopes is required.

The capability subclass is IVw.

6—Wabasso sand. This poorly drained soil is on flatwoods. Areas of this soil are irregular in shape and range from 5 to 250 acres. Slopes are less than 2 percent.

Typically, this soil has a dark gray sand surface layer about 6 inches thick. The subsurface layer to a depth of about 25 inches is light gray sand. The subsoil to a depth of about 30 inches is black sand that is coated with organic matter. To a depth of about 58 inches, it is sandy clay loam that is dark grayish brown in the upper part and gray in the lower part. The substratum to a depth of 80 inches is grayish brown loamy sand that has lenses of sand and sandy loam.

Included with this soil in mapping are small areas of Pineda and Riviera soils and small areas of Wabasso soils that have a limestone substratum. Also included near the Caloosahatchee River are areas of better drained soils and areas of soils that have an accumulation of secondary carbonates. The included soils generally make up 10 to 20 percent of the map unit.

Under natural conditions this Wabasso soil has a high water table within 10 inches of the surface for less than 2 months in most years and at a depth of 10 to 40 inches for 6 months or more. In dry periods the water table is at a depth of more than 40 inches. Permeability is rapid in the surface layer, subsurface layer, and substratum; moderate in the sandy part of the subsoil; and slow in the loamy part of the subsoil. The organic matter content and natural fertility are low. The available water capacity is moderate in the subsoil and low in the other layers.

Most areas of this soil are in native range or improved pasture. Natural vegetation is an open forest of slash pine with an understory of saw palmetto. Cabbage palm and live oak are scattered throughout the area. Pineland threeawn is the most abundant native grass. Other grasses important for range management are chalky bluestem, creeping bluestem, lopsided indiangrass, and low panicums.

Under natural conditions this soil is not suited to cultivated crops because of the wetness. The number of suitable crops is limited unless intensive water-control measures are used. A water-control system must remove excess water in wet periods and provide subsurface irrigation in dry periods. If water control is adequate, the soil is well suited to many kinds of flowers and vegetables. Good management, in addition to water control, includes crop rotations that keep close-growing, soil-improving crops in the cropping system at least two-thirds of the time. The crop residue should be plowed under to protect the soil from erosion. Crops respond to fertilizer. Seedbed preparation should include bedding.

The soil is poorly suited to citrus because of the wetness. If adequately drained, it is moderately suited to oranges and grapefruit (fig. 4). After periods of heavy rainfall, drainage needs to remove excess water rapidly to a depth of about 4 to 6 feet. Citrus trees should be planted on beds to lower the effective depth of the water table. A close-growing plant cover between the trees protects the soil from blowing when it is dry and from water erosion during periods of heavy rainfall. The trees require regular applications of fertilizer and occasional applications of lime. Irrigation is needed to maximize yields.

This soil is well suited to pasture and hay. Pangolagrass, bahiagrass, and clover grow well if they are well managed. A water-control system is needed to remove excess surface water after periods of heavy rainfall. Regular applications of fertilizer and lime are also needed. Grazing should be carefully controlled to maintain healthy plants for the highest yields.

The potential productivity for pine trees is moderate. The equipment use limitation, seedling mortality, and plant competition are the main concerns in management. South Florida slash pine is a recommended tree to plant.

This soil is poorly suited to urban development and recreational uses because of the high water table and the sandy texture. A water-control system is required. Fill material that is 3 feet or more thick or ditches that remove excess surface water are also required. Septic tank absorption fields do not function adequately unless the water table is lowered or fill material is added. The sandy texture and the high water table are severe limitations affecting sites for sanitary landfills. Because cutbanks caving is a hazard in shallow excavations, shoring of side slopes is required.

The capability subclass is IIIw.

7—Immokalee sand. This poorly drained soil is on broad flatwoods. Areas of this soil are irregular in shape and range from 5 to more than 100 acres. Slopes are less than 2 percent.

Typically, this soil has a very dark gray sand surface layer about 5 inches thick. The subsurface layer to a depth of about 40 inches is sand. It is gray in the upper part and light gray in the lower part. The subsoil to a depth of about 70 inches is sand that is stained with organic matter. It is black in the upper part and dark brown in the lower part. The substratum is light brownish gray sand to a depth of 80 inches or more.

Included with this soil in mapping are Basinger, Myakka, Oldsmar, and Valkaria soils. Also included are areas of soils that have a black subsoil that is weakly or moderately cemented or that has few or common medium and coarse nodules that are moderately or strongly cemented. The included soils make up about 20 percent of the map unit.

Under natural conditions this Immokalee soil has a high water table within 10 inches of the surface for about 5 months in most years. During dry periods the water table is at a depth of about 50 inches. The available water capacity is moderate in the subsoil and low or very low in the other layers. Permeability is rapid in the surface and subsurface layers and moderate in the subsoil. The organic matter content and natural fertility are low.

Most areas of this soil are in native range or improved pasture. Natural vegetation consists of South Florida slash pine and saw palmetto. Pineland threeawn is the most abundant native grass. Other important range grasses are chalky bluestem, creeping bluestem, and lopsided indiangrass.

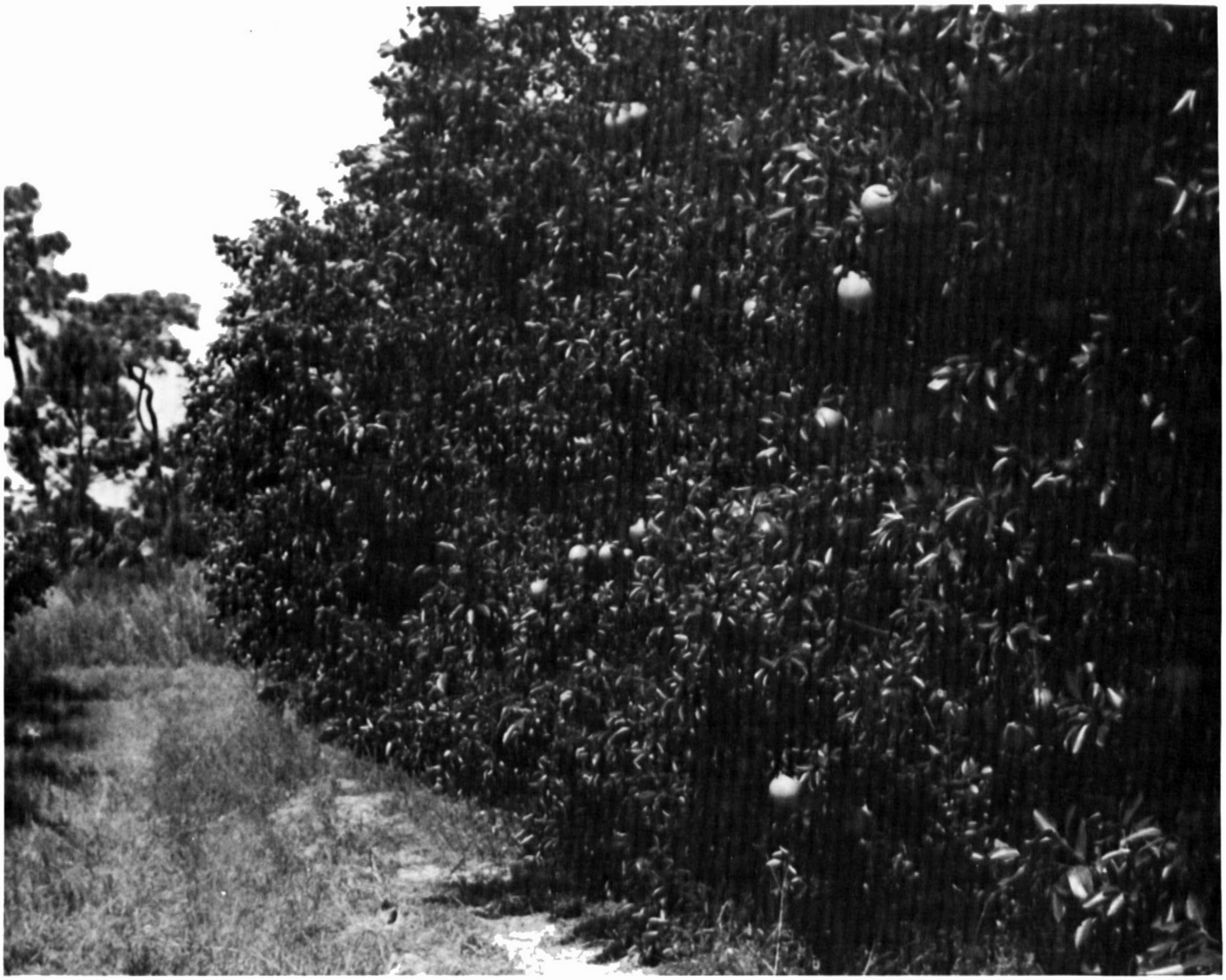


Figure 4.—If adequately drained, Wabasso sand is suited to citrus, such as oranges.

Under natural conditions this soil is poorly suited to cultivated crops because of the wetness, the sandy texture, and low fertility. The number of suitable crops is limited unless very intensive management practices are followed. If good water-control and soil-improving measures are used, this soil is suitable for many vegetable crops. A water-control system must remove excess water in wet periods and provide subsurface irrigation in dry periods. Crop rotations should keep close-growing, soil-improving crops in the cropping system three-fourths of the time. Seedbed preparation should include bedding. Crops respond to fertilizer and lime.

The soil is poorly suited to citrus unless very intensive management practices are used. A water-control system is needed to maintain the high water table at a depth of about 4 feet. The trees should be planted on beds to help lower the effective depth of the water table, and a plant cover should be 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. Regular applications of fertilizer and lime are needed, and grazing should be managed to maintain healthy plants.

The potential productivity for pine trees is moderate. The equipment use limitation, seedling mortality, and plant competition are the main concerns in management. South Florida slash pine is a recommended tree to plant. A simple water-control system is needed to remove excess surface water.

The high water table and the sandy texture are severe limitations affecting urban development and recreational uses. A water-control system is required. Fill material that is 3 feet or more thick or ditches that remove excess surface water are also required. Septic tank absorption fields do not function adequately unless the water table is lowered or fill material is added. The sandy texture and the high water table are severe limitations affecting sites for sanitary landfills. Because cutbanks caving is a hazard in shallow excavations, shoring of side slopes is required.

The capability subclass is IVw.

8—Malabar sand. This poorly drained soil is in sloughs on flatwoods. Areas of this soil are elongated and irregular in shape and range from 10 to 500 acres. Slopes are less than 2 percent.

Typically, this soil has a dark grayish brown sand surface layer about 5 inches thick. The subsurface layer to a depth of about 15 inches is light brownish gray sand. The subsoil extends to a depth of about 65 inches. In sequence downward, it is very pale brown sand, brownish yellow sand, light yellowish brown sand, light brownish gray sand, gray sandy clay loam, and gray sandy loam. The substratum to a depth of 80 inches is gray, stratified sand and loamy sand.

Included with this soil in mapping are small areas of Basinger, Boca, Holopaw, Oldsmar, Pineda, Riviera, and Valkaria soils. Also included are a few areas of soils that have weathered discontinuous limestone or carbonate gravel and cobbles at a depth of 60 to 80 inches. The included soils make up less than 25 percent of the map unit.

Under natural conditions this Malabar soil has a high water table within 10 inches of the surface for 2 to 6 months in most years. Permeability is rapid in the surface layer, subsurface layer, and sandy part of the subsoil; slow or very slow in the loamy part of the subsoil; and moderately rapid or rapid in the substratum. The available water capacity is moderate in the loamy part of the subsoil and low or very low in the other layers. The organic matter content and natural fertility are low.

Most areas of this soil are in natural vegetation or pasture. Some areas are used for citrus. Natural vegetation is mainly grasses and scattered slash pine and clumps of saw palmetto. Blue maidencane also grows well.

Under natural conditions this soil is poorly suited to cultivated crops because of the wetness. If water control is adequate, however, it is suited to some vegetable crops. A water-control system must remove excess surface water rapidly and provide for irrigation. Good management practices include crop rotations that keep close-growing cover crops in the cropping system three-fourths of the time. Growing cover crops and maintaining crop residue help to control erosion. Seedbed preparation should include bedding of the rows. Fertilizer and lime should be applied according to the needs of the crop.

Under natural conditions this soil is poorly suited to citrus. It is suitable if a water-control system is used to maintain the high water table at a depth of about 4 to 6 feet and to provide subsurface irrigation. The trees need to be planted on beds, and a close-growing plant cover should be maintained between the rows. Regular applications of fertilizer 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 periods of heavy rainfall. Regular applications of fertilizer and lime are needed, and grazing should be controlled to prevent overgrazing and weakening of the plants.

The potential productivity for pine trees is moderately high. The equipment use limitation and seedling mortality are the main concerns in management. South Florida slash pine is the preferred tree to plant.

The sandy texture and the high water table are severe limitations affecting urban and recreational uses. A water-control system is required. Fill material that is 3 feet or more thick or ditches that remove excess surface water rapidly are also required. Septic tank absorption fields do not function adequately unless the water table is lowered or fill material is added. The sandy texture and the high water table are severe limitations affecting sites for sanitary landfills. Because cutbanks caving is a hazard in shallow excavations, shoring of side slopes is required.

The capability subclass is IVw.

9—Riviera fine sand. This poorly drained soil is in sloughs on broad flatwoods. Areas of this soil are irregular and elongated in shape and range from 5 to 500 acres. Slopes are less than 2 percent.

Typically, this soil has a very dark gray fine sand surface layer about 4 inches thick. The subsurface layer to a depth of about 26 inches is fine sand. It is gray in the upper part and light gray in the lower part. The subsoil to a depth of about 32 inches is gray sandy loam that has vertical intrusions of light gray sand. It is gray sandy clay loam to a depth of about 50 inches and gray sandy loam to a depth of about 70 inches. The substratum to a depth of 80 inches or more is gray sandy clay loam that has a few calcium carbonate fragments.

Included with this soil in mapping are small areas of Boca, Gentry, Holopaw, Malabar, Pineda, and Winder soils. Also included in areas near the Caloosahatchee River are soils that are similar to the Riviera soil but are moderately well drained. The included soils make up less than 20 percent of the map unit.

Under natural conditions this Riviera soil has a high water table within 10 inches of the surface for 2 to 4 months in most years. During most of the remainder of the year, the water table is between depths of 10 and 30 inches, and for short periods in dry seasons, it recedes below a depth of 40 inches. Following periods of prolonged, heavy rainfall, the water table in most areas rises above the surface, resulting in sheet flow for a week or more. Permeability is rapid in the surface and subsurface layers, slow in the subsoil, and moderate or moderately rapid in the substratum. Natural fertility and organic matter content are low. The available water capacity is low in the surface and subsurface layers and moderate in the subsoil.

Most areas of this soil are in natural vegetation, which includes South Florida slash pine, cabbage palm, waxmyrtle, blue maidencane, broomsedge bluestem, pineland threeawn, cordgrass, panicums, and a variety of sedges.

Under natural conditions this soil is not suited to cultivated crops because of the wetness. If a water-control system is used, it is well suited to many fruit and vegetable crops. The system should remove excess water rapidly and provide subsurface irrigation in dry periods. Good soil management includes crop rotations that keep close-growing cover crops in the cropping system at least two-thirds of the time and use of crop residue to protect the soil from erosion. Good seedbed preparation includes bedding. Fertilizer should be applied according to the needs of the crop.

If water control is adequate, this soil is suited to citrus trees. The water-control system needs to maintain good drainage to a depth of about 4 to 6 feet. Planting citrus trees on beds provides good surface drainage. A good close-growing plant cover is needed between the trees to protect the soil from erosion when the trees are young. Regular applications of fertilizer and occasional applications of lime are needed.

This soil is well suited to pasture and hay crops of pangolagrass, bahiagrass, and clover. Excellent pastures of grass or grass-clover mixtures can be grown with good management. A simple drainage system is needed to remove the excess surface water in wet periods. Fertilizer and controlled grazing are needed for highest yields.

The potential productivity for pine trees is moderately high, but a water-control system is needed if the potential productivity is to be realized. The equipment use limitation, plant competition, and seedling mortality are the main concerns in management. South Florida slash pine is a recommended tree to plant.

The high water table is a severe limitation affecting most urban and recreational uses.

The capability subclass is IIIw.

10—Pineda fine sand. This poorly drained soil is in sloughs and on low flats in flatwood areas. Areas of this soil are irregular in shape and range from 5 to 500 acres. Slopes are smooth to slightly convex and are 0 to 2 percent.

Typically, this soil has a black fine sand surface layer about 2 inches thick. The subsurface layer is gray and light gray fine sand to a depth of about 14 inches. The subsoil to a depth of about 30 inches is fine sand. It is yellowish brown in the upper part and light yellowish brown in the lower part. To a depth of about 50 inches, it is gray sandy clay loam. The substratum is gray sandy loam to a depth of about 60 inches and gray sandy clay loam to a depth of about 75 inches. To a depth of 80 inches, it is white sand that has about 50 percent calcium carbonate nodules.

Included with this soil in mapping are small areas of Boca, Malabar, Riviera, Wabasso, and Winder soils. In some places discontinuous limestone is at a depth of 60 to 80 inches. The included soils make up about 5 to 25 percent of the map unit.

Under natural conditions this soil has a high water table within 10 inches of the surface for up to 6 months in most years and between depths of 10 and 40 inches for most of the remaining time. Some areas are covered with shallow water for less than 1 month, and sheet flow can occur. Permeability is rapid in the surface layer, subsurface layer, and sandy part of the subsoil and slow or very slow in the loamy part. The available water capacity is low in the surface layer, subsurface layer,

Figure 5.—Most areas of Pineda fine sand are used as native rangeland.

and sandy part of the subsoil and moderate in the loamy part of the subsoil and in the substratum. Natural fertility and the organic matter content are low.

Most areas of this soil are used for native range (fig. 5). Some areas are used for pasture, citrus, or vegetable crops. Natural vegetation is slash pine, scattered saw palmetto, cabbage palm, waxmyrtle, blue maidencane, broomsedge bluestem, pineland threeawn, and many grasses.

Under natural conditions this soil is poorly suited to crops. If water control is adequate, it is well suited to vegetable crops. The water-control system must remove excess surface water and provide subsurface irrigation. Good management includes crop rotations that keep close-growing cover crops in the cropping system at least two-thirds of the time. Using cover crops and maintaining crop residue help to control erosion. Seedbed preparation should include bedding. Fertilizer should be applied according to the needs of the crop.

Under natural conditions this soil is poorly suited to citrus, but if water control is adequate, it is well suited. A water-control system needs to maintain the high water table at a depth of about 4 to 6 feet. Planting trees on beds lowers the effective depth of the water table. A close-growing plant cover is needed between the tree rows to protect the soil from erosion. Regular applications of fertilizer are needed.

This soil is suited to pasture and hay crops of pangolagrass, bahiagrass, and clover. Excellent pastures of grass or grass-clover mixtures can be grown if properly managed. A water-control system is needed to remove excess surface water during wet periods. Lime, fertilizer, and controlled grazing are needed for highest yields.

The potential productivity is moderate for pine trees. A water-control system is needed for highest yields. The equipment use limitation and seedling mortality are the main concerns in management. South Florida slash pine is a recommended tree to plant.

The high water table is a severe limitation affecting urban and recreational uses.

The capability subclass is IIIw.

12—Winder fine sand. This poorly drained soil is in broad, low sloughs on flatwoods. Areas of this soil are irregular in shape and range from 5 to 500 acres or more. Slopes are less than 2 percent.

Typically, this soil has a dark gray fine sand surface layer about 4 inches thick. The subsurface layer to a depth of about 14 inches is light gray fine sand. The subsoil extends to a depth of about 47 inches. In sequence downward, it is sandy loam that has tongues or vertical intrusions of fine sand from the subsurface layer, gray sandy clay loam that has many brownish yellow mottles, and gray sandy loam. The substratum to a depth of 80 inches is stratified gray sandy loam and sandy clay loam that contain calcium carbonate nodules.

Included with this soil in mapping are small areas of Boca, Gator, Gentry, Hallandale, Pineda, Riviera, and Wabasso soils. The included soils make up less than 20 percent of the map unit.

Under natural conditions this Winder soil has a high water table within 10 inches of the surface for 6 months in most years. Permeability is slow in the subsoil and rapid in the surface and subsurface layers and substratum. The available water capacity is low in the surface and subsurface layers and moderate in the subsoil. The organic matter content and natural fertility are low.

Most areas of this soil are in native range or improved pasture. Blue maidencane, a desirable forage species, is one of the more abundant native grasses. Overgrazing and excessive drainage result in the replacement of blue maidencane by less palatable sedges, rushes, and grasses, such as Florida threeawn, pineland threeawn, broomsedge bluestem, and sand cordgrass.

Under natural conditions this soil is poorly suited to cultivated crops because of the wetness. If water control is adequate, it is suited to many fruit and vegetable crops. The water-control system must remove excess water and provide subsurface irrigation. Crop residue should be used to protect the soil from erosion. Seedbed preparation should include bedding. Crops respond to fertilizer.

If water control is adequate, this soil is well suited to citrus. A water-control system needs to maintain good drainage to a depth of about 4 to 6 feet. Planting citrus trees on beds lowers the effective depth of the water table. A good close-growing plant cover should be maintained between the trees to protect the soil from blowing in dry weather and from water erosion during rains. Regular applications of fertilizer are needed.

This soil is well suited to pasture grasses, such as pangolagrass, bahiagrass, and clover. Good pastures of grass or grass-clover mixtures can be grown if properly managed. Controlled grazing and regular applications of fertilizer are needed for highest yields. Water-control measures are needed to remove excess surface water after periods of heavy rainfall.

If surface drainage is adequate, this soil has high potential for production of pine trees. Ditching is needed to remove surface water, and the trees should be planted on beds. The equipment use limitation, seedling mortality, and plant competition are the main concerns in management. South Florida slash pine is a recommended tree to plant.

This soil is poorly suited to urban and recreational uses because of the high water table and the sandy texture. A water-control system is required. Fill material that is 3 feet or more thick or ditches that remove excess surface water are also required. Septic tank absorption fields do not function adequately unless the water table is lowered or fill material is added. The sandy texture and the high water table are severe limitations affecting sites for sanitary landfills. Because cutbanks caving is a hazard in shallow excavations, shoring of side slopes is required.

The capability subclass is IIIw.

13—Gentry fine sand, depressional. This very poorly drained soil is in marshes, swamps, and depressions. Areas of this soil range from about 5 to 50 acres. The surface is slightly concave, and slopes are less than 2 percent.

Typically, this soil has a fine sand surface layer about 22 inches thick. It is black in the upper part and very dark gray in the lower part. The subsoil to a depth of 75 inches is sandy clay loam. It is dark gray in the upper part and gray sandy loam in the lower part. The substratum is gray sandy loam to a depth of 80 inches.

Included with this soil in mapping are small areas of Chobee, Delray, Gator, and Winder soils. Also included are soils that have a light colored subsurface layer. The included soils make up less than 20 percent of the map unit.

This Gentry soil is ponded for more than 6 months in most years. Permeability is rapid in the surface and subsurface layers, slow in the subsoil, and moderate in the substratum. The available water capacity is moderate, and natural fertility is medium.

Most areas of this soil are in natural vegetation, mainly maidencane, fireflags, pickerelweed, or cypress and hardwood trees. Some areas of maidencane or blue maidencane are used for grazing. Water for livestock and other animals is available in most areas, and many areas have high potential as habitat for wildlife.

In its natural condition this soil is poorly suited to cultivated crops because of the wetness. The soil generally is at the lowest landscape position and is difficult to drain; however, if water control is adequate, it is well suited to many vegetable crops. Seedbed preparation should include bedding. Crops respond to fertilizer.

Unless water control is intensive, this soil is not suited to citrus. If water control is adequate and trees are planted on beds, it is moderately suited to citrus. The water-control system should maintain the high water table at a depth of about 4 to 6 feet. Regular applications of fertilizer are needed.

In its natural condition this soil is too wet for most pasture grasses. If water control is adequate, improved grasses and legumes can be grown.

This soil generally is not suited to pine trees because of the ponding. In some areas it is suited to cypress production through natural regeneration.

The ponding is a severe limitation affecting urban and recreational uses.

The capability subclass is VIIw.

14—Wabasso sand, limestone substratum. This poorly drained soil is on flatwoods. It has discontinuous beds of fractured limestone at a depth of 45 to 80 inches. Areas of this soil are elongated or irregular in shape and range from 5 to more than 1,000 acres. Slopes are 0 to 2 percent.

Typically, this soil has a very dark gray sand surface layer about 6 inches thick. The subsurface layer to a depth of about 25 inches is sand that is gray in the upper part and light gray in the lower part. The subsoil extends to a depth of about 45 inches. In sequence downward, it is dark reddish brown sand that is well coated with organic matter and brown sand and dark grayish brown sandy clay loam that has yellowish mottles. The subsoil is underlain by fractured angular limestone.

Included with this soil in mapping are small areas of Boca, Gator, Gentry, Hallandale, Pineda, and Riviera soils. Also included are soils that have an accumulation of secondary carbonates. The included soils make up 10 to 25 percent of the map unit.

Under natural conditions this Wabasso soil has a high water table within 10 inches of the surface for 2 to 4 months in most years. In dry periods the high water table is at a depth of more than 40 inches. 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. The available water capacity is low in the sandy layers. The soil is droughty during dry periods. The organic matter content and natural fertility are low.

In areas where water control is adequate and good management practices are used, this soil is used for specialty crops and improved pasture. In most places the limestone bedrock is too deep to interfere with common agricultural practices.

About half the acreage of this soil remains in native vegetation, mainly an open forest of slash pine and a thick understory of saw palmetto. Scattered cabbage palm and live oak are common. Pineland threeawn is the most abundant native grass. Other important range grasses are creeping bluestem, chalky bluestem, lopsided indiangrass, and panicums.

Under natural conditions this soil is poorly suited to cultivated crops because of the wetness. If water control is adequate and soil fertility is improved, it can produce a variety of vegetable crops. The water-control system should remove excess water during wet periods and provide water during dry periods. Crops respond to fertilizer. Crop residue should be used to protect the soil from erosion. Seedbed preparation should include bedding.

This soil is poorly suited to citrus unless intensive management practices are used. A water-control system is needed to maintain the high water table at a depth of about 4 to 6 feet. Limestone can restrict the construction of deep ditches and canals. Trees should be planted on beds to lower the effective depth of the water table, and fertilizer and lime are needed.

This soil is well suited to pasture; however, water-control measures are needed to remove excess surface water after periods of heavy rainfall. Fertilizer and lime are needed, and grazing should be controlled.

The potential productivity for pine trees is moderately high. Seedling mortality and the equipment use limitation are moderate. South Florida slash pine is a recommended tree to plant.

This soil is poorly suited to urban development and recreational uses because of the high water table and the sandy texture. A water-control system is required. Fill material that is 3 feet or more thick or ditches that remove excess surface water rapidly are also required. Septic tank absorption fields do not function adequately unless the water table is lowered or fill material is added. The sandy texture and the high water table are severe limitations affecting sites for sanitary landfills. Because cutbanks caving is a hazard in shallow excavations, shoring of side slopes is required.

The capability subclass is IIIw.

15—Myakka sand. This poorly drained soil is on broad flatwoods. Areas of this soil are irregular in shape and range from 5 to more than 500 acres. Slopes are less than 2 percent.

Typically, this soil has a very dark gray sand surface layer about 6 inches thick. The subsurface layer to a depth of about 26 inches is gray sand. The subsoil to a depth of about 60 inches is sand that is stained with organic matter. It is black in the upper part and dark brown in the lower part. The substratum to a depth of 80 inches is grayish brown sand.

Included with this soil in mapping are small areas of Basinger, Immokalee, Okeelanta, Oldsmar, Pompano, and Valkaria soils. Also included are soils that have discontinuous weathered limestone or carbonate gravel and cobbles at a depth of more than 60 inches. The included soils make up 10 to 25 percent of the map unit.

Under natural conditions this Myakka soil has a high water table within 10 inches of the surface for 1 to 5 months and at a depth of more than 40 inches during dry periods. Permeability is rapid in the surface layer, subsurface layer, and substratum and moderate or moderately rapid in the subsoil. The available water capacity is moderate in the subsoil and low in the other layers. The organic matter content and natural fertility are low.

Most areas of this soil are native range or improved pasture. Some areas are used for vegetables or citrus. Natural vegetation consists of South Florida slash pine, saw palmetto, and pineland threeawn. Important range grasses are chalky bluestem, creeping bluestem, and lopsided indiangrass.

Under natural conditions this soil is poorly suited to cultivated crops because of the wetness. The number of suitable crops is limited unless intensive water-control measures are used. If a water-control system is used, the soil is suited to vegetable crops. The system should remove excess water and provide irrigation. Good management, in addition to water control, includes crop rotations that keep close-growing, soil-improving crops in the cropping system at least two-thirds of the time. Cover crops and crop residue should be used to protect the soil from erosion. Seedbed preparation should include bedding. Crops respond to fertilizer and lime.

This soil is poorly suited to citrus trees because of the wetness; however, if this soil is adequately drained and well managed, citrus can be grown. A water-control system needs to maintain the high water table at a depth of about 4 to 6 feet. Trees should be planted on beds to lower the effective depth of the water table. A close-growing cover crop is needed between the tree rows to protect the soil from blowing when dry and from water erosion during periods of heavy rainfall. Lime, fertilizer, and irrigation during periods of low rainfall are needed to maximize yields.

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 periods of heavy rainfall. Regular applications of fertilizer and lime are needed, and grazing should be controlled to maintain healthy plants.

Potential productivity for pine trees is moderate. The equipment use limitation and seedling mortality are the main concerns in management. South Florida slash pine is a recommended tree to plant.

The high water table and the sandy texture are severe limitations for urban development and recreational uses. A water-control system is required if this soil is developed for urban or recreational uses. Fill material that is 3 feet or more thick or ditches that remove excess surface water are also required. Septic tank absorption fields do not function adequately unless the water table is lowered or fill material is added. The sandy texture and the high water table are severe limitations affecting sites for sanitary landfills. Because cutbanks caving is a hazard in shallow excavations, shoring of side slopes is required.

The capability subclass is IVw.

17—Basinger sand. This poorly drained soil is in sloughs and poorly defined drainageways. Areas of this soil are elongated or oval and range from 5 to 300 acres. Slopes are less than 2 percent.

Typically, this soil has a very dark gray sand surface layer about 6 inches thick. The subsurface layer to a depth of about 25 inches is light brownish gray sand.

The subsoil to a depth of about 50 inches is dark yellowish brown sand. The substratum to a depth of 80 inches is light brownish gray sand.

Included with this soil in mapping are small areas of Holopaw, Immokalee, Malabar, Myakka, Pompano, and Valkaria soils. Also included are small areas of Basinger soils that are ponded and a few areas of soils that have limestone or loamy layers, or both, at a depth of 60 to 80 inches. The included soils make up 10 to 25 percent of the map unit.

Under natural conditions this Basinger soil has a high water table within 10 inches of the surface for 2 to 6 months in most years and at a depth of less than 30 inches throughout the remainder of the year except during long dry periods. Permeability is very rapid, and the available water capacity is low or very low. The organic matter content is moderately low or low, and natural fertility is low.

Most areas of this soil are used as native range. Some areas are in improved pasture. Natural vegetation is mainly grasses, rushes, and sedges. Blue maidencane is the most common range grass.

In its natural condition this soil is poorly suited to cultivated crops because of the wetness. If water control is adequate, it is suited to many fruit and vegetable crops. The water-control system must remove excess surface water and provide subsurface irrigation. Seedbed preparation should include bedding. Crops respond to fertilizer.

This soil is poorly suited to citrus unless intensive water-control measures are used. The water-control system should maintain the high water table at a depth of about 4 feet. The trees should be planted on beds, and lime and fertilizer should be applied as needed.

Where suitable drainage outlets are available, this soil is well suited to pasture. Water control is needed to remove surface water after periods of heavy rainfall. If drainage is excessive, the soil becomes droughty during dry periods. Regular applications of fertilizer and lime are needed because of the rapid leaching through the soil.

Potential productivity is moderate for pine trees if surface drainage is adequate. Bedding and shallow ditches are required in most areas. The equipment use limitation, seedling mortality, plant competition, the erosion hazard, and windthrow are concerns in management. Slash pine is the best tree to plant.

A water-control system is required if this soil is developed for urban or recreational uses. Fill material that is 3 feet or more thick or ditches that remove excess surface water are required. Septic tank absorption fields do not function adequately unless the water table is lowered or fill material is added. The sandy texture and the high water table are severe limitations affecting sites for sanitary landfills. Because cutbanks caving is a hazard in shallow excavations, shoring of side slopes is required.

The capability subclass is IVw.

18—Pompano sand. This poorly drained soil is in sloughs and on broad, low flats. Areas of this soil are elongated or irregular in shape and range from 5 to 500 acres. Slopes are less than 2 percent.

Typically, this soil has a dark gray sand surface layer about 6 inches thick. The underlying material to a depth of about 80 inches is sand. It is light gray in the upper part and light brownish gray in the lower part.

Included with this soil in mapping are small areas of Basinger, Hallandale, Holopaw, Immokalee, and Valkaria soils. Also included are areas of soils that have discontinuous limestone at a depth of 60 to 80 inches. The included soils make up 15 to 25 percent of the map unit.

Under natural conditions this Pompano soil has a high water table within 10 inches of the surface for 2 to 6 months and within a depth of 30 inches for 9 months or more in most years. After periods of heavy rainfall, many areas have shallow water on the surface for a few days. The organic matter content and natural fertility are low. The available water capacity is very low. Permeability is very rapid.

Most areas of this soil are in natural vegetation or improved pasture. Natural vegetation is mostly grass and grasslike rushes and sedges. Scattered slash pine and cabbage palm are in several areas. Blue maidencane is the common forage grass.

Under natural conditions this soil is poorly suited to cultivated crops because of the wetness and low fertility. The number of suitable crops is limited unless very intensive management practices are followed. With good water-control and soil-improving measures, the soil is suited to many vegetable crops. The water-control system needs to remove excess water in wet periods and provide water through subsurface irrigation in dry periods. Row crops should be rotated with close-growing, soil-improving crops that remain on the land three-fourths of the time. All crop residue should be plowed under. Seedbed preparation should include bedding. Crops respond to fertilizer.

Under natural conditions this soil is poorly suited to citrus, but citrus can be grown if a water-control system is installed that maintains the high water table at a depth of about 4 to 6 feet. The trees should be planted on beds to lower the effective depth of the water table, and a plant cover should be maintained between the trees. Fertilizer and lime are needed.

If adequate surface drainage is available, this soil is moderately suited to pasture. The high water table should be maintained near the surface because the soil is droughty during dry periods. Fertilizer and lime leach easily, and regular applications of both are needed.

The potential productivity for pine trees is moderate, but excess surface water must be removed before the potential can be reached. The equipment use limitation and seedling mortality are the main concerns in management. South Florida slash pine is the best tree to plant.

The high water table and the sandy texture are severe limitations affecting urban and recreational uses. A water-control system is required. Fill material that is 3 feet or more thick or ditches that remove excess surface water are required. Septic tank absorption fields do not function adequately unless the water table is lowered or fill material is added. The sandy texture and the high water table are severe limitations affecting sites for sanitary landfills. Because cutbanks caving is a hazard in shallow excavations, shoring of side slopes is required.

The capability subclass is IVw.

19—Gator muck. This very poorly drained organic soil is in marshes and swamps. Areas of this soil are oval or elongated and range from 5 to 1,200 acres. The surface is slightly concave, and slopes are less than 1 percent.

Typically, this soil has a black muck surface layer about 32 inches thick. The underlying material is black sandy loam to a depth of about 35 inches. To a depth of 51 inches, it is gray sandy clay loam that contains carbonate nodules.

Included with this soil in mapping are small areas of Gentry, Okeelanta, Pahokee, and Terra Ceia soils and some soils that have a muck surface layer that is less than 16 inches thick. The included soils make up less than 25 percent of the map unit.

Under natural conditions this Gator soil is saturated except during prolonged droughts and is ponded by up to a foot of water for at least 9 months during most years. Permeability is rapid in the organic material and moderate in the loamy material. The available water capacity is very high in the organic material and moderate in the loamy material. Natural fertility is medium.

Most areas of this soil remain in their natural condition, mostly freshwater marshes with sawgrass (fig. 6), maidencane, sand cordgrass, pickerelweed, and fireflags. Some areas are cypress swamps. Most areas are useful for water retention and as habitat for wildlife. Where maidencane is abundant, the areas provide good grazing for livestock.

Under natural conditions this soil is poorly suited to cultivated crops because of the wetness, but with adequate water control it is well suited to most vegetable crops and sugarcane. A well designed and maintained water-control system is needed. The system should remove excess water when the soil is cultivated and keep the soil saturated with water at other times. Crops respond to fertilizer. Water-tolerant cover crops should be kept on the land when it is not in use for row crops. Crop residue should be left on the surface or plowed under.

Most improved grasses and clovers grow well if water control is adequate. High yields of pangolagrass, bahiagrass, and white clover can be obtained. The water-control system should maintain the high water table near the surface to prevent subsidence of the muck. Fertilizer that is high in potash, phosphorus, and minor elements is needed. Grazing should be controlled to permit maximum yields.

This soil is not suited to citrus or pine trees.

Ponding and the high content of organic matter are severe limitations affecting urban and recreational uses.

The capability subclass is VIIw.

20—Okeelanta muck. This very poorly drained soil is in depressions and broad freshwater marshes. Areas of this soil are irregular in shape and range from 5 to 500 acres. The surface is slightly concave, and slopes are less than 2 percent.

Typically, this soil has a black muck surface layer about 35 inches thick. The underlying material to a depth of about 60 inches is sand. It is very dark grayish brown in the upper part and light brownish gray in the lower part.

Included with this soil in mapping are small areas of Basinger, Delray, Gator, Holopaw, Pahokee, Terra Ceia, and Winder soils. Also included are areas of soils that have discontinuous weathered limestone, a loamy layer, or calcareous gravel and cobbles at a depth of 50 to 80 inches. The included soils make up less than 25 percent of the map unit.

Under natural conditions this Okeelanta soil is ponded for 6 to 12 months in most years. The high water table is rarely at a depth of more than 10 inches. Internal drainage is slow, but response to artificial drainage is rapid. The available water capacity is very high in the organic material. Permeability is rapid. Natural fertility is medium, and the soil responds well to

Figure 6.—Sawgrass grows on Gator muck in this freshwater marsh.

fertilizer. When drained, the soil subsides rapidly.

Most areas of this soil are in marshes and are used as native range. They are also important for water retention and wildlife habitat. Areas near Clewiston are drained and used for sugarcane. Natural vegetation consists of grasses, sedges, rushes, flags, smartweed, and pickerelweed. Maidencane is abundant in the marshes.

Under natural conditions this soil is not suited to cultivated crops. If water control is adequate, the soil is well suited to many vegetable crops and sugarcane. The water-control system needs to remove excess water while crops are growing and keep the soil saturated with water at all other times. Fertilizer containing phosphate, potash, and minor elements is needed. Lime is needed in some areas. Cover crops should be maintained on the soil when row crops are not being grown. Crop residue and cover crops help to control erosion.

Most improved grasses and clovers grow well on this soil if water control is adequate. High yields of pangolagrass, bahiagrass, and white clover can be obtained. Water control should maintain the water table near the surface to prevent excessive oxidation of the muck. Fertilizer that is high in potash, phosphorus, and minor elements is needed. Grazing should be controlled to permit maximum yields.

This soil is not suited to citrus or pine trees.

The high content of organic matter and the high water table are severe limitations affecting urban and recreational uses.

The capability subclass is IIIw.

21—Holopaw sand. This poorly drained soil is in sloughs and low areas on flatwoods. Areas of this soil are oval or elongated and range from 5 to 500 acres. The surface is slightly concave, and slopes are less than 2 percent.

Typically, this soil has a dark gray sand surface layer about 5 inches thick. The subsurface layer is sand to a depth of about 48 inches. It is light brownish gray in the upper part, light gray in the next part, and light brownish gray in the lower part. The subsoil to a depth of about 65 inches is grayish brown sandy clay loam. The substratum to a depth of 80 inches is grayish brown sandy loam that has many carbonate nodules.

Included with this soil in mapping are small areas of Basinger, Boca, Gentry, Malabar, Oldsmar, Pineda, and Riviera soils. Also included are soils that have discontinuous limestone bedrock at a depth of 60 to 80 inches. The included soils make up as much as 25 percent of the map unit.

Under natural conditions this Holopaw soil has a high water table within 10 inches of the surface for 6 months in most years. Most areas have a thin layer of water on the surface for several days following periods of heavy rainfall and are subject to sheet flow. Permeability is rapid in the surface and subsurface layers and moderate or moderately rapid in the subsoil. The organic matter content and natural fertility are low. The available water capacity is low in the surface and subsurface layers and moderate in the subsoil.

Most areas of this soil are used as rangeland. Some areas are used for improved pasture. Natural vegetation is mostly grass and a few slash pine. Blue maidencane, a desirable grass for range management, is common, but when it is overgrazed, less palatable grasses, such as sand cordgrass, pineland threeawn, and broomsedge bluestem, generally are more abundant.

Under natural conditions this soil is poorly suited to cultivated crops because of the wetness and the thick, sandy surface layer. If intensive management practices are used to control water and improve soil fertility, a variety of crops can be grown. The water-control system should provide for irrigation during dry periods and removal of water during wet periods. Seedbed preparation should include bedding. Crops respond to fertilizer.

Under natural conditions this soil is poorly suited to citrus. Citrus trees can be grown if a water-control system maintains the high water table at a depth of about 4 feet. The trees should be planted on beds. Fertilizer and lime should be added as needed.

This soil is well suited to improved pasture if excess surface water is removed; however, because the soil is sandy and the available water capacity is low, the high water table should be maintained near the surface. Fertilizer and lime should be added when soil tests indicate they are needed.

This soil has moderately high potential productivity for pine trees; however, a water-control system is needed to attain this potential. The equipment use limitation and seedling mortality are the main concerns in management. South Florida slash pine is the best tree to plant.

This soil is poorly suited to urban and recreational uses because of the high water table and the sandy texture. A water-control system is required. Fill material that is 3 feet or more thick or ditches that remove excess surface water are also required. Septic tank absorption fields do not function adequately unless the water table is lowered or fill material is added. The sandy texture and the high water table are severe limitations affecting sites for sanitary landfills. Because cutbanks caving is a hazard in shallow excavations, shoring of side slopes is required.

The capability subclass is IVw.

22—Valkaria sand. This poorly drained soil is in sloughs on broad flatwoods. Areas of this soil generally are oval or elongated and range from 5 to 500 acres. Slopes are less than 2 percent.

Typically, this soil has a sand surface layer about 10 inches thick. It is very dark gray in the upper part and dark grayish brown in the lower part. The subsurface layer to a depth of about 15 inches is light gray sand. The subsoil to a depth of about 45 inches is sand. It is very pale brown in the upper part, brownish yellow in the next part, and brown in the lower part. The substratum is light brownish gray sand to a depth of 80 inches.

Included with this soil in mapping are small areas of Basinger, Immokalee, Malabar, Myakka, Pineda, and Pompano soils. The included soils make up 10 to 25 percent of the map unit.

Under natural conditions this Valkaria soil has a high water table within 10 inches of the surface for 6 months in most years. Water stands on the surface for a few days following extended periods of heavy rainfall, and the soil is subject to sheet flow. The high water table is rarely at a depth of more than 30 inches. The organic matter content and natural fertility are low. The available water capacity is low in the surface layer, subsurface layer, and subsoil and very low in the substratum. Permeability is rapid.

Most areas of this soil are used as rangeland. Some areas are used for improved pasture, vegetables, or citrus. Natural vegetation consists of grasses, sedges, and rushes. Blue maidencane, a desirable range grass, grows well in areas that are properly managed.

This soil is poorly suited to cultivated crops because of the wetness. If water is controlled and soil fertility is improved, the soil is suited to many vegetable crops. The water-control system must provide irrigation during dry periods and remove excess water during wet periods. Seedbed preparation should include bedding. Crops respond to fertilizer.

Citrus can be grown if intensive management practices are used. Water control is necessary. The water-control system should maintain the high water table at a depth of about 4 to 6 feet. The trees should be planted on beds to help lower the effective depth of the water table.

If adequate surface drainage is available, this soil is well suited to pasture. The high water table should be maintained near the surface because the soil is droughty during dry periods. Fertilizer and lime leach easily, and regular applications of both are needed.

Potential productivity is moderate for pine trees if adequate surface drainage is provided. Trees should be planted on beds. The equipment use limitation, seedling mortality, and plant competition are the main concerns in management. South Florida slash pine is a recommended tree to plant.

This soil is poorly suited to urban and recreational uses because of the high water table and the sandy texture. A water-control system is required. Fill material that is 3 feet or more thick or ditches that remove excess surface water rapidly are also required. Septic tank absorption fields do not function adequately unless the water table is lowered or fill material is added. The sandy texture and the high water table are severe limitations affecting sites for sanitary landfills. Because cutbanks caving is a hazard in shallow excavations, shoring of side slopes is required.

The capability subclass is IVw.

23—Hallandale sand. This poorly drained soil is on flatwoods. Areas of this soil are elongated or irregular in shape and range from 5 to 50 acres. Slopes are less than 2 percent.

Typically, this soil has a dark gray sand surface layer about 4 inches thick. The underlying material to a depth of about 16 inches is brown sand. It is underlain by hard, fractured limestone that has many solution basins (fig. 7).

Included with this soil in mapping are small areas of Boca, Jupiter, Margate, Pineda, Riviera, and Wabasso soils. The included soils make up less than 20 percent of the map unit.

Under natural conditions this Hallandale soil has a high water table within 10 inches of the surface for 6 months in most years. The root zone is restricted by the shallow depth to bedrock and the seasonal high water table. The available water capacity is low. Permeability is moderate or moderately rapid. The organic matter content and natural fertility are low.

Most areas of this soil are in pasture or native range. Natural vegetation consists of scattered slash pine, cabbage palm, and clumps of saw palmetto with a ground cover of grasses. In many areas the most abundant grass is pineland threeawn. The more desirable native range grasses are blue maidencane, chalky bluestem, and panicums.

This soil is poorly suited to cultivated crops because of the wetness and the shallow depth to bedrock. A water-control system that removes excess surface water and provides for irrigation is needed; however, the shallow depth to bedrock interferes with the construction of such a system.

This soil is poorly suited to citrus because of the wetness and the shallow depth to bedrock. A water-control system that maintains the high water table at a depth of about 4 feet is needed; however, the shallow depth to bedrock interferes with the construction of such a system. It also interferes with the planting of citrus trees.

This soil is well suited to pasture if excess surface water is removed. Regular applications of fertilizer are needed.

Potential productivity for pine trees is moderate. The equipment use limitation and seedling mortality are moderate. South Florida slash pine is a recommended tree to plant.

The shallow depth to bedrock and the high water table are severe limitations affecting urban and recreational uses.

The capability subclass is IVw.

24—Pomello fine sand, 0 to 5 percent slopes. This moderately well drained soil is on low, sandy ridges on flatwoods. Areas range from 5 to 40 acres.

Typically, this soil has a gray fine sand surface layer about 4 inches thick. The subsurface layer to a depth of about 40 inches is white fine sand. The subsoil to a depth of about 65 inches is fine sand that is stained with organic matter. It is dark reddish brown in the upper part and dark brown in the lower part. The substratum is very pale brown fine sand to a depth of 80 inches or more.

Included with this soil in mapping are small areas of Basinger, Immokalee, and Oldsmar soils. Also included are areas of soils that have a weakly cemented to strongly cemented subsoil. The included soils generally make up about 5 to 25 percent of the map unit.

Under natural conditions this Pomello soil has a high

Figure 7.—Shallow limestone is exposed in a drainage ditch in Hallandale sand. The limestone generally is less than 3 feet thick and has fractures and solution basins.

water table at a depth of 24 to 40 inches for about 1 to 4 months in most years. For the remainder of the year, the high water table generally is at a depth of 40 to 60 inches. Permeability is moderately rapid in the subsoil and rapid or very rapid in the other layers. The available water capacity is low in the subsoil and very low in the other layers. The organic matter content and natural fertility are low.

Most areas of this soil are in natural vegetation, but they have limited use for native range. Natural vegetation consists mostly of scattered scrub oak and slash pine with a moderately thick undergrowth of saw palmetto.

This soil is not suited to most crops commonly grown, and it is poorly suited to citrus. Only fair yields can be obtained even if good management practices are used. For highest yields, sprinkler irrigation is recommended and lime and fertilizer are needed.

If good management practices are used, this soil is fairly well suited to improved pasture grasses, such as bahiagrass. It is not suited to clover. Droughtiness is a limitation except during wet periods. Lime and fertilizer are needed. Grazing should be controlled to permit highest yields and to maintain ground cover.

The potential productivity is low for pine trees. Seedling mortality, plant competition, and the equipment use limitation are the major concerns in management. South Florida slash pine and sand pine are preferred for planting.

The sandy texture and the high water table are moderate or severe limitations affecting urban uses and severe limitations affecting recreational uses. A water-control system is required. Fill material that is 3 feet or more thick or ditches that remove excess surface water rapidly are also required. Septic tank absorption fields do not function adequately unless the water table is lowered or fill material is added. The sandy texture and the high water table are severe limitations affecting sites for sanitary landfills. Because cutbanks caving is a hazard in shallow excavations, shoring of side slopes is required.

The capability subclass is VIs.

26—Holopaw sand, limestone substratum. This poorly drained soil is on broad, low flats and in poorly defined drainageways. Areas of this soil are irregular in shape and range from 5 to more than 500 acres. Slopes are less than 2 percent.

Typically, this soil has a dark grayish brown sand surface layer about 6 inches thick. The subsurface layer to a depth of about 40 inches is sand. It is brown in the upper part, pale brown in the next part, and light gray in the lower part. The subsoil to a depth of about 45 inches is brown sand, and to a depth of about 60 inches, it is gray sandy loam that has calcium carbonates. The subsoil is underlain by fractured limestone.

Included with this soil in mapping are small areas of Basinger, Boca, Delray, Malabar, Oldsmar, Pineda, and Riviera soils. Also included are some areas of the Malabar soils that have limestone at a depth of 60 to 80 inches. The included soils make up less than 25 percent of the map unit.

Under natural conditions this Holopaw soil has a high water table within 10 inches of the surface for 2 to 6 months in most years. Permeability is rapid in the surface and subsurface layers and moderate or moderately slow in the subsoil. The available water capacity is low in the surface and subsurface layers and moderate or high in the subsoil. The organic matter content and natural fertility are low.

Most areas of this soil are in improved pasture or native range. Natural vegetation is mainly blue maidencane and other grasses. Rushes, sedges, and grasses, such as Florida threeawn, pineland threeawn, broomsedge bluestem, and sand cordgrass, are also included.

Under natural conditions this soil is poorly suited to cultivated crops because of the wetness. If a water-control system is used to remove excess water and provide irrigation, many fruit and vegetable crops can be grown. Cover crops or crop residue should be maintained to prevent excessive erosion. Crops respond well to fertilizer.

Good citrus production can be obtained if water control is adequate. Drainage needs to be controlled to a depth of about 4 to 6 feet. Citrus trees should be planted on beds. Cover crops should be maintained between rows to protect the soil from wind and water erosion. Regular applications of fertilizer are needed.

The soil is well suited to pasture of pangolagrass, bahiagrass, and clover. Fertilizer and controlled grazing are necessary for consistently high yields. Water-control measures are needed to remove excess surface water after periods of heavy rainfall.

If surface drainage is adequate, this soil has moderately high potential productivity for pine trees. South Florida slash pine is a recommended tree to plant.

This soil is poorly suited to urban and recreational uses because of the high water table and the sandy texture. A water-control system is required if this soil is developed for urban or recreational uses. Fill material that is 3 feet or more thick or ditches that remove excess surface water are also required. Septic tank absorption fields do not function adequately unless the water table is lowered or fill material is added. The sandy texture and the high water table are severe limitations affecting sites for sanitary landfills. Because cutbanks caving is a hazard in shallow excavations, shoring of side slopes is required.

The capability subclass is IVw.

27—Riviera sand, limestone substratum. This poorly drained soil is in sloughs on broad flatwoods. Areas of this soil are irregular in shape and range from about 5 to more than 500 acres. Slopes are less than 2 percent.

Typically, this soil has a black sand surface layer about 5 inches thick. The subsurface layer to a depth of about 35 inches is light brownish gray sand. The subsoil to a depth of about 50 inches is olive gray sandy loam. It is underlain by fractured limestone.

Included with this soil in mapping are small areas of Boca, Gator, Gentry, Holopaw, Pineda, Wabasso, and Winder soils. Included in a few areas are soils in which sand grains in the subsurface layer are coated with carbonates. Also included in areas along streams are soils that are subject to flooding. The included soils make up less than 25 percent of the map unit.

Under natural conditions this Riviera soil has a high water table within 10 inches of the surface for 2 to 4 months during most years and at a depth of 10 to 30 inches for most of the remainder of the year. Following periods of prolonged, heavy rainfall, the water table in most areas rises above the surface for a week or more and sheet flow occurs. Permeability is rapid in the surface and subsurface layers and slow in the subsoil. Natural fertility and the organic matter content are low. The available water capacity is low in the surface and subsurface layers and moderate in the subsoil.

Native vegetation consists of blue maidencane, pineland threeawn, broomsedge bluestem, rushes, and sedges.

Under natural conditions this soil is not suited to vegetable or field crops because of the wetness. If water control is adequate, however, it is well suited to many crops grown in the area. The water-control system must remove water quickly after periods of heavy rainfall and provide irrigation during dry periods. Soil-improving crops should be included in the crop rotation. Fertilizer should be applied according to the needs of the crop.

If water control is adequate, this soil is suited to citrus. A water-control system needs to maintain good drainage to a depth of about 4 to 6 feet. Planting trees on beds lowers the effective depth of the water table. Regular applications of fertilizer and occasional applications of lime are needed.

If drained, this soil is suited to pasture and hay. Shallow ditches are needed to remove excess surface water following periods of heavy rainfall. Excellent pastures of grass or grass-clover mixtures can be grown if the soil is properly managed. Regular applications of fertilizer and occasional applications of lime are needed.

If surface drainage is adequate, this soil has moderately high potential for pine trees. Trees should be planted on beds. The equipment use limitation and seedling mortality are the main concerns in management. South Florida slash pine is a recommended tree to plant.

The high water table and the sandy texture are severe limitations affecting urban and recreational uses. A water-control system is required. Fill material that is 3 feet or more thick or ditches that remove excess surface water are also required. Septic tank absorption fields do not function adequately unless the water table is lowered or fill material is added. The sandy texture and the high water table are severe limitations affecting sites for sanitary landfills. Because cutbanks caving is a hazard in shallow excavations, shoring of side slopes is required.

The capability subclass is IIIw.

28—Boca sand, depressional. This poorly drained soil is in depressions on flatwoods. Areas of this soil are oval, elongated, or irregular in shape and range from 5 to 250 acres. The surface is slightly concave, and slopes are less than 2 percent.

Typically, this soil has a dark gray sand surface layer about 5 inches thick. The subsurface layer to a depth of about 25 inches is sand. It is gray in the upper part and light gray in the lower part. The subsoil is gray or light brownish gray sandy clay loam to a depth of about 32 inches. The substratum to a depth of about 38 inches is calcium carbonate and rock fragments. It is underlain by limestone that has numerous fissures and solution basins.

Included with this soil in mapping are small areas of Basinger, Gator, Hallandale, Holopaw, Malabar, Okeelanta, Pineda, and Riviera soils. The included soils make up about 20 to 25 percent of the map unit.

Under natural conditions this Boca soil is ponded for 3 to 6 months in most years. The high water table is within 10 inches of the surface for 2 to 4 months in most years. During extended dry periods, the water table is below a depth of 38 inches. Permeability is rapid in the surface and subsurface layers and moderate in the subsoil. The organic matter content and natural fertility are low. The available water capacity is low in the surface layer, very low in the subsurface layer, and moderate in the subsoil.

Most areas of this soil are used as native range. A few areas are in improved pasture. Small marshy or swampy areas are dominated by sawgrass, maidencane, and cypress. Blue maidencane, creeping bluestem, and chalky bluestem are important native grasses for range management.

In its natural condition this soil is not suited to cultivated crops because of the wetness. Suitable drainage outlets are not available in many areas.

This soil generally is not suited to pine trees because of the ponding and the wetness. In some areas it is suited to cypress production through natural regeneration.

The capability subclass is VIIw.

29—Oldsmar sand, limestone substratum. This nearly level, poorly drained soil is in broad areas on flatwoods. Areas of this soil are irregular in shape and range from 5 to more than 1,000 acres.

Typically, this soil has a black sand surface layer about 5 inches thick. The subsurface layer to a depth of about 38 inches is sand. It is dark gray in the upper part and light gray in the lower part. The subsoil to a depth of about 63 inches is sand that is very dark gray in the upper part, black in the next part, and dark brown in the lower part. It is dark grayish brown sandy clay loam to a depth of about 73 inches. The subsoil is underlain by fractured limestone.

Included with this soil in mapping are small areas of Hallandale, Holopaw, Immokalee, Malabar, Riviera, and Pineda soils. Also included are areas of soils that have an accumulation of calcareous material. The included soils make up less than 25 percent of the map unit.

Under natural conditions this Oldsmar soil has a high water table within 10 inches of the surface for about 3 months in most years and at a depth of more than 40 inches during dry periods. Permeability is rapid in the sandy surface and subsurface layers, moderately rapid to moderately slow in the sandy part of the subsoil, and slow or very slow in the loamy part of the subsoil. The available water capacity is low in the surface and subsurface layers and moderate in the subsoil. Natural fertility and the organic matter content are low.

Most areas of this soil are in pasture or native range. Some areas are used for crops or citrus. Natural vegetation is South Florida slash pine, saw palmetto, chalky bluestem, creeping bluestem, lopsided indiangrass, and pineland threeawn.

Under natural conditions this soil is poorly suited to cultivated crops because of the wetness. If intensive water-control measures are used, it is suited to a variety of vegetable crops. The water-control system should remove excess water in wet periods and provide subsurface irrigation in dry periods. Good management practices include close-growing, soil-improving crops in the rotation and use of crop residue and cover crops to protect the soil from erosion. Crops respond to fertilizer.

Under natural conditions this soil is poorly suited to citrus because of the wetness. If a drainage system is used to maintain the high water table at a depth of about 4 feet, citrus can be grown. The trees should be planted on beds to lower the effective depth of the water table, and a close-growing plant cover is needed between the trees to protect the soil from erosion. Lime, fertilizer, and supplemental irrigation during dry periods are needed for maximum yields.

This soil is well suited to pasture. Pangolagrass, bahiagrass, and white clover grow well if properly managed. A simple drainage system is needed to remove excess surface water during periods of heavy rainfall. Regular applications of lime and fertilizer are needed, and grazing should be controlled to maintain healthy plants for best yields.

The potential productivity for pine trees is moderately high. The major concerns in management are plant competition, seedling mortality, and the equipment use limitation. A simple drainage system is needed to remove excess surface water. South Florida slash pine is the preferred tree to plant.

The high water table and the sandy texture are severe limitations affecting urban and recreational uses. A water-control system is required. Fill material that is 3 feet or more thick or ditches that remove excess surface water are also required. Septic tank absorption fields do not function adequately unless the water table is lowered or fill material is added. The sandy texture and the high water table are severe limitations affecting sites for sanitary landfills. Because cutbanks caving is a hazard in shallow excavations, shoring of side slopes is required.

The capability subclass is IVw.

32—Riviera sand, depressional. This poorly drained soil is in depressions on flatwoods. Areas of this soil generally are oval or elongated and range from 10 to 500 acres. Slopes are less than 2 percent.

Typically, this soil has a very dark gray sand surface layer about 5 inches thick. The subsurface layer is light gray fine sand to a depth of about 26 inches. It has tongues or intrusions that extend into the subsoil. The subsoil extends to a depth of about 70 inches. The upper part is grayish brown, mottled sandy clay loam, and the lower part is grayish brown sandy loam. The substratum to a depth of 80 inches is gray sand that has many shell fragments.

Included with this soil in mapping are small areas of Boca, Gentry, Malabar, Pineda, Holopaw, and Winder soils. Also included are areas of soils that have discontinuous limestone bedrock or calcium carbonate concretions at a depth of 60 to 80 inches. The included soils make up as much as 40 percent of the map unit.

This Riviera soil has up to 24 inches of water ponded on the surface for 4 to 6 months in most years. The high water table is rarely more than 30 inches below the surface. Permeability is rapid in the surface and subsurface layers and moderate or moderately rapid in the subsoil. The organic matter content and natural fertility are low. The available water capacity is low in the surface and subsurface layers, moderate in the upper 10 inches of the subsoil, and low below that depth.

Most areas of this soil are in natural vegetation of water-tolerant grasses, rushes, and sedges. Some areas are in pasture. Blue maidencane, an important forage grass, thrives, but it is replaced by less palatable species if it is overgrazed. Waxmyrtle generally is along the edge of the range areas. Queensdelight (corkwood) is common in the lower areas.

Under natural conditions this soil is not suited to cultivated crops, improved pasture grasses, or citrus. If properly drained, however, it is suited to many vegetable crops. A water-control system needs to remove excess water when crops are on the land. Fertilizer containing phosphate, potash, and minor elements is needed. Crop residue should be plowed under, and water-tolerant cover crops should remain on the land when it is not being used for row crops.

Most improved grasses and clovers grow well on this soil if water control is adequate. Fertilizer that is high in potash, phosphorus, and minor elements is needed. Grazing should be controlled for maximum yields.

This soil generally is not suited to pine trees because of the ponding and the wetness. In some areas it is suited to cypress production through natural regeneration.

The ponding is a severe limitation affecting urban and recreational uses.

The capability subclass is VIIw.

33—Holopaw sand, depressional. This poorly drained soil is in depressions on flatwoods. Areas of this soil generally are rounded or oval and range from 10 to 200 acres. The surface is slightly concave, and slopes are less than 2 percent.

Typically, this soil has a dark grayish brown sand surface layer about 6 inches thick. The subsurface layer to a depth of about 65 inches is sand. It is very pale brown in the upper part and light gray in the lower part. The subsoil to a depth of 80 inches is light brownish gray sandy clay loam.

Included with this soil in mapping are small areas of Basinger, Riviera, Malabar, and Pineda soils. Also included are areas of soils that have discontinuous limestone at a depth of 60 to 80 inches. The included soils make up about 25 percent of the map unit.

Under natural conditions this Holopaw soil is ponded for 3 to 6 months or more in most years. The high water table is rarely more than 30 inches below the surface. Permeability is rapid in the surface and subsurface layers and moderate or moderately rapid in the subsoil. The organic matter content and natural fertility are low.

Most areas of this soil are in natural vegetation. Some areas are in improved pasture. The natural vegetation is mostly water-tolerant grasses, sedges, and rushes and scattered St. Johnswort. Cypress trees are abundant in many areas. Blue maidencane, an important forage grass, generally is abundant, but in some areas less palatable species have increased because of overgrazing or excessive drainage.

Under natural conditions this soil is not suited to cultivated crops. If properly drained, however, it is suited to many vegetable crops. A water-control system should remove excess water and provide subsurface irrigation. Crops respond to fertilizer. Crop residue should be left on the surface or plowed under. Seedbed preparation should include bedding. Water-tolerant cover crops should be on the land when it is not being used for row crops.

This soil is not suited to citrus.

Most improved grasses and clovers grow well on this soil if water control is adequate. Fertilizer that is high in potash, phosphorus, and minor elements is needed. Grazing should be controlled for maximum yields.

This soil generally is not suited to pine trees because of the ponding and the wetness. In some areas it is suited to cypress production through natural regeneration.

A water-control system is required if this soil is developed for urban or recreational uses. Fill material that is 3 feet or more thick or ditches that remove excess surface water are also required. Septic tank absorption fields do not function adequately unless the water table is lowered or fill material is added. The sandy texture and the high water table are severe limitations affecting sites for sanitary landfills. Because cutbanks caving is a hazard in shallow excavations, shoring of side slopes is required.

This soil is poorly suited to urban and recreational uses because of the ponding and the sandy texture.

The capability subclass is VIIw.

34—Chobee fine sandy loam, limestone substratum, depressional. This very poorly drained soil is in swamps, marshes, and depressions. Areas of this soil generally are oval or elongated and range from 5 to 300 acres. The surface generally is concave, and slopes are less than 2 percent.

Typically, this soil has a black fine sandy loam surface layer about 15 inches thick. The subsoil to a depth of about 32 inches is light gray sandy clay loam. The substratum to a depth of about 50 inches is light brownish gray sandy clay loam. It is underlain by limestone.

Included with this soil in mapping are small areas of Dania, Gator, Gentry, Jupiter, and Winder soils. Gator and Dania soils are organic. Gentry soils have an argillic horizon. Jupiter soils are sandy and have limestone at a depth of less than 20 inches. Winder soils do not have a mollic epipedon and are not underlain by limestone. The included soils make up about 15 to 25 percent of the map unit.

Under natural conditions this Chobee soil is ponded

Figure 8.—In most years, water ponds in areas of Chobee fine sandy loam, limestone substratum, depressional, for up to 6 months.

for up to 6 months of the year (fig. 8). The high water table is rarely at a depth of more than 20 inches. Permeability is slow, and the available water capacity is moderate. Natural fertility is medium.

Most areas of this soil are in natural vegetation and provide food and protection for various kinds of wildlife. A few areas along streams and canals are drained and used for improved pasture or citrus. Natural vegetation in areas near streams is a forest of swamp hardwoods and baldcypress. Other areas are marshes, most of which have short sawgrass interspersed with other hydrophytic plants. Maidencane, an excellent range forage, is common in marshes.

Under natural conditions this soil is not suited to vegetables or field crops because of the wetness. Most areas of the soil are on the lowest part of the landscape and are difficult to drain. Even if drainage is adequate, the loamy soil is difficult to cultivate because it is hard when dry and soft and muddy when wet.

This soil is not suited to citrus because of the ponding and poor physical properties.

If surface drainage is adequate, good yields of improved pasture and hay crops can be produced. The presence of calcareous material in the substrata eliminates the need for repeated, heavy applications of lime. The time for seedbed preparation and harvesting largely depends on the moisture condition of the soil. This soil is often too dry and hard or too wet and muddy to be worked.

This soil generally is not suited to pine trees because of the ponding and wetness. In some areas it is suited to cypress production through natural regeneration.

The wetness and the ponding are severe limitations affecting urban and recreational uses.

The capability subclass is VIIw.

37—Tuscawilla fine sand. This nearly level, poorly drained soil is on low-lying ridges and hammocks, which generally are between sloughs and depressions on flatwoods. Areas of this soil are irregular in shape and range from 5 to more than 150 acres.

Typically, this soil has a dark gray fine sand surface layer about 4 inches thick. The subsurface layer to a depth of about 8 inches is gray fine sand. The subsoil extends to a depth of about 56 inches. It is dark grayish brown sandy clay loam in the upper part; light gray, calcareous sandy clay loam in the next part; and light gray, calcareous fine sandy loam in the lower part. The substratum is white, calcareous loamy fine sand to a depth of 80 inches or more.

Included with this soil in mapping are small areas of Boca, Jupiter, Pineda, and Wabasso soils. Also included are areas of soils in which the upper part of the subsoil is thin and very dark gray or black, areas of soils near the Caloosahatchee River that are not as wet as the Tuscawilla soil, and areas of soils that have carbonates in the upper part of the subsoil. The included soils make up about 10 to 25 percent of the map unit.

Under natural conditions this Tuscawilla soil has a high water table within 12 inches of the surface for up to 6 months in most years. Permeability is rapid in the surface and subsurface layers and moderate in the substratum and subsoil. The organic matter content and natural fertility are low. The available water capacity is low in the surface and subsurface layers, moderate in the subsoil, and low or moderate in the substratum.

Most areas of this soil are used as native rangeland. Natural vegetation is slash pine, laurel oak, live oak, cabbage palm, waxmyrtle, bluestem, and panicums.

Under natural conditions this soil is poorly suited to cultivated crops because of the wetness. If a water-control system is used to remove excess water and provide subsurface irrigation, it is suited to many fruit and vegetable crops. Crop residue should be used to protect the soil from erosion. Seedbed preparation should include bedding. Crops respond to fertilizer.

If a water-control system maintains the high water table at a depth of about 4 feet, this soil is well suited to citrus. Trees should be planted on beds, and a plant cover should be maintained between the trees to protect the soil from erosion. Fertilizer should be applied as needed.

This soil is well suited to improved pasture, such as pangolagrass, improved bahiagrass, and white clover. Water-control measures are needed to remove excess surface water after periods of heavy rainfall. Regular applications of fertilizer are needed, and grazing should be managed to maintain healthy plants.

Potential productivity for pine trees is high. The major concerns in management are plant competition, the equipment limitation, and seedling mortality. Slash pine is preferred for planting. A simple water-control system is needed to remove excess surface water.

The high water table is a severe limitation affecting urban and recreational development.

The capability subclass is IIIw.

39—Udifluvents. This map unit consists of spoil material that was piled along the Caloosahatchee River when the waterway was dredged and widened. In places the material was piled along the riverbanks, but in other places it was pumped into rectangular areas surrounded by a high retaining dike and a perimeter canal. Areas of this map unit range from 5 to 300 acres. Slopes are mostly less than 2 percent. The slope of some narrow side slopes along dikes, excavations, and riverbanks ranges to 60 percent or more.

In a representative pedon, these soils have a very dark gray fine sand surface layer about 25 inches thick. The underlying material is mixed or stratified light gray, light brownish gray, or gray sand, sandy clay, and clay or silty clay, loamy sand, sandy loam, sandy clay loam, or sandy clay that contains fragments of shell, limestone, or both. The composition of the material varies from place to place and from layer to layer depending upon the kind of material excavated and the degree to which it was sorted upon deposition. Coarser material, such as rock, shell, and sand, was concentrated near the point of deposition; finer particles of silt and clay remained suspended in the water and were carried farther.

Included with this soil in mapping are small areas of soils in which the loamy overburden is less than 20 inches thick and soils in which the layer of sand is up to 60 inches thick and generally is underlain by the typical stratified loamy material.

Properties of the Udifluvents vary according to the composition. This material is mostly well drained and calcareous. In places where the clay content is high, internal drainage is very slow and water stands in low areas for several days following periods of heavy rainfall. If the texture is clayey and rocks or shells are few, the soil strength is too low to support heavy loads or traffic when the soil is wet.

In most places the overburden is mounded as it was originally deposited. Some places have been smoothed, and others have been excavated to obtain material for roads and fill. Riverfront houses are common along the Caloosahatchee River. A golf course and marina at Port La Belle are on this soil. A few areas are in improved pasture and citrus. Natural vegetation is largely a thick growth of Brazilian pepper and baccharis bushes. Cabbage palms are dominant on a few of the older, less disturbed spoil banks. In some places the vegetation is weedy annuals and grasses.

This soil is highly variable. In some places soil properties can be unsatisfactory for agricultural or community development, and in others the properties can be desirable for specific purposes. Detailed onsite investigation should be conducted before the soil is used for any purpose.

This map unit is not assigned a capability classification.

42—Riviera sand, limestone substratum, depressional. This poorly drained soil is near ponds and in depressions. Areas of this soil generally are oval or elongated and range from about 5 to 500 acres. The surface is concave, and slopes are less than 2 percent.

Typically, this soil has a very dark gray sand surface layer about 3 inches thick. The subsurface layer to a depth of about 32 inches is gray sand. The subsoil is dark gray sandy clay loam to a depth of about 50 inches and gray sandy loam to a depth of about 58 inches. The substratum is calcareous sand, fine sand, or loamy fine sand that has marl and shell or rock fragments. Fractured limestone that has numerous fissures and solution basins begins at a depth of about 60 inches.

Included with this soil in mapping are Boca, Gator, Gentry, Hallandale, Holopaw, Malabar, Pineda, and Winder soils and some areas of soils that have a thin mucky layer on the surface. The included soils make up about 15 to 25 percent of the map unit.

Unless drained, this Riviera soil is ponded for 4 to 9 months in most years. During the remainder of the year, the high water table generally is within 20 inches of the surface. Permeability is rapid in the sandy surface and subsurface layers, but water movement is impeded by the high water table. Permeability is moderate or moderately rapid in the subsoil. The available water capacity is low in the surface and subsurface layers and moderate in the subsoil. Natural fertility is low.

Most areas of this soil are in natural vegetation and are used as habitat for wildlife or for water storage. The vegetation is dominantly cypress or maidencane. Other plants include arrowhead, blueflag, pickerelweed, spikerush, sedges, rushes, and queensdelight. The marshes where maidencane is abundant are valuable as rangeland.

Under natural conditions this soil is not suited to cultivated crops or improved pasture grasses. Water stands on the surface for long periods. Adequate drainage is difficult to establish because in most places suitable outlets are not available. The soil provides watering places and feeding grounds for many species of wading birds and other wetland wildlife.

This soil generally is not suited to pine trees because of the ponding and the wetness. It can be suited to cypress production through natural regeneration.

The capability subclass is VIIw.

44—Jupiter fine sand. This poorly drained soil is in hammocks and on low flats that border sloughs and marshes. Areas of this soil are irregular in shape and range from 5 to 50 acres. Slopes are less than 1 percent.

Typically, this soil has a fine sand surface layer about 6 inches thick. It is black in the upper part and very dark grayish brown in the lower part. This layer is underlain by fractured limestone that contains numerous crevices and solution basins.

Included with this soil in mapping are small areas of Boca, Chobee, Gentry, Hallandale, and Oldsmar soils. Also included are areas of soils that have bedrock at a depth of less than 10 inches, areas of rock outcrop, and areas of soils that have an accumulation of calcareous material. The included soils make up about 15 to 30 percent of the map unit.

Under natural conditions this Jupiter soil has a high water table within 10 inches of the surface for 2 to 4 months during most years and at a depth of 10 to 40 inches during dry periods. Permeability is rapid above the bedrock. The limestone has sufficient fractures and solution basins to permit water movement. The

Figure 9.—Most areas of Jupiter fine sand remain in natural vegetation of live oak and cabbage palm.

available water capacity is low or moderate. The organic matter content is moderate, and natural fertility is medium.

Most areas of this soil are in natural vegetation and provide forage and shelter for cattle and other animals. Some areas are used for pasture and specialty crops. Natural vegetation is live oak and cabbage palm (fig. 9).

Under natural conditions this soil is not suited to cultivated crops because of the wetness and the shallow depth to limestone. The limestone and the high water table severely limit root development. If water control is adequate, the soil is suited to some vegetable crops. The water-control system should be designed to remove excess water; however, the limestone makes such a system difficult to construct. Row crops should be planted on beds and should be rotated with soil-improving crops. Crop residue and soil-improving crops should be used to protect the soil from erosion. Fertilizer should be applied according to the needs of the crop.

Under natural conditions this soil is poorly suited to citrus; however, citrus can be grown if water control and intense management are provided. The water-control system should maintain the high water table at a depth of about 4 feet. Trees should be planted on beds, and a plant cover should be maintained between the trees.

This soil is well suited to pasture. Pangolagrass, improved bahiagrass, and white clover grow well if properly managed. A water-control system is needed to remove excess water after periods of heavy rainfall. Regular applications of fertilizer are needed, and grazing should be controlled to prevent damage to plants.

This soil has only moderate potential productivity for pine trees even if a water-control system removes excess surface water. Windthrow hazard and seedling mortality are the main concerns in management. South Florida slash pine is a recommended tree to plant.

The shallow depth to bedrock and the high water table are severe limitations affecting urban and recreational uses.

The capability subclass is IVw.

45—Pahokee muck. This very poorly drained organic soil is in marshes and swamps. Areas of this soil vary in shape and range from 5 to 500 acres. The surface is slightly concave, and slopes are less than 1 percent.

Typically, this soil has a black muck surface layer about 40 inches thick that is underlain by fractured limestone.

Included with this soil in mapping are small areas of Boca, Dania, Gentry, Hallandale, Lauderhill, Margate, Okeelanta, Riviera, Terra Ceia, and Winder soils. The included soils make up less than 20 percent of the map unit.

Under natural conditions this Pahokee soil is saturated except during prolonged droughts. In most years it is ponded for 6 to 12 months. Permeability is rapid, but internal drainage is impeded by the high water table. The available water capacity is very high. Natural fertility is medium.

Some areas of this soil are in natural vegetation, but large areas are drained and used for sugarcane, vegetables, or pasture. Natural vegetation is mostly sawgrass in marshes and a few small areas of cypress swamp or willow thicket.

Unless drained, this soil is not suited to cultivated crops. If water control is adequate, it is well suited to most vegetable crops and sugarcane. The water-control system should provide for the rapid removal of excess water when crops are on the land. At other times the soil should be kept saturated. Water-tolerant cover crops should be on the land when it is not being used for row crops. Fertilizer containing phosphate, potash, and trace elements is needed.

This soil is not suited to citrus.

Most improved grasses and clovers grow well on this soil if water control is adequate. The high water table should be maintained near the surface to prevent excessive subsidence of the organic material.

This soil is not suited to pine trees.

The ponding and the high content of organic matter are severe limitations affecting urban and recreational uses.

The capability subclass is IIIw.

47—Udorthents. This map unit consists of a heterogeneous mixture of shell, marl, limestone, and sandy and loamy materials left after excavation for construction materials. Areas of this map unit generally are rectangular and range from about 40 to 60 acres. The surface generally is rough and irregular in shape, and slopes are less than 5 percent.

Udorthents make up about 80 percent of most areas of this map unit but range from 75 to 90 percent. Typically, these soils to a depth of more than 40 inches are grayish, calcareous, loamy material mixed with sand, shell, and limestone fragments. In most places the shell and rock fragments make up less than 35 percent of the volume.

Included in mapping are areas in which the overburden is less than 40 inches thick. Also included are small areas that contain water. These inclusions make up less than 20 percent of the map unit.

Properties of Udorthents vary within short distances. These soils are alkaline. The organic matter content and natural fertility are low.

Many areas of these soils are barren or have vegetation in the early stages of succession. Broomsedge bluestem, Brazilian pepper, and caesar weed are common.

Without alteration, these soils are not suited to agricultural uses, woodland, or urban development.

This map unit is not assigned a capability classification.

49—Aquents, organic substratum. This map unit consists of poorly drained soils that have been mixed by land leveling or deep tillage. In most places it is a heterogeneous mixture of soils that is used as fill for low areas, such as depressions. The center of many wet spots was deepened to create ponds, and the excavated material was spread over the remaining area to raise the surface level. Areas of these soils generally are rectangular or oval and range from 5 to 50 acres. In most places the surface has been smoothed. Slopes are 0 to 2 percent.

Typically, the overburden consists of grayish brown sandy clay loam that has pockets and streaks of black to gray sand or loamy sand. The original soil is buried at a depth of about 35 inches. It is black muck in the upper part, black sand in the next part, and light brownish gray sand in the lower part.

Included in mapping are small areas of Basinger, Chobee, Gator, Okeelanta, Pompano, Riviera, and Winder soils. In places the overburden is 10 inches thick. The included soils rarely make up more than 15 percent of the map unit.

The physical and chemical properties of these soils are extremely variable, often within short distances. Natural fertility and organic matter content generally are low. The high water table is variable but is at a depth of 10 to 40 inches for most of the year. Permeability is estimated to be rapid throughout.

Most areas of these soils have been leveled for cultivated crops.

This soil varies so widely in its physical and chemical properties that the suitability for cultivated crops, citrus, improved pasture, or woodland varies widely. Suitability for these uses depends upon the thickness of the fill and upon the source of the soil material used as fill. The thickness of the fill material directly affects whether or not a water-control system is required. Such soil properties as natural fertility and availability of soil moisture for plant use are also influenced by the kind of soil material used for fill.

This map unit is not assigned a capability classification.

50—Delray sand, depressional. This very poorly drained soil is in swamps, marshes, and depressions. Areas of this soil range from 10 to 500 acres. The surface is concave, and slopes are less than 2 percent.

Typically, this soil has a sand surface layer about 22 inches thick. It is black in the upper part and very dark gray in the lower part. The subsurface layer to a depth of about 50 inches is gray sand. The subsoil to a depth of about 62 inches is dark grayish brown sandy clay loam. The substratum to a depth of 80 inches is gray loamy fine sand that contains fragments of calcareous material.

Included with this soil in mapping are small areas of Gentry, Holopaw, and Okeelanta soils and some soils that have limestone at a depth of 40 to 80 inches. The included soils make up less than 25 percent of the map unit.

Under natural conditions this Delray soil has a high water table within 10 inches of the surface for 6 to 9 months in most years and is ponded for 2 to 6 months. Internal drainage is slow because of the high water table, but the response to artificial drainage is rapid. The organic matter content is high. The available water capacity is high in the surface layer, low in the subsurface layer, and moderate in the subsoil. Permeability is rapid in the surface and subsurface layers and moderate or moderately rapid in the subsoil. Natural fertility is medium, but response to fertilizer is good.

Most areas of this soil are in natural vegetation. Some areas are in improved pasture. Natural vegetation in swamps is dominantly red maple, swampbay, laurel oak, and cabbage palm. Maidencane and blue maidencane generally are abundant in marshes.

Unless drained, this soil is not suited to cultivated crops. If water control is adequate, it is well suited to many locally important crops. A water-control system should remove excess water rapidly during periods of heavy rainfall. Additional important soil management practices include good seedbed preparation, crop rotations, and regular applications of fertilizer. Cover crops should be rotated with row crops and should be on the land two-thirds of the time. Crop residue should be plowed under.

Unless drained, this soil is not suited to citrus. If water control is adequate, it is moderately suited. The trees should be planted on beds, and a close-growing plant cover should be maintained between the trees. Regular applications of fertilizer are needed.

This soil is too wet for most improved pasture grasses and legumes. If water control is adequate, it is well suited to such plants as pangolagrass, bahiagrass, and clover. Simple drainage measures are needed to remove excess surface water. Fertilizer and lime are also needed. Grazing should be controlled to maintain plant vigor for best yields.

This soil generally is not suited to pine trees because of the ponding and the wetness. In some areas it is suited to cypress production through natural regeneration.

The high water table is a severe limitation affecting most urban and recreational uses.

The capability subclass is VIIw.

51—Malabar fine sand, high. This poorly drained soil is on broad flatwoods. Areas of this soil generally are elongated or irregular in shape and range from 5 to 300 acres. The surface generally is slightly convex, and slopes are 0 to 2 percent.

Typically, this soil has a dark gray fine sand surface layer about 5 inches thick. The subsurface layer to a depth of about 28 inches is fine sand. It is light gray in the upper part and very pale brown in the lower part. The subsoil extends to a depth of about 65 inches. In sequence downward, it is yellowish brown fine sand; very pale brown fine sand; grayish brown, mottled sandy loam; and light gray, mottled sandy loam. The substratum to a depth of 80 inches is a mixture of light gray sand and shell fragments.

Included with this soil in mapping are small areas of Boca, Holopaw, Oldsmar, Pineda, and Riviera soils. Also included are a few areas of soils that have weathered discontinuous limestone at a depth of 60 to 80 inches and soils that have an accumulation of secondary carbonates. The included soils make up less than 25 percent of the map unit.

Under natural conditions this Malabar soil has a high water table within 10 inches of the surface for 1 to 3 months in most years and at a depth of more than 40 inches during dry periods. Permeability is rapid in the surface layer, subsurface layer, and sandy part of the subsoil and moderately slow in the loamy part of the subsoil. The available water capacity is low in the surface layer, subsurface layer, and sandy part of the subsoil and moderate in the loamy part of the subsoil. The organic matter content and natural fertility are low.

Most areas of this soil are used as native range. Natural vegetation consists mostly of slash pine, saw palmetto, cabbage palm, and live oak. Pineland threeawn is an abundant ground cover.

Under natural conditions this soil is poorly suited to cultivated crops because of the wetness. If water control is adequate, it is suited to some vegetable crops. A water-control system must remove excess surface water rapidly and provide subsurface irrigation. Good management practices include crop rotations that keep close-growing cover crops in the cropping system at least three-fourths of the time. Cover crops and crop residue should be used to protect the soil from erosion and to increase the content of organic matter. Seedbed preparation should include bedding. Crops respond to fertilizer and lime.

Under natural conditions this soil is poorly suited to citrus. If water control is adequate, citrus can be produced. The water-control system must maintain the high water table at a depth of about 4 to 6 feet. Trees should be planted on beds, and a close-growing cover crop should be maintained between the rows. Regular applications of fertilizer are needed.

This soil is well suited to pasture. Pangolagrass, improved bahiagrass, and white clover grow well if properly managed. Water-control measures are needed to remove excess surface water after periods of heavy rainfall. Regular applications of lime and fertilizer are needed, and grazing should be controlled to maintain plant vigor for best yields.

This soil has moderately high potential for the production of South Florida slash pine. The equipment use limitation and seedling mortality are moderate. South Florida slash pine is a recommended tree to plant.

The high water table and the sandy texture are severe limitations affecting urban and recreational uses. A water-control system is required. Fill material that is 3 feet or more thick or ditches that remove excess surface water are also required. Septic tank absorption fields do not function adequately unless the water table is lowered or fill material is added. The sandy texture and the high water table are severe limitations affecting sites for sanitary landfills. Because cutbanks caving is a hazard in shallow excavations, shoring of side slopes is required.

The capability subclass is IVw.

53—Adamsville fine sand. This somewhat poorly drained soil is on low-lying ridges near La Belle. Areas of this soil are slightly convex, irregular in shape, and range from 40 to 100 acres or more. Slopes are 0 to 2 percent.

Typically, this soil has a dark gray fine sand surface layer about 5 inches thick. The underlying material to a depth of 80 inches is fine sand. In sequence downward, it is light gray, brown, light gray, and light brownish gray. Mottles are in all layers between depths of 25 and 70 inches.

Included with this soil in mapping are soils similar to the Adamsville soil except they have loamy material and shell fragments in the underlying material. Also included are small areas of Holopaw, Oldsmar, and Pompano soils. The included soils make up about 20 percent of the map unit.

Under natural conditions this Adamsville soil has a high water table at a depth of 20 to 40 inches for 2 to 6 months in most years. During dry periods the water table is at a depth of more than 60 inches. Permeability is rapid, and the available water capacity is low in the surface layer and very low in the underlying material. The organic matter content and natural fertility are low.

Most areas of this soil are used as native range. Natural vegetation consists mostly of slash pine, saw palmetto, cabbage palm, and live oak. Pineland threeawn is an abundant ground cover.

Under natural conditions this soil is poorly suited to cultivated crops because of the wetness, droughtiness, and low fertility. If a complete water-control system is used to remove excess surface water and to provide subsurface irrigation, the soil is suited to many fruit and vegetable crops. Crop residue should be used to protect the soil from erosion. Crops respond to lime and fertilizer.

If a water-control system maintains the high water table at a depth of about 4 feet, this soil is moderately suited to citrus. Trees should be planted on beds, and a plant cover should be maintained between trees to protect the soil from erosion. Fertilizer and lime should be applied as needed.

This soil is moderately well suited to improved pasture, such as pangolagrass and bahiagrass. Simple drainage is needed to remove excess surface water during periods of heavy rainfall. Regular applications of fertilizer are also needed. Grazing should be managed to maintain healthy plants.

This soil has a moderately high potential for the production of pine trees. The equipment use limitation and seedling mortality are moderate. South Florida slash pine is the most suitable tree to plant.

The high water table and the sandy texture are moderate or severe limitations affecting most urban and recreational uses. A water-control system is required if this soil is developed for urban or recreational uses. Fill material that is 3 feet or more thick or ditches that remove excess surface water are also required. Septic tank absorption fields do not function adequately unless the water table is lowered or fill material is added. The sandy texture and the high water table are severe limitations affecting sites for sanitary landfills. Because cutbanks caving is a hazard in shallow excavations, shoring of side slopes is required.

The capability subclass is IIIw.

56—Terra Ceia muck. This very poorly drained, organic soil is in freshwater marshes and swamps. Areas of this soil range from 5 to more than 100 acres. The surface is slightly concave, and slopes are less than 1 percent.

Typically, this soil is black muck to a depth of 70 inches.

Included with this soil in mapping are small areas of Chobee, Gator, Gentry, Okeelanta, Riviera, Pahokee, and Winder soils. The included soils make up about 10 to 15 percent of the map unit.

Under natural conditions this Terra Ceia soil is ponded by as much as 12 inches of water for up to 6 months. The high water table is rarely more than 18 inches below the surface. Permeability is rapid, but internal drainage is restricted by the high water table. The available water capacity is very high. Natural fertility is medium, and response to fertilizer is good.

Many areas of this soil are in natural vegetation, such as sawgrass, pickerelweed, and maidencane. Some large areas are drained and used for sugarcane, vegetables, or pasture.

This soil is not suited to cultivated crops unless very intensive water-control measures are used. If water control is adequate, it is well suited to a variety of vegetable crops and to sugarcane. Fertilizer containing phosphate, potash, and minor elements is needed. When the land is not being used for crops, the soil should be kept saturated to prevent excessive subsidence of the muck.

This soil is not suited to citrus.

Most improved grasses and clover grow well if water control is adequate. The high water table should be maintained near the surface to prevent excessive oxidation of this soil. Fertilizer that is high in phosphorus, potash, and minor elements is needed.

This soil is not suited to pine trees.

The ponding is a severe limitation affecting urban and recreational uses.

The capability subclass is IIIw.

57—Chobee fine sandy loam, depressional. This very poorly drained soil is in marshes, swamps, and depressions. Areas of this soil are elongated or oval and range from 5 to 100 acres or more. The surface is concave, and slopes are less than 2 percent.

Typically, this soil has a black fine sandy loam surface layer about 9 inches thick. The subsoil extends to a depth of about 68 inches. It is gray fine sandy loam in the upper part and light gray sandy clay loam in the lower part. The substratum to a depth of 80 inches is light gray fine sandy loam.

Included with this soil in mapping are small areas of Gator, Gentry, Riviera, and Winder soils and some soils that have fractured limestone at a depth of 40 to 70 inches. Also included in areas along the Caloosahatchee River are some better drained soils. The included soils make up about 10 to 25 percent of the map unit.

This Chobee soil has a high water table within 10 inches of the surface for 3 to 6 months in most years and is ponded for about 6 months in most years. Permeability is moderately rapid in the surface layer, slow in the subsoil, and moderately slow in the substratum. The available water capacity is moderate. Natural fertility is medium.

Most areas of this soil are used for native range and wildlife habitat. Some areas are drained and used for pasture or citrus. Natural vegetation generally is sawgrass, maidencane, pickerelweed, and other hydrophytic plants. Some areas have cypress, ash, and red maple trees. Maidencane, an important range grass, is in marshy areas.

Under natural conditions this soil is too wet for cultivated crops. Drainage is difficult because the soil is in a low landscape position and suitable drainage outlets are not available. If water control and seedbed preparation are adequate, a variety of vegetable crops can be grown; however, some problems arise because the fine textured, slowly permeable subsoil is near the surface. The soil is hard when dry and plastic when wet, and water can stand for long periods in ruts and other low spots.

Unless drained, this soil is not suited to citrus. If water control is adequate and trees are planted on beds, it is moderately suited. Regular applications of fertilizer and occasional applications of lime are needed.

This soil is too wet for improved pasture. A drainage system is needed to remove surface water. If water control is adequate, the soil is well suited to several improved grasses and legumes.

This soil generally is not suited to pine trees because of the ponding and the wetness. Cypress can be grown in some areas through natural regeneration.

The capability subclass is VIIw.

58—Oldsmar sand, depressional. This poorly drained soil is in depressions on flatwoods. Areas of this soil generally are round, oval, or irregular in shape and range from about 5 to more than 200 acres. The surface is slightly concave, and slopes are less than 2 percent.

Typically, this soil has a dark gray sand surface layer about 3 inches thick. The subsurface layer to a depth of about 32 inches is light brownish gray sand. The subsoil extends to a depth of about 65 inches. It is dark grayish brown sand in the upper part and black sand in the next part. The lower part is grayish brown sandy loam that has pockets of sandy clay loam. The substratum to a depth of 80 inches is brown fine sand.

Included with this soil in mapping are small areas of Basinger, Gentry, Gator, Holopaw, Malabar, Okeelanta, and Riviera soils. Also included are soils that have a thin muck surface layer and soils that have limestone at a depth of more than 60 inches. The included soils make up less than 25 percent of the map unit.

Under natural conditions this Oldsmar soil is ponded for 3 to 9 months or more in most years. The high water table is rarely at a depth of more than 24 inches. Permeability is rapid in the surface and subsurface layers, rapid to moderately slow in the upper part of the subsoil, slow in the lower part of the subsoil, and rapid in the substratum. The organic matter content and natural fertility are low. The available water capacity is low in the surface and subsurface layers and moderate in the subsoil.

Most areas of this soil are used as native range. Natural vegetation consists mostly of maidencane, bluestem, and St. Johnswort.

Under natural conditions this soil is not suited to cultivated crops; however, if water control is adequate, it is suited to vegetable crops. The water-control system must remove excess water in wet periods and provide irrigation in dry periods. Crop rotations should keep close-growing, soil-improving crops in the cropping system three-fourths of the time. Seedbed preparation should include bedding.

Under natural conditions this soil is not suited to citrus. Even if management is intensive and water control is adequate, it is only poorly suited.

Under natural conditions this soil is not suited to improved pasture; however, if a good water-control system is used, good pasture of grass or grass-clover mixtures can be grown. Controlled grazing and regular applications of lime and fertilizer are needed for highest yields.

This soil generally is not suited to pine trees because of the ponding and the wetness. In some areas, it is suited to cypress production through natural regeneration.

The ponding and the sandy texture are severe limitations affecting urban development and recreational uses.

The capability subclass is VIIw.

59—Winder fine sand, depressional. This nearly level, poorly drained soil is in marshes and depressions on flatwoods. Areas of this soil generally are round, oval, or irregular in shape and range from 5 to more than 1,000 acres.

Typically, this soil has a gray fine sand surface layer about 8 inches thick. The subsurface layer to a depth of about 19 inches is very pale brown fine sand. The subsoil to a depth of about 30 inches is light gray sandy clay loam. The substratum to a depth of about 40 inches is greenish gray sandy clay loam that has a few carbonate nodules. To a depth of about 60 inches, it is light gray sandy clay loam, and to a depth of 80 inches, it is greenish gray loamy sand that has more than 50 percent carbonate nodules.

Included with this soil in mapping are Boca, Gator, Gentry, Okeelanta, and Riviera soils. Also included are soils that have a thin muck surface layer and soils that have discontinuous limestone at a depth of more than 60 inches. The included soils make up less than 25 percent of the map unit.

Under natural conditions this Winder soil is ponded for 3 to 9 months in most years. The high water table is rarely at a depth of more than 24 inches. Permeability is rapid in the surface and subsurface layers, slow in the subsoil, and rapid in the substratum. The organic matter content and natural fertility are low. The available water capacity is low in the surface and subsurface layers, moderate in the subsoil, and low in the substratum.

Most areas of this soil are used as native range. Natural vegetation is waxmyrtle, maidencane, queensdelight, and sand cordgrass.

Under natural conditions this soil is not suited to cultivated crops; however, if water control is adequate, it is suited to vegetable crops. The water-control system must remove excess water rapidly and prevent ponding. Cover crops and crop residue should be used to protect the soil from erosion. Seedbed preparation should include bedding. Crops respond to fertilizer.

Under natural conditions this soil is not suited to citrus; however, it is suited if a water-control system is used that maintains good drainage to a depth of about 4 feet. Planting trees on beds lowers the effective depth of the water table. A close-growing plant cover is needed between the trees to protect the soil from blowing when the trees are young. Regular applications of fertilizer are also needed.

In its natural condition this soil is not suited to improved pasture; however, if water control is adequate, good pasture of improved grasses or grass-clover mixtures can be grown. Controlled grazing and regular applications of lime and fertilizer are required for highest yields.

This soil generally is not suited to pine trees because of the ponding and the wetness. Cypress can be grown in some areas through natural regeneration.

This soil is poorly suited to urban and recreational uses because of the ponding and the sandy texture.

The capability subclass is VIIw.

60—Myakka sand, depressional. This poorly drained soil is in depressions on flatwoods. Areas of this soil generally are round, oval, or irregular in shape and range from about 5 to more than 70 acres. The surface is slightly concave, and slopes are less than 2 percent.

Typically, this soil has a dark gray sand surface layer about 3 inches thick. The subsurface layer to a depth of about 25 inches is sand. It is gray in the upper part and light gray in the lower part. The subsoil to a depth of about 60 inches is sand. It is black in the upper part and dark brown in the lower part. The substratum to a depth of 80 inches or more is brown sand.

Included with this soil in mapping are small areas of Basinger, Immokalee, Oldsmar, and Okeelanta soils. Also included are soils that have a thin muck surface layer and soils that have limestone at a depth of 60 to 80 inches. The included soils make up less than 25 percent of the map unit.

Under natural conditions this Myakka soil is ponded for 6 to 9 months in most years. The high water table is rarely at a depth of more than 30 inches. Permeability is rapid in the surface layer, subsurface layer, and substratum and moderate or moderately rapid in the subsoil. The available water capacity is low in the surface and subsurface layers and moderate in the subsoil. The organic matter content and natural fertility are low.

Most areas of this soil are used as rangeland. Natural vegetation consists mostly of maidencane, bluestem, and St. Johnswort.

Under natural conditions this soil is not suited to cultivated crops; however, if water control is adequate, it is suited to vegetable crops. The water-control system must remove excess water rapidly. Good management also includes keeping a close-growing cover crop in the crop rotation. This cover crop and crop residue help to protect the soil from erosion. Seedbed preparation needs to include bedding. Fertilizer should be applied according to the needs of the crop.

Under natural conditions this soil is not suited to citrus. It is only poorly suited even if management is intense and water control is adequate.

Under natural conditions this soil is not suited to improved pasture; however, if water control is adequate, good quality pasture of improved grasses or grass-clover mixtures can be grown. Controlled grazing and regular applications of lime and fertilizer are needed for highest yields.

This soil generally is not suited to pine trees because of the ponding and the wetness. In some areas it is suited to cypress production through natural regeneration.

The ponding is a severe limitation affecting urban and recreational development.

The capability subclass is VIIw.

61—Malabar sand, depressional. This poorly drained soil is in depressions on flatwoods. Areas are oval, elongated, or irregular in shape and range from 5 to more than 200 acres. The surface is smooth to concave, and slopes are less than 2 percent.

Typically, this soil has a dark grayish brown sand surface layer about 1 inch thick. The subsurface layer to a depth of about 11 inches is light brownish gray sand. The subsoil extends to a depth of about 70 inches. It is very pale brown sand in the upper part, light brownish gray sand in the next part, and grayish brown sandy loam in the lower part. The substratum to a depth of about 80 inches is gray sand.

Included with this soil in mapping are small areas of Boca, Gator, Holopaw, Okeelanta, Pineda, Riviera, and Valkaria soils. Also included are soils similar to Malabar soils except they have discontinuous limestone at a depth of 60 to 80 inches. The included soils make up less than 25 percent of the map unit.

Under natural conditions this Malabar soil is ponded for 3 to 6 months in most years. The high water table is rarely more than 30 inches below the surface. Permeability is rapid in the surface layer, subsurface layer, and upper part of the subsoil; slow in the lower part of the subsoil; and moderately rapid or rapid in the substratum. The organic matter content and natural fertility are low. The available water capacity is low in the surface layer, subsurface layer, and upper part of the subsoil and moderate in the lower part of the subsoil.

Most areas of this soil are used as native range. Natural vegetation is St. Johnswort, maidencane, sand cordgrass, and other water-tolerant grasses. Some areas have dense to scattered stands of cypress.

Under natural conditions this soil is not suited to cultivated crops; however, if water control is adequate, it is suited to vegetable crops. The water-control system must remove excess water rapidly and provide for irrigation during dry periods. Good management also includes crop rotations that keep close-growing cover crops in the cropping system at least two-thirds of the time. These cover crops and crop residue help to protect the soil from erosion. Seedbed preparation should include bedding. Fertilizer should be applied according to the needs of the crop.

Under natural conditions this soil is not suited to citrus; however, citrus can be grown if a water-control system is used that maintains the high water table at a depth of about 4 feet. Planting trees on beds lowers the effective depth of the water table. A close-growing cover crop is needed between the trees to protect the soil from blowing when the trees are young. Regular applications of fertilizer are needed.

Under natural conditions this soil is not suited to improved pasture; however, if water control is adequate, good quality pasture of improved grasses or grass-clover mixtures can be grown. Controlled grazing and regular applications of fertilizer are needed for highest yields.

This soil generally is not suited to pine trees because of the ponding and the wetness. Cypress can be grown in some areas through natural regeneration.

The capability subclass is VIIw.

62—Pineda sand, depressional. This poorly drained soil is in depressions on flatwoods. Areas of this soil are oval, elongated, or irregular in shape and range from 5 to 150 acres. The surface is slightly concave, and slopes are less than 2 percent.

Typically, this soil has a light gray sand surface layer about 5 inches thick. The subsurface layer to a depth of about 14 inches is very pale brown sand. The subsoil is brownish yellow sand to a depth of about 24 inches and gray sandy loam to a depth of about 42 inches. The substratum is gray sand to a depth of about 50 inches, greenish gray loamy sand to a depth of about 75 inches, and greenish gray sand to a depth of 80 inches or more.

Included with this soil in mapping are small areas of Boca, Chobee, Gator, Holopaw, Malabar, Okeelanta, Riviera, and Valkaria soils. Also included are soils similar to the Pineda soil except they have discontinuous limestone at a depth of 60 to 80 inches. The included soils make up less than 25 percent of the map unit.

Under natural conditions this Pineda soil is ponded for 3 to 6 months in most years. The high water table is rarely more than 30 inches below the surface. Permeability is rapid in the surface layer, subsurface layer, and upper part of the subsoil; slow in the lower part of the subsoil, and moderately rapid in the substratum. The organic matter content and natural fertility are low. The available water capacity is low in the surface layer, subsurface layer, and upper part of the subsoil; moderate in the lower part of the subsoil; and low in the substratum.

Most areas of this soil are used as native range. Natural vegetation is St. Johnswort, maidencane, and sand cordgrass. Some areas have dense to scattered stands of cypress trees.

Under natural conditions this soil is not suited to cultivated crops because of the ponding; however, if a good water-control system is used, it is suited to vegetable crops. The system must remove excess water in wet periods. Row crops should be rotated with close-growing, soil-improving crops. The soil-improving crops need to be in the rotation three-fourths of the time. Crop residue and soil-improving crops help to protect the soil from erosion. Seedbed preparation should include bedding. Crops respond to fertilizer.

Under natural conditions this soil is not suited to citrus trees; however, citrus can be grown if a water-control system that maintains good drainage to a depth of about 4 feet is installed. Planting the trees on beds also lowers the effective depth of the water table. When the trees are young, a close-growing plant cover is needed between the trees to protect them from blowing soil. Regular applications of fertilizer are needed.

Under natural conditions this Pineda soil is not suited to improved pasture; however, if water control is adequate, good quality pasture of improved grasses or grass-clover mixtures can be grown. Controlled grazing and regular applications of lime and fertilizer are needed for highest yields.

This soil generally is not suited to pine trees because of the ponding and the wetness. Cypress can be grown in some areas through natural regeneration.

The ponding is a severe limitation affecting urban and recreational uses.

The capability subclass is VIIw.

63—Jupiter-Ochopee-Rock outcrop complex. This map unit consists of areas of nearly level, poorly drained Jupiter and Ochopee soils and bedrock outcrops on broad, low-lying, grassy prairies in southeastern Hendry County. The areas are irregular in shape and range from 20 to 250 acres or more. They are about 50 percent Jupiter soil, 25 percent Ochopee soil, 15 percent Rock outcrop, and 10 percent other soils. The soils and the Rock outcrop are in too complex a pattern to be mapped separately at the selected scale.

Typically, the Jupiter soil has a black fine sand surface layer about 6 inches thick. The subsoil to a depth of about 14 inches is dark grayish brown fine sand. It is underlain by fractured limestone.

Typically, the Ochopee soil is fine sandy loam to a depth of about 10 inches. It is dark grayish brown in the upper part and brown in the lower part. Limestone bedrock is at a depth of about 10 inches.

The Rock outcrop part of this map unit is hard, fractured limestone.

Included in mapping are small areas of Boca, Chobee, Margate, Pineda, Riviera, and Wabasso soils.

Under natural conditions this Jupiter soil has a high water table within 10 inches of the surface for up to 6 months in most years. Permeability is rapid. The organic matter content is moderate, and natural fertility is medium.

Under natural conditions this Ochopee soil has a high water table within 10 inches of the surface for up to 6 months in most years. Permeability is moderately rapid. The organic matter content and natural fertility are low.

Most areas of this map unit are used as native range. Natural vegetation is scattered slash pine, cabbage palm, saw palmetto, pineland threeawn, blue maidencane (fig. 10), chalky bluestem, and panicums.

The soils in this map unit are poorly suited to vegetable crops because of the wetness and the shallow depth to limestone. A water-control system is needed to remove excess surface water and provide subsurface irrigation; however, the shallow depth of bedrock interferes with construction of such a system.

These soils are poorly suited to citrus because of the wetness and the shallow depth to bedrock. A water-control system is needed to maintain the high water table at a depth of about 4 to 6 feet; however, the shallow depth to bedrock interferes with the construction of such a system. It also interferes with the planting of trees.

If excess surface water is removed, these soils are suited to pasture. Regular applications of lime and fertilizer are needed.

The potential productivity for pine trees is moderate. The equipment use limitation is severe, and seedling mortality is moderate. South Florida slash pine is a recommended tree to plant.

The shallow depth to bedrock and the high water table are severe limitations affecting urban and recreational uses.

The capability subclass is IVw.

64—Hallandale sand, depressional. This very poorly drained soil is in depressions on flatwoods. Areas of this soil generally are round or oval and range from about 5 to more than 20 acres. The surface is slightly concave, and slopes are less than 2 percent.

Figure 10.—Blue maidencane is one of the main native grasses grown in areas of the Jupiter-Ochopee-Rock outcrop complex.

Typically, this soil has a very dark gray sand surface layer about 3 inches thick. The subsoil to a depth of about 15 inches is sand. It is dark grayish brown in the upper part and dark brown in the lower part. It is underlain by hard limestone.

Included with this soil in mapping are small areas of Boca, Pineda, Pahokee, Riviera, and Winder soils. The included soils make up less than 25 percent of the map unit.

This Hallandale soil is ponded for 6 to 9 months in most years. Permeability is moderately rapid or rapid, and the available water capacity is low. The organic matter content and natural fertility are low.

Most areas of this soil are used as range. Natural vegetation is St. Johnswort, maidencane, panicums, bluestem, and cypress.

Under natural conditions this soil is not suited to cultivated crops. If a water-control system is used to remove excess water, it is suited to a variety of vegetable crops; however, the shallow depth to bedrock interferes with the construction of such a system. Good management includes close-growing cover crops in the crop rotation. Crop residue should be returned to the soil. Seedbed preparation should include bedding. Fertilizer should be added as needed.

Under natural conditions this soil is not suited to citrus. It is poorly suited even if water control is adequate.

Under natural conditions this soil is not suited to improved pasture; however, if water control is adequate, good quality pasture of improved grasses or grass-clover mixtures can be grown. Controlled grazing and regular applications of lime or fertilizer are needed for high yields.

The potential productivity is moderate for pine trees; however, water control is needed. The equipment use limitation and seedling mortality are concerns in management. South Florida slash pine is a recommended tree to plant.

This soil is poorly suited to most urban and recreational uses because of the ponding and the shallow depth to bedrock.

The capability subclass is VIIw.

65—Plantation muck. This nearly level, very poorly drained soil is on broad, low-lying flats generally adjacent to the Everglades. Areas of this soil are predominantly fringes of organic soils and generally are elongated. They range from 5 to more than 150 acres.

Typically, this soil has a black muck surface layer about 12 inches thick. The next layer to a depth of about 20 inches is black sand. The substratum to a depth of about 39 inches is pale brown sand. It is underlain by hard limestone.

Included with this soil in mapping are small areas of Boca, Hallandale, Margate, and Pahokee soils. The included soils make up about 15 to 30 percent of the map unit.

Under natural conditions this Plantation soil is ponded for 1 to 2 months in most years. The high water table is within 10 inches of the surface for 2 to 6 months and within 20 inches the rest of the year. Permeability is rapid, and the available water capacity is very high in the organic material and low in the mineral material. The organic matter content is high, and natural fertility is medium.

Most areas of this soil are in improved pasture. Some areas are used as rangeland or cropland. The plant cover is mainly improved pasture or sugarcane.

Under natural conditions this soil is poorly suited to cultivated crops because of the wetness. If water control is adequate, sugarcane and many vegetable crops can be grown. Crop residue should be returned to the soil to reduce oxidation. Seedbed preparation should include bedding. Crops respond to fertilizer.

Even if water control is adequate, this soil is poorly suited to citrus.

If water control is adequate, this soil is well suited to pasture of improved grasses and clover. Lime and fertilizer should be applied according to plant needs, and controlled grazing is needed to maintain healthy plants.

This soil is poorly suited to pine trees even if water control is adequate.

This soil is poorly suited to urban and recreational uses because of the high water table and the high content of organic matter.

The capability subclass is IVw.

66—Margate sand. This nearly level, poorly drained soil is on low-lying flats and in sloughs adjacent to the Everglades. Areas of this soil are elongated and irregular in shape and range from 5 to 250 acres or more.

Typically, this soil has a black sand surface layer about 10 inches thick. The subsurface layer to a depth of about 18 inches is brown sand. The subsoil to a depth of about 24 inches is pale brown sand. The substratum is light yellowish brown gravelly sand to a depth of about 30 inches. It is underlain by hard limestone.

Included with this soil in mapping are small areas of Pahokee and Hallandale soils. The included soils make up about 10 to 15 percent of the map unit.

Under natural conditions this Margate soil is ponded for about 7 months during most years. The high water table is rarely at a depth of more than 24 inches. Permeability is rapid. The organic matter content and natural fertility are low. The available water capacity is low in the surface layer, very low in the subsurface layer and the subsoil, and low in the substratum.

Most areas of this soil are in improved pasture or cropland.

Under natural conditions this soil is poorly suited to cultivated crops because of the wetness. If water control is adequate, it is suited to cultivation. The water-control system must remove excess surface water and provide subsurface irrigation. Crop residue should be used to protect the soil from erosion. Seedbed preparation should include bedding. Crops respond to fertilizer.

If a water-control system maintains the high water table at a depth of about 4 feet, this soil is suited to citrus. Trees should be planted on beds, and a cover crop should be maintained between the trees to protect the soil from erosion. Fertilizer should be applied as needed.

This soil is well suited to pasture. Improved bahiagrass or grass-clover mixtures grow well if properly managed. Water-control measures are needed to remove the excess surface water after periods of heavy rainfall. Regular applications of fertilizer are needed, and grazing should be managed to maintain healthy plants.

This soil is not suited to pine trees even if a water-control system is used.

This soil is poorly suited to urban and recreational uses because of the ponding and the sandy texture.

The capability subclass is IVw.

67—Lauderhill muck. This very poorly drained soil is mainly in the Everglades. Areas of this soil are irregular in shape and range from 5 to more than 500 acres. Slopes are less than 2 percent.

Typically, this soil is muck to a depth of about 35 inches. It is black to a depth of about 24 inches, dark reddish brown to a depth of about 31 inches, and black below that depth. It is underlain by hard limestone.

Included with this soil in mapping are small areas of Gator, Margate, Okeelanta, Pahokee, Plantation, and Terra Ceia soils. The included soils make up about 25 percent of the map unit.

Under natural conditions this Lauderhill soil is ponded for 6 to 12 months during most years. The high water table is rarely at a depth of more than 10 inches. Permeability is rapid, and the available water capacity is very high in the muck. Natural fertility is medium. The organic matter content is high. Subsidence of the muck occurs if the soil is drained.

Most areas of this soil are drained and used for sugarcane or vegetable crops. Some areas are in improved pasture or native range. Natural vegetation is sawgrass, pickerelweed, flags, rushes, sedges, willow, and elder.

Under natural conditions this soil is not suited to cultivated crops. If water control is adequate, sugarcane and many vegetable crops can be grown. Crops respond to fertilizer. Cover crops and crop residue help to protect the soil from erosion. The soil should be kept saturated when crops are not being grown to reduce subsidence of the muck.

This soil is poorly suited to citrus even if water control is adequate.

If water control is adequate, this soil is well suited to pastures of grass and grass-clover mixtures. Regular applications of fertilizer are needed. Grazing should be managed to permit maximum yields.

This soil is not suited to pine trees.

The high content of organic matter, the high water table, and the depth to bedrock are severe limitations affecting urban and recreational uses.

The capability subclass is IIIw.

68—Dania muck. This nearly level, very poorly drained soil is in marshes along the edge of the Everglades.

Typically, this soil is muck to a depth of about 14 inches. It is black in the upper part and dark reddish brown in the lower part. The underlying material to a depth of about 18 inches is very dark gray fine sand. It is underlain by hard limestone.

Included with this soil in mapping are small areas of Lauderhill, Margate, Pahokee, and Plantation soils. The included soils make up less than 25 percent of the map unit.

Under natural conditions this Dania soil is ponded for 6 to 12 months during most years. The high water table is rarely at a depth of more than 10 inches. Permeability is rapid in the muck and moderate in the underlying material. Natural fertility is medium. The organic matter content is high. Subsidence of the muck occurs if the soil is drained.

Most areas of this soil are drained and used for sugarcane or pasture. Natural vegetation is sawgrass, maidencane, willow, and elder.

Under natural conditions this soil is not suited to cultivated crops because of the wetness and the shallow depth to bedrock. If water control is adequate, it is suited to sugarcane and improved pasture; however, the shallow depth to limestone interferes with the construction of a drainage system. If the soil is flooded, it is protected from excess subsidence.

This soil is not suited to citrus.

If water control is adequate, this soil is suited to hay and pasture crops of grass and grass-clover mixture. Fertilizer is needed.

This soil is not suited to pine trees.

The high content of organic matter, the high water table, and the shallow depth to bedrock are severe limitations affecting urban and recreational uses.

The capability subclass is Vw.

69—Denaud-Gator mucks. This map unit consists of very poorly drained soils in depressions along the edge of the Everglades. Areas of these soils are oval or irregular in shape and range from 5 to 30 acres. Slopes are less than 2 percent. The areas are about 50 percent Denaud soil, 25 percent Gator soil, and 25 percent other soils. These soils are in too complex a pattern to be mapped separately at the selected scale.

Typically, the Denaud soil has a black muck surface layer about 11 inches thick. The subsurface layer is black fine sand to a depth of about 20 inches and dark gray fine sand to a depth of about 23 inches. The underlying material to a depth of about 42 inches is gray fine sandy loam. To a depth of 80 inches, it is light gray gravelly fine sand that has shell and calcareous concretions.

Typically, the Gator soil has a black muck surface layer about 32 inches thick. The subsurface layer to a depth of about 35 inches is black sandy loam. The underlying material to a depth of 51 inches is gray sandy clay loam. Calcium carbonate nodules are in the lower part of the underlying material.

Included with these soils in mapping are small areas of Basinger, Chobee, Delray, Gentry, Holopaw, Pineda, Riviera, and Winder soils. Also included are some areas of soils that have fractured discontinuous limestone. These inclusions normally occur around the edge of the delineations. Inclusions make up less than 25 percent of the map unit.

Under natural conditions the Denaud and Gator soils are ponded for 6 to 9 months in most years. The high water table is rarely below a depth of 20 inches. Permeability is rapid in the organic material of both soils and in the subsurface layer of the Denaud soil. It is moderate or moderately slow in the other layers of both soils. The available water capacity is very high in the organic material and high in the underlying material of the Gator soil. In the Denaud soil, it is very high in the surface layer, moderate or low in the subsurface layer, and moderate in the underlying material.

Most areas of these soils are used for improved pasture or wildlife habitat. Natural vegetation consists of blue maidencane and sawgrass in the fringe areas and fire flags, pickerelweed, pond lily, and willow in the other areas. Baldcypress is along the edge of some ponds.

Under natural conditions these soils are poorly suited to cultivated crops because of the wetness. If water control is adequate, some fruit and vegetable crops can be grown. The water-control system must remove excess water and provide irrigation. Crops respond well to fertilizer.

These soils are not suited to citrus.

If water control is adequate, these soils are suited to pasture. Fertilizer and controlled grazing are necessary for consistently high yields.

These soils are not suited to pine trees.

The high water table and the muck surface layer are severe limitations affecting most urban and recreational uses.

The capability subclass is VIIw.

70—Denaud muck. This very poorly drained soil is primarily in depressions along the edge of the Everglades. Areas of this soil are oval or irregular in shape and range from 5 to 30 acres. Slopes are less than 2 percent.

Typically, the Denaud soil has a black muck surface layer about 11 inches thick. The subsurface layer is black fine sand to a depth of about 20 inches and dark gray fine sand to a depth of about 23 inches. The underlying material is gray fine sandy loam to a depth of about 42 inches. To a depth of 80 inches, it is light gray gravelly fine sand that has shell and calcareous concretions.

Included with this soil in mapping are small areas of Basinger, Chobee, Delray, Gator, Gentry, Holopaw, Pineda, Riviera, and Winder soils. Also included are some areas of soils that have fractured discontinuous limestone. Except for the Gator soils, which generally occur in the center of the delineation, these inclusions normally occur around the edge of the delineation. These inclusions make up less than 25 percent of the map unit.

Under natural conditions this Denaud soil is ponded for 6 to 9 months in most years. The high water table is rarely below a depth of 20 inches. Permeability is rapid in the surface and subsurface layers and moderate or moderately slow in the underlying material. The available water capacity is very high in the surface layer, moderate or low in the subsurface layer, and moderate in the underlying material.

Most areas of this soil are used for improved pasture or wildlife habitat. Natural vegetation consists of blue maidencane, sawgrass, fire flags, pickerelweed, willow, and baldcypress.

Under natural conditions this soil is poorly suited to cultivated crops because of the wetness. If water control is adequate, some fruit and vegetable crops can be grown. The water-control system must remove excess water and provide irrigation. Crops respond well to fertilizer.

This soil is not suited to citrus.

If water control is adequate, this soil is suited to pasture. Fertilizer and controlled grazing are necessary for consistently high yields.

This soil is not suited to pine trees.

The high water table and the muck surface layer are severe limitations affecting most urban and recreational uses.

The capability subclass is IIIw.

73—Adamsville variant sand. This somewhat poorly drained soil is on a low-lying ridge near Clewiston. Areas of this soil are convex, long, and narrow and range from 20 to 40 acres. Slopes range from 0 to 5 percent.

Typically, this soil has a very dark gray sand surface layer about 6 inches thick. The upper part of the underlying material to a depth of about 49 inches is sand. It is light gray in the upper part, very dark grayish brown in the next part, and white in the lower part. The next layer to a depth of about 59 inches is black muck. The lower part of the underlying material to a depth of 80 inches is pale brown sand.

Included with this soil in mapping are small areas of Basinger, Boca, Immokalee, and Margate soils. The included soils make up less than 25 percent of the map unit.

Under natural conditions this Adamsville soil has a high water table at a depth of more than 30 inches during most of the year. During dry periods, the water table is at a depth of more than 60 inches. Permeability is rapid, and the available water capacity is low in the sandy layers and very high in the organic layer. Natural fertility is low.

Some areas of this soil are in natural vegetation, and others have been cleared and are used for homesites. Natural vegetation includes cabbage palm, strangler fig, cypress, shrubs, and ferns.

Under natural conditions this soil is poorly suited to cultivated crops. It is suited to a variety of vegetable crops if a water-control system is used. The system must remove excess water in wet periods and provide irrigation in dry periods. Crop residue should be used to protect the soil from erosion.

Under natural conditions this soil is not suited to citrus; however, if a water-control system maintains the high water table at a depth of about 4 to 6 feet, it is moderately well suited. Trees should be planted on beds, and a plant cover should be maintained between tree rows to protect the soil from erosion. Fertilizer and lime should be applied as needed.

This soil is moderately well suited to improved pasture, such as pangolagrass and bahiagrass. A water-control system is needed to remove excess water after periods of heavy rainfall.

The potential productivity for pine trees is moderately high. The equipment use limitation and seedling mortality are moderate. South Florida slash pine is a recommended tree to plant.

The high water table and the sandy texture are moderate or severe limitations affecting most urban and recreational uses. A water-control system is required if this soil is developed for urban or recreational uses. Fill material that is 3 feet or more thick or ditches that remove excess surface water are also required. Septic tank absorption fields do not function adequately unless the water table is lowered or fill material is added. The sandy texture and the high water table are also severe limitations affecting sites for sanitary landfills. Because cutbanks caving is a hazard in shallow excavations, shoring of side slopes is required.

The capability subclass is IIIw.

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 of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

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

Information in this section can be used to plan the use and management of soils for crops and pasture; as 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 limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

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

Contractors can use this survey to locate sources of sand 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 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 are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

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

About 310,000 acres in Hendry County was used for crops and pasture according to the 1980 Census of Agriculture. Of this total, 300,000 acres was used for pasture and 10,000 acres was used for vegetables, such as cucumbers, tomatoes, watermelons, peppers, and smaller acres of squash, eggplant, sod, and citrus nursery plants. In addition, about 325,000 acres was used as native range, and more than 43,000 acres was used for citrus. About 55,000 acres was used for sugarcane.

The potential for increased food production in Hendry County is good. In addition to the acres in pasture, about 170,000 acres of potentially good cropland is currently used as woodland. In addition to the reserve capacity represented by land not now in farming, food production could be increased considerably by extending the latest crop production technology to all cropland in the county. This soil survey can greatly facilitate the application of such technology.

The acreage in crops, pasture, and woodland has gradually been decreasing as more land is used for urban development. In 1980, about 17,000 acres of urban land or land being held for urbanization was in the county. According to Extension Service estimates, this acreage has increased about 10 percent per year for the past 10 years. The use of this soil survey to help make land use decisions that will influence the future role of farming in the county is discussed in the section "General Soil Map Units."

Because of major limitations, the soils in Hendry

County do not meet the requirements for prime farmland. The main management needs are measures that help to control erosion and soil blowing, improve drainage, and help to maintain fertility and tilth.

Soil erosion is not a major problem in Hendry County because the dominant slope is less than 2 percent. However, loss of the surface layer through erosion is damaging because productivity is reduced as the surface layer is lost and part of the subsoil is incorporated into the plow layer and because soil erosion on farmland also 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 protective surface cover, reduce runoff, and increase infiltration. Plant cover on the soil for extended periods can hold soil erosion losses to amounts that will not reduce the productive capacity of the soil. On livestock farms that require pasture and hay, the legume and grass forage crops in the cropping system reduce erosion and also provide nitrogen and improve tilth for the following crop.

Conservation tillage leaves crop residue on the soil surface, which increases organic matter, infiltration, and available water capacity. This practice can be adapted to most of the soils in the survey area.

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

Soil blowing 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. Maintaining a plant cover and surface mulch minimizes soil blowing.

Field windbreaks of adapted trees and shrubs, such as Carolina laurelcherry, 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 and 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 for the design of erosion control practices for each kind of soil is in the "Erosion Control Handbook—Florida," which is available in the local office of the Soil Conservation Service.

Soil drainage is a major management concern on much of the acreage used for crops and pasture in Hendry County. Some soils are naturally so wet that the production of crops common to the area generally is not practical without artificial drainage. These soils are the poorly drained soils (such as Basinger, Holopaw, Immokalee, Malabar, Myakka, Margate, Oldsmar, Pineda, Pompano, Riviera, Tuscawilla, Wabasso, Winder, and Valkaria soils) and the very poorly drained soils (such as Chobee, Dania, Denaud, Delray, Gentry, Okeelanta, Pahokee, Plantation, and Terra Ceia soils). Many of these soils also have a low available water capacity and are droughty during dry periods. A subsurface irrigation system is needed on these soils for adequate crop and pasture production.

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

Soil fertility is naturally low on most soils in Hendry County. Most of the soils have a strongly acid or very strongly acid surface layer. If lime has not been added, ground limestone is needed to raise the pH level sufficiently for good growth of crops. Nitrogen, potassium, and available phosphorus levels are naturally low in most of these soils. Additions of lime and fertilizer should be based on the results of soil tests, the needs of the crop, 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 that have good tilth are granular and porous.

Many of the soils in the county have a sandy surface layer that is light in color and that is low or moderate in content of organic matter. The Chobee, Dania, Delray, Gator, Gentry, Margate, Okeelanta, and Terra Ceia soils, however, have a dark sandy, loamy, or organic surface layer and are high in content of organic matter.

Generally, the structure of the surface layer of most of the soils in the county is weak. Soils that have a low content of organic matter form a slight crust following intense rainfall. The crust is slightly hard when it is dry and 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 improve soil structure and minimize crust formation.

Specialty crops grown commercially in Hendry County are citrus, watermelons, cucumbers, peppers, sugarcane, squash, eggplant, nursery plants, and sod. The latest information and suggestions for growing specialty crops can be obtained from local offices of the Soil Conservation Service and the Cooperative Extension Service.

Pastures in Hendry County are used to produce forage for beef cattle. Cow-calf operations are the major cattle systems. Bahiagrass is the major pasture plant. Grass seeds could be harvested from bahiagrass for improved pasture plantings as well as commercial purposes. Stargrass is also grown for pasture. Excess grass is harvested as hay during the summer for feeding during the winter.

If the Basinger, Boca, Gentry, Holopaw, Immokalee, Malabar, Myakka, Pineda, Riviera, and Wabasso soils are drained, they are well suited to bahiagrass and hemerthria grass pasture. Where subsurface irrigation is used, the length of the growing season and total forage production will increase. These soils are well suited to legumes, such as white clover, if adequate lime and fertilizer are added.

Pasture in some parts of the county is depleted by continuous excessive grazing. Yields of pasture can be increased by adding lime and fertilizer, including legumes in the cropping system, irrigating, and using other management practices. The amount and kind of pasture yields are closely related to the kind of soil. Proper management is based on the relationship of soils, pasture plants, lime, fertilizer, and moisture.

Expected yields for bahiagrass under a high level of management are shown in table 3.

The latest information and suggestions for growing pasture can be obtained from local offices of the Soil Conservation Service and the Cooperative Extension Service.

Yields Per Acre

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

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

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

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

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

Land Capability Classification

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

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

Class I soils have few limitations that restrict their use.

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

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

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

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

Class VI soils have severe limitations that make them generally not suited to cultivation.

Class VII soils have very severe limitations that make them not suited to 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, *w* or *s*, to the class numeral, for example, IIIw. The letter *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage) and *s* shows that the soil is limited mainly because it is shallow, droughty, or stony.

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

The acreage of soils in each capability class and subclass is shown in table 4. The capability classification of each map unit is given in the section "Detailed Soil Map Units."

Rangeland and Grazeable Woodland

R. Greg Hendricks, state range conservationist, Soil Conservation Service, helped prepare 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 of soils, vegetation, and water.

Table 5 shows, for each soil, the range site and the total 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 5 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, or 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 and a seasonal high water table are also important.

Potential annual production is the amount of vegetation that can be expected to grow annually on well managed rangeland that is supporting the climax 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, but 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, average, 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 unfavorable year, growing conditions are well below average, generally because of low available soil moisture.

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, season, amount of shade, growing conditions, and unseasonable dry periods.

Range management requires a knowledge of the kinds of soil and of the potential climax plant community. It also requires an evaluation of the present range condition. Range condition is determined by comparing the present plant community with the climax plant community on a particular range site. The more closely the existing community resembles the climax 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 climax 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.

Rangeland

Native grasses are an important part of the overall, year-round supply of forage to livestock producers in Hendry County. This forage is readily available. It is economical and provides important roughage needed by cattle, which are the principal grazing livestock produced in the area. About 325,000 acres of native rangeland is available to cattle producers. About 285,000 acres is used strictly as rangeland, and the rest is used by cattle producers in connection with pulp and timber operations as grazeable woodlands.

Rangeland consists of specific native vegetation that differs because of soil properties, light intensity, and water fluctuation. These recognizable differences in plant composition on rangeland in Florida are defined by 13 specific range sites, 8 of which occur in Hendry County. The dominant native forage plants that naturally grow on a range site generally are the most productive and the most suitable for livestock. These plants maintain themselves as long as the environment does not change. They are grouped into three categories according to their response to grazing—decreasers, increasers, and invaders.

Decreasers generally are the most abundant and most palatable plants on a given range site that is in good or excellent condition. They decrease in abundance if the rangeland is under continuous heavy grazing.

Increasers are plants less palatable to livestock. They increase for a short time under continuous heavy grazing but eventually decrease under continuous heavy grazing.

Invaders are native to rangelands in small amounts. They have very little forage value and tend to increase and become the new dominant plants as the decreaser and increaser plants have been grazed out.

Range condition is determined by comparing the present plant community with the potential climax 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 and does not have a specific meaning that pertains to the present plant community in a given use. The classes used to measure range condition are excellent, producing 76 to 100 percent of potential; good, producing 51 to 75 percent; fair, producing 26 to 50 percent; and poor, producing 0 to 25 percent.

About 15 percent of the rangeland in Hendry County is in good or excellent condition and about 85 percent is in poor or fair condition. For each soil in Hendry County that supports rangeland vegetation suitable for grazing, table 5 gives the range site that can be expected if the native vegetative cover has not been eliminated by the influences of man.

Table 6 shows the annual production of air-dry herbage per acre that can be expected in good, fair, and poor growth years for each range site in excellent condition. Good years are those in which climatic factors, such as rainfall and temperature, are favorable for plant growth. Moisture content in the plants varies as the growing season progresses and is not a measure of productivity. Forage refers to total vegetation produced annually on well managed rangeland and does not reflect forage value or grazing potentials. Table 6 also lists the most important native range plants that should be managed for best livestock production and rangeland integrity.

The productivity of soils is closely related to the natural drainage of the soil. The wettest soils, such as those in freshwater and saltwater marshes, produce the greatest amount of vegetation, while the deep, droughty soils normally produce the least amount of forage annually.

Management of the soils for range should be planned with potential productivity in mind. Soils with the highest production should be given highest priority when economic considerations are important.

Major management considerations revolve around livestock grazing. The objective in range management is to control grazing so that the native 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, conservation of water, and controlled erosion. The length of time an area should be grazed, the season it should be used, how long and when the range should be rested, the grazing pattern of livestock within a pasture that contains more than one soil, and the palatability of the dominant plants on the soil are basic considerations if rangeland is to be improved or maintained.

Rangeland improvement practices, such as mechanical brush control, controlled burning, and especially controlled livestock grazing, benefit rangelands. Predicting the effects of these practices is of the utmost importance. Without exception, the proper management of rangeland results in maximum sustained production, conservation of the soil and water resources, and improvement of the habitat for many wildlife species.

Grazeable Woodland

Grazeable woodland is forest that has an understory of native grasses, legumes, and forbs. The understory is an integral part of the forest plant community. The native plants can be grazed without significantly impairing other forest values. On such forest land, grazing is compatible with timber management if it is controlled or managed in such a manner that timber and forage resources are maintained or enhanced.

Understory vegetation consists of grasses, forbs, shrubs, and other plants within the reach of livestock or used by grazing or browsing wildlife. A well managed forest can produce enough understory vegetation to support an optimum number of livestock or wildlife, or both.

Forage production of grazeable woodland varies according to the different kinds of grazeable woodland; the amount of shade cast by the canopy; the accumulation of fallen needles; the influence of time and intensity of grazing on the present grasses; absence of grass and forage production; and the number, size, and spacing and site preparation method of tree plantings.

Woodland Management and Productivity

Soils vary in their ability to produce trees. Depth, fertility, texture, and the available water capacity influence tree growth. Elevation, aspect, and climate determine the kinds of trees that can grow on a site. Available water capacity and depth of the root zone are major influences of tree growth.

This soil survey can be used by woodland managers planning ways to increase the productivity of forest land. Some soils respond better to fertilization than others, and some are more susceptible to landslides and erosion after roads are built and timber is harvested. Some soils require special efforts to reforest. In the section "Detailed Soil Map Units," each map unit in the survey area suitable for producing timber is described in terms of productivity, limitations for harvesting timber, and management concerns for producing timber. The common forest understory plants are also listed. Table 7 summarizes this forestry information and rates the soils for a number of factors to be considered in management. *Slight, moderate*, and *severe* are used to indicate the degree of the major soil limitations to be considered in forest management.

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

Table 7 lists the *ordination symbol* for each soil. The first part of the ordination symbol, a number, indicates the potential productivity of a soil for the indicator species in cubic meters per hectare. The indicator species is the tree that is common in the area and that is generally the most productive on the soil. The larger the number, the greater the potential productivity. Potential productivity is based on the site index and the point where mean annual increment is the greatest.

The second part of the ordination symbol, a letter, indicates the major kind of soil limitation for use and management. The letter *W* indicates a soil in which excessive water, either seasonal or year-round, causes a significant limitation. The letter *S* indicates a dry, sandy soil. If a soil has more than one limitation, the priority is W and then S.

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

Ratings of *equipment limitation* indicate limits on the use of forest management equipment, year-round or seasonal, because of such soil characteristics as slope, wetness, stoniness, or susceptibility of the surface layer to compaction. The rating is *slight* if equipment use is restricted by soil wetness for less than 2 months and if special equipment is not needed. The rating is *moderate* if soil wetness restricts equipment use from 2 to 6 months per year or if special equipment is needed to avoid or reduce soil compaction. The rating is *severe* if soil wetness restricts equipment use for more than 6 months per year or if special equipment is needed to avoid or reduce soil compaction. Ratings of *moderate* or *severe* indicate a need to choose the most suitable equipment and to carefully plan the timing of harvesting and other management operations.

Ratings of *seedling mortality* refer to the probability of death of naturally occurring or properly planted seedlings of good stock in periods of normal rainfall as influenced by kinds of soil or topographic features.

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

Ratings of *windthrow hazard* indicate the likelihood of trees being uprooted by the wind. Restricted rooting depth is the main reason for windthrow. Rooting depth can be restricted by a high water table or bedrock or by a combination of such factors as soil wetness, texture, structure, and depth. The risk is *slight* if strong winds cause trees to break but do not uproot them; *moderate* if strong winds cause an occasional tree to be blown over and many trees to break; and *severe* if moderate or strong winds commonly blow trees over. Ratings of *moderate* or *severe* indicate the need for care in thinning or possibly not thinning. Specialized equipment may be needed to avoid damage to shallow root systems in partial cutting operations. A plan for periodic salvage of windthrown trees and the maintenance of a road and trail system may be needed.

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

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

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

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

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

Recreation

In table 8, the soils of the survey area are rated according to the limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 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 gentle 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, 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 nearly 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 well drained, 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 free of 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, biologist, Soil Conservation Service, helped prepare this section.

Good habitat for wildlife is available in most of Hendry County. The large areas of flatwoods interspersed with marshes, sloughs, and swamps provide habitat for a variety of wildlife species, especially for wading birds and other wetland species.

The primary game species are deer, wild turkey, quail, and feral hogs. Other wildlife species include gray fox, skunks, snipe, raccoon, opossum, bobcat, armadillo, otter, and a variety of songbirds, woodpeckers, wading birds, reptiles, and amphibians. Largemouth bass, various sunfishes, catfish, and chain pickerel provide good fishing in the Caloosahatchee River and larger wetland ponds.

The habitat for wildlife shows little evidence of pressure from urban development, but the changes in habitat caused by converting the native rangelands to improved pasture are detrimental to wildlife. Some range areas could offer better wildlife habitat if grazing and burning practices were improved.

A number of endangered or threatened species are in the county. They range from the easily recognizable wood stork to the seldom seen red-cockaded woodpecker. A complete list of such species with information on range and habitat can be obtained from the district conservationist at the local office of the Soil Conservation Service.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, maintaining the existing plant cover, or 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, and wetness. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, browntop millet, cowpeas, 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, and wetness. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are bahiagrass, deervetch, sesbania, and clover.

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, and wetness. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, partridge pea, and bristlegrass.

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, saw palmetto, dahoon, red maple, wild grape, sweetgum, blackberry, and blueberry. 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, and reaction. Examples of wetland plants are smartweed, wild millet, maidencane, pickerelweed, cordgrass, rushes, sedges, and reeds.

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

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

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

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

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

Habitat for rangeland wildlife consists of areas of shrubs and wild herbaceous plants. Wildlife attracted to rangeland include deer, meadowlark, and lark bunting.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

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

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

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

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

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

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

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

Building Site Development

Table 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 and soil texture. 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 caving is affected by soil texture and the depth to the water table.

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

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

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

Sanitary Facilities

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

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

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent and surfacing of effluent, 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 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 texture and 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 permeability, depth to a high water table, depth to bedrock, 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. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Bedrock can cause construction problems.

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

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

The ratings in table 11 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock, depth to a high water table, and flooding affect both types of landfill. Texture, highly organic layers, and soil reaction affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

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

Soil texture and wetness 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. Sandy soils are subject to soil blowing.

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

Construction Materials

Table 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 a high water table. 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, and few coarse fragments. 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. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10 and high shrink-swell potential. 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) and the thickness of suitable material. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

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

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

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

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of cobbles and have little or no gravel. 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, or soils that have only 20 to 40 inches of suitable material. 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, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and releases a variety of plant-available nutrients as it decomposes.

Water Management

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

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

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

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

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

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of 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 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; and subsidence of organic layers. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by 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 20.

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 20.

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.

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

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

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at ⅓ bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

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

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

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

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

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

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

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

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion. Losses are expressed in tons per acre per year. These estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.02 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur over a sustained period without affecting crop productivity. The rate is expressed in tons per acre per year.

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

1. Sands, coarse sands, fine sands, and very fine sands. They are extremely erodible, and vegetation is difficult to establish.

2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, and sapric organic soils. These soils are very highly erodible. Crops can be grown if intensive measures to control wind erosion are used.

3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control wind erosion are used.

4L. Calcareous loams, silt loams, clay loams, and silty clay loams. These soils are erodible. Crops can be grown if intensive measures to control wind erosion are used.

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

5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic organic soils. These soils are slightly erodible. Crops can be grown if measures to control wind erosion are used.

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

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

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

Organic matter is the plant and animal residue in the soil at various stages of decomposition.

In table 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 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 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 rating means that under natural conditions the soil is in hydrologic group D, but by artificial methods the water table can be lowered sufficiently so that the soil fits into 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.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 16 are the depth to the seasonal high water table; the kind of water table, that is, *apparent;* and the months of the year that the water table commonly is highest. A water table that is seasonally high for less than 1 month is not indicated in table 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.

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

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

Subsidence is the settlement of organic soils or of saturated mineral soils of very low density. Subsidence results from either desiccation and shrinkage or oxidation of organic material, or both, following drainage. Subsidence takes place gradually, usually over a period of several years. Table 16 shows the expected initial subsidence, which usually is a result of drainage, and total subsidence, which results from a combination of factors.

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

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

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

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

Physical, Chemical, and Mineralogical Analyses of Selected Soils

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

Parameters for physical, chemical, and mineralogical properties of representative pedons sampled in Hendry County are in tables 17, 18, and 19. The analyses were conducted and coordinated by the Soil Characterization Laboratory at the University of Florida. Detailed profile descriptions of the analyzed soils are given in alphabetical order in the section "Classification of the Soils." Laboratory data and profile information for additional soils in Hendry County, as well as for other counties in Florida, are on file at the University of Florida, Soil Science Department.

Typifying pedons were sampled from pits at carefully selected locations. Samples were air dried, crushed, and sieved through a 2-millimeter screen. Most analytical methods used are outlined in Soil Survey Investigations Report No. 1 *(12)*.

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

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

Electrical conductivity determinations were made with a conductivity bridge on 1:1 soil to water mixtures. Iron and aluminum extractable in sodium dithionite-citrate were determined by atomic absorption spectrophotometry. Aluminum, carbon, and iron were extracted from probable spodic horizons with 0.01 molar sodium pyrophosphate. Determination of aluminum and iron was by atomic absorption, and determination of extracted carbon was by the Walkley-Black wet combustion method.

Mineralogy of the clay fraction of less than 2 microns was ascertained by x-ray diffraction. Peak heights at 18-, 14-, 7.2-, and 4.31-angstrom positions represent montmorillonite, interstratified expandable vermiculite or 14-angstrom intergrades, kaolinite, and quartz, respectively. Peaks were measured, summed, and normalized to give the percent of soil minerals identified in the x-ray diffractograms. These percentage values do not indicate absolute determined quantities of 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 of the mineral soils sampled for laboratory analyses in Hendry County are inherently sandy in the upper part of the solum (table 17) and have argillic horizons in the lower part of the solum. Many are underlain with limestone. Except for the Chobee soils, all other pedons have one or more horizons in which the total sand content exceeds 90 percent. Oldsmar soils have more than 90 percent sand to a depth of more than 1 meter.

Only the Chobee soils have large amounts of clay throughout the entire pedon. The clay content ranges from 16.1 to 23.4 percent. Deeper argillic horizons in the Oldsmar, Pineda, and Riviera soils have content of clay ranging from 14.4 to 24.6 percent.

Silt content exceeds 9 percent in the Chobee soils almost to a depth of 1 meter, but it rarely exceeds 5 percent in other soils.

Fine sand dominates the sand fractions throughout all of the soils in Hendry County except Oldsmar soils, which are dominated by medium sand. Except for the Chobee and Oldsmar soils, all of the soils have one horizon or more in which fine sand content exceeds 50 percent. Measurable amounts of very coarse sand, generally less than 0.5 percent, are in one horizon or more of all the soils. The content of coarse sand generally is less than 10 percent; however, four horizons of the Pineda soils exceed this amount. The content of very fine sand generally is less than 6 percent; however, all but the deepest horizon of the Chobee soils considerably exceed this value. The sandy soils rapidly become droughty during periods of low precipitation when rainfall is widely scattered. Conversely, these sandy soils are rapidly saturated when heavy amounts of rainfall occur.

The hydraulic conductivity value of most of the soils ranges from about 30 to 60 centimeters per hour in horizons in the upper part of the solum, but it rarely exceeds 0.5 centimeter per hour in the deeper argillic horizons. The higher clay content in the Chobee soils results in a hydraulic conductivity value of 0.3 centimeter per hour or less. Design and function of septic tank absorption fields are affected by low hydraulic conductivity value. The spodic horizons in the Oldsmar soils have higher hydraulic conductivity value than is generally recorded for these horizons in most of the soils in Florida. The available water for plants can be estimated from bulk density and water content data. Excessively sandy soils, such as Pineda sand, retain very low amounts of available water; conversely, soils that have a higher amount of fine-textured material and a higher content of organic matter, such as Chobee fine sandy loam, retain much larger amounts of available water.

Chemical analyses (table 18) show that a wide range of extractable bases are in the soils of Hendry County. Except for Chobee and Plantation soils, all of the other soils have one or more horizons that have less than 1 milliequivalent per 100 grams extractable bases. Chobee soils have more than 22 milliequivalents per 100 grams extractable bases. The mild, humid climate of Hendry County results in depletion of basic cations (calcium, magnesium, sodium, and potassium) through leaching.

Calcium is the dominant base in all of the soils of Hendry County. Slightly more magnesium than calcium occurs only in the surface horizon of Plantation muck. All soils have one horizon or more in which extractable calcium content exceeds 9.5 milliequivalents per 100 grams. Extractable magnesium of 1 milliequivalent or more occurs in one horizon or more of all the soils except Oldsmar and Riviera soils. The highest amounts of extractable calcium (ranging from 15 to 27 milliequivalents per 100 grams) and the highest amounts of extractable magnesium (ranging from 6 to 11 milliequivalents per 100 grams) occur in the Chobee soils. Sodium generally occurs in amounts that are much less than 0.2 milliequivalent per 100 grams; however, practically all horizons of the Chobee soils and the surface horizon of Plantation muck exceed this value. All soils have one horizon or more that has 0.04 or less milliequivalent per 100 grams extractable potassium. Some soils have horizons with nondetectable amounts of potassium.

Values for cation-exchange capacity, an indicator of plant nutrient-holding capacity, exceed 10 milliequivalents per 100 grams in the surface layer of all soils except the Oldsmar, Pineda, and Riviera soils. Enhanced cation-exchange capacities occur in all argillic horizons. Soils, such as Pineda soils, that have a low cation-exchange capacity in the surface layer require only small amounts of lime or sulfur to significantly alter the base status and soil reaction. Generally, soils of low inherent soil fertility are associated with low values for extractable bases and low cation-exchange capacities, and fertile soils are associated with high extractable base values, high base saturation values, and high cation-exchange capacities.

The content of organic carbon is less than 1 percent throughout the Pineda soils and in all horizons below the surface layer of the Chobee, Margate, and Riviera soils. The surface layer of the Margate and Plantation soils is the only horizon that has more than 4 percent organic carbon. The best developed spodic horizon occurring in the Oldsmar soils has enhanced amounts of organic carbon ranging from 1.28 to 1.77 percent. In the other soils, the content of organic carbon decreases rapidly as depth increases. Since the content of organic carbon in the surface layer is directly related to soil nutrient- and water-holding capacities of sandy soils, management practices that conserve and maintain the amount of organic carbon are highly desirable.

Electrical conductivity values are all very low, ranging from 0.01 to 0.27 millimhos per centimeter. The highest electrical conductivity values occur throughout the Chobee soils. These data indicate that the content of soluble salt in soils sampled in Hendry County is insufficient to detrimentally affect the growth of salt-sensitive plants.

Soil reaction in water ranges from pH 4.1 in the surface layer of the Oldsmar soils that have a limestone substratum to pH 8.4 in the C horizon of the Chobee soils. Soil reaction frequently is lower, about 1.0 pH unit or less, when determined in potassium chloride and calcium chloride solutions than in water. Maximum plant nutrient availability is generally attained when soil reaction is between pH 6.5 and 7.5; however, under Florida conditions, maintaining soil reaction above pH 6.5 is not economically feasible for most agricultural production purposes.

The ratio of pyrophosphate extractable carbon and aluminum to clay in the Bh horizon of the Oldsmar soils is sufficient to meet the chemical criteria for spodic horizons. Pyrophosphate extractable iron and aluminum ratio to citrate-dithionite extractable iron and aluminum is also sufficient to meet spodic horizon criteria. Sodium pyrophosphate extractable iron is 0.05 percent or less in the spodic horizon of these soils.

Citrate-dithionite extractable iron in the argillic horizon of Chobee, Pineda, and Riviera soils ranges from 0.13 to 1.89 percent. These values in the Bh horizon of the Oldsmar soils range from 0.03 to 0.11 percent. Aluminum extracted by citrate-dithionite from the Bt horizon in the Chobee, Pineda, and Riviera soils ranges from 0.02 to 0.17 percent. The amounts of iron and aluminum in Hendry County soils are not sufficient to detrimentally affect phosphorus availability.

Sand fractions of 2.0 millimeters to 0.05 millimeter are siliceous, and quartz is overwhelmingly dominant in all pedons. Small amounts of heavy minerals occur in most horizons with the greatest concentrations in the very fine sand fraction. No weatherable minerals are observed. Crystalline mineral components of the clay fraction of less than 0.002 millimeter are shown in table 19 for major horizons of the pedons sampled. The clay mineralogical suite is composed mostly of montmorillonite, a 14-angstrom intergrade, kaolinite, and quartz. Feldspar and goethite also occur in the Pineda sand.

Large amounts of montmorillonite occur in all pedons sampled. The 14-angstrom intergrade is not detectable in the Chobee soils as well as in several horizons of Pineda sand and the Oldsmar soils. Kaolinite occurs in all other horizons for which determinations for clay identification were performed except in the Bw and Bw1 horizons of the Pineda soils. Varying amounts of quartz occur in all pedons; however, quartz is not detectable in the Btg1 horizon of Riviera fine sand.

Montmorillonite is dominant in Hendry County soils. The occurrence of relatively large amounts of montmorillonite suggests that it is among the most stable minerals in this neutral or alkaline weathering environment. Much smaller amounts of montmorillonite are in most horizons of the Margate and Oldsmar soils because this mineral is not stable in an acidic environment. The Chobee soils have a large amount of clay that is mostly montmorillonitic. Considerable volume change can result from shrinking and swelling of montmorillonitic soil materials that have a high content of clay.

Large amounts of 14-angstrom intergrade minerals and quartz occur in the Margate and Oldsmar soils because these are among the most stable clay minerals in an acidic environment. Clay-size quartz has primarily resulted from decrements of the silt fraction. Kaolinite has a tendency to increase as pedon depth increases, but the tendency is inconsistent. Soils dominated by montmorillonite have a much higher cation-exchange capacity and retain more plant nutrients than soils dominated by 14-angstrom intergrade minerals, kaolinite, and quartz.

Engineering Index Test Data

Table 20 shows laboratory index 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.

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

The tests and methods are AASHTO classification—M 145 (AASHTO), D 3282 (ASTM); Unified classification—D 2487 (ASTM); Mechanical analysis—T 88 (AASHTO), D 2217 (ASTM); Liquid limit—T 89 (AASHTO), D 423 (ASTM); Plasticity index—T 90 (AASHTO), D 424 (ASTM); Moisture density, Method A—T 99 (AASHTO), D 698 (ASTM); California bearing ratio—T 193 (AASHTO), D 1883 (ASTM); Shrinkage—T 92 (AASHTO), D 427 (ASTM); Limestone bearing ratio—Florida Highway Standard; and Volume change (Abercrombie)—Georgia Highway Standard.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(11)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or on laboratory measurements. Table 21 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

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

SUBORDER. Each order is divided into suborders, primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is 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 sandy texture, plus *aquent*, the suborder of the Entisols that has an aquic moisture regime).

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

Soil Series and Their Morphology

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

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the *Soil Survey Manual (10)*. Many of the technical terms used in the descriptions are defined in *Soil Taxonomy (11)*. 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."

Adamsville Series

The Adamsville series is a member of the hyperthermic, uncoated family of Aquic Quartzipsamments. It consists of somewhat poorly drained, rapidly permeable soils that formed in sandy marine sediment. These soils are on low, sandy ridges. Slope is 0 to 2 percent.

Adamsville soils are associated on the landscape with Holopaw, Oldsmar, Pompano, and Wabasso soils. Holopaw soils are poorly drained and have an argillic horizon. Oldsmar and Wabasso soils have a spodic and an argillic horizon. Pompano soils are poorly drained.

Typical pedon of Adamsville fine sand; about 0.6 mile west of Highway 29 and 0.1 mile north of Highway 80 in La Belle, SE¼SW¼ sec. 5, T. 43 S., R. 29 E.

A—0 to 5 inches; dark gray (10YR 4/1) fine sand; weak fine granular structure; very friable; slightly acid; clear wavy boundary.

C1—5 to 25 inches; light gray (10YR 7/1) fine sand; single grained; loose; slightly acid; clear wavy boundary.

C2—25 to 45 inches; brown (10YR 5/3) fine sand; common medium faint light gray (10YR 7/2) mottles; single grained; loose; slightly acid; gradual wavy boundary.

C3—45 to 70 inches; light gray (10YR 7/2) fine sand; common medium prominent yellowish brown (10YR 5/8) mottles; single grained; loose; slightly acid; gradual wavy boundary.

C4—70 to 80 inches; light brownish gray (10YR 6/2) fine sand; single grained; loose; slightly acid.

Silt plus clay content is less than 5 percent in the 10- to 40-inch control section. Texture is sand or fine sand. Reaction is very strongly acid to mildly alkaline.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2, or it is neutral in hue and has value of 2 to 5.

The C horizon has hue of 10YR, value of 5 to 8, and chroma of 1 to 4. Most pedons have mottles in shades of gray, yellow, or brown.

Adamsville Variant

The Adamsville variant is a member of the hyperthermic, uncoated family of Aquic Quartzipsamments. It consists of somewhat poorly drained, rapidly permeable soils that formed in sandy marine sediment. Slope ranges from 0 to 5 percent.

Adamsville variant soils are associated on the landscape with Immokalee, Oldsmar, Hallandale, and Margate soils. All of the associated soils are poorly drained. Immokalee and Oldsmar soils have a spodic horizon. In addition, Oldsmar soils have an argillic horizon at a depth of more than 40 inches. Hallandale and Margate soils have limestone within a depth of 40 inches.

Typical pedon of Adamsville variant sand; in a natural area about 0.5 mile northwest of Clewiston and 0.3 mile southwest of Lake Okeechobee, SE¼NE¼ sec. 9, T. 43 S., R. 34 E.

A—0 to 6 inches; very dark gray (10YR 3/1) sand; weak fine granular structure; very friable; slightly acid; clear wavy boundary.

C1—6 to 15 inches; light gray (10YR 7/1) sand; single grained; loose; slightly acid; clear smooth boundary.

C2—15 to 19 inches; very dark grayish brown (10YR 3/2) sand; common light gray (10YR 7/1) uncoated sand grains; single grained; loose; slightly acid; clear wavy boundary.

C3—19 to 49 inches; white (10YR 8/1) sand; single grained; loose; slightly acid; abrupt smooth boundary.

Oab—49 to 59 inches; black (10YR 2/1) muck; about 70 percent fiber when unrubbed, about 10 percent when rubbed; weak fine granular structure; friable; extremely acid; clear wavy boundary.

Cb—59 to 80 inches; pale brown (10YR 6/3) sand; single grained; loose; slightly acid.

Reaction is strongly acid to slightly acid in the mineral material and extremely acid or very strongly acid in the buried organic horizon. Silt plus clay content is less than 5 percent in the 10- to 40-inch control section.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2.

The C horizon has hue of 10YR, value of 5 to 8, and chroma of 1 to 4. It has many uncoated sand grains.

The buried Oa horizon has hue of 10YR to 5YR, value of 2, and chroma of 2 or less.

The buried C horizon has hue of 10YR, value of 6 or 7, and chroma of 1 to 3. Texture is sand or fine sand.

Basinger Series

The Basinger series is a member of the siliceous, hyperthermic family of Spodic Psammaquents. It consists of poorly drained, very rapidly permeable soils that formed in sandy marine sediment. These soils are in sloughs and depressions in broad flatwood areas. Slope is less than 2 percent.

Basinger soils are associated on the landscape with Immokalee, Margate, Myakka, Pompano, and Valkaria soils. Immokalee and Myakka soils have a spodic horizon. Margate soils have limestone at a depth of 20 to 40 inches. Pompano soils do not have a Bh horizon. Valkaria soils have a high-chroma Bw horizon.

Typical pedon of Basinger sand; 3.3 miles north of Sears Road, 1.8 miles east of Highway 29, and about 7 miles south of La Belle, NE¼SE¼ sec. 34, T. 43 S., R. 29 E.

A—0 to 6 inches; very dark gray (10YR 3/1) sand; weak medium granular structure; very friable; medium acid; abrupt wavy boundary.
E—6 to 25 inches; light brownish gray (10YR 6/2) sand; single grained; loose; medium acid; clear wavy boundary.
Bh—25 to 50 inches; dark yellowish brown (10YR 4/4) sand; single grained; loose; medium acid; gradual wavy boundary.
C—50 to 80 inches; light brownish gray (2.5Y 6/2) sand; single grained; loose; slightly acid.

Texture is sand or fine sand to a depth of 80 inches or more. Reaction is extremely acid to neutral.

The A horizon has hue of 10YR, value of 3 to 6, and chroma of 1; has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2; or is neutral in hue and has value of 2 to 4.

The E horizon has hue of 10YR and value of 6 and chroma of 2 or less, value of 7 and chroma of 4 or less, or value of 8 and chroma of 1 or 2 or is neutral in hue and has value of 5 to 8. This horizon is 5 to 30 inches thick.

The Bh horizon is within a depth of 40 inches and has common to many uncoated sand grains. It dominantly has hue of 10YR and value and chroma of 3 or 4. Colors are variable, but the value is always more than one unit darker than the value of the E horizon. In some pedons this layer is a Bh/E horizon. The Bh part has hue of 10YR, value of 3 or 4, and chroma of 2; hue of 7.5YR, value of 3, and chroma of 2; hue of 7.5YR, value of 4, and chroma of 2 to 4; or hue of 5YR, value of 3, and chroma of 3 or 4. The E part has the same color range as that of the E horizon.

The C horizon has hue of 10YR, 2.5Y, or 5Y and value of 5 to 8 and chroma of 1 or 2 or value of 4 to 6 and chroma of 3.

Boca Series

The Boca series is a member of the loamy, siliceous, hyperthermic family of Arenic Ochraqualfs. It consists of poorly drained and very poorly drained, moderately permeable soils that formed in moderately thick beds of sandy and loamy marine sediments over limestone. These soils are on flatwoods and in depressions. Slope is 0 to 2 percent.

Boca soils are associated on the landscape with Hallandale, Holopaw, Malabar, Margate, Pineda, Riviera, and Wabasso soils. Holopaw, Malabar, Pineda, Riviera, and Wabasso soils are not underlain by limestone. Hallandale and Margate soils do not have an argillic horizon. Hallandale soils have limestone within a depth of 20 inches. Holopaw and Malabar soils have a Bt horizon at a depth of more than 40 inches. Malabar and Pineda soils have a high-chroma Bw horizon. Wabasso soils have a spodic horizon.

Typical pedon of Boca sand; about 0.75 mile east of Florida Highway 29 and 1.125 miles south of Florida Highway 80, in La Belle, SW¼NE¼ sec. 16, T. 43 S., R. 29 E.

A1—0 to 2 inches; very dark gray (10YR 3/1) sand; weak fine granular structure; very friable; strongly acid; abrupt wavy boundary.
A—2 to 7 inches; gray (10YR 5/1) sand; weak fine granular structure; very friable; many black streaks in root channels; strongly acid; gradual wavy boundary.
E—7 to 27 inches; light gray (10YR 7/2) fine sand; single grained; loose; common very dark grayish brown streaks in root channels; medium acid; abrupt wavy boundary.
EB—27 to 28 inches; dark grayish brown (10YR 4/2) fine sand; single grained; loose; medium acid; abrupt wavy boundary.
Btg—28 to 33 inches; grayish brown (10YR 5/2) fine sandy loam; common fine and medium distinct yellowish brown (10YR 5/6) and few fine prominent red (2.5YR 4/6) mottles; slightly sticky and slightly plastic; slightly acid; abrupt irregular boundary.
2R—33 inches; angular limestone; fissures and solution basins at intervals of 1 to 6 feet.

The thickness of the solum and depth to limestone range from 20 to 40 inches. The depth is greater in pedons that have solution basins. Depth to the argillic horizon ranges from 20 to 40 inches in most pedons. The argillic horizon generally is deeper in pedons that have solution basins.

The A horizon has hue of 10YR or 2.5Y, value of 2 to 5, and chroma of 1 or 2. It is 3 to 9 inches thick. Where value is less than 3.5, this horizon is less than 6 inches thick. Reaction ranges from strongly acid to mildly alkaline.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 3 or less. Texture is sand or fine sand.

Where present, the EB horizon has hue of 10YR, value of 3 to 7, and chroma of 2 to 8 or hue of 7.5YR, value of 4, and chroma of 2. Some pedons have mottles in shades of brown, yellow, or gray. Texture is fine sand or sand. Reaction is strongly acid to mildly alkaline.

The Btg horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 or 2. Mottles in shades of gray, yellow, or brown are common. Texture is sandy loam, fine sandy loam, or sandy clay loam. Reaction is slightly acid to moderately alkaline and can be calcareous in places near the bedrock.

Some pedons have a 2C horizon that is as much as 3 inches thick. This horizon is partly decomposed, calcareous material underlain by angular limestone that has numerous fractures and solution basins.

Chobee Series

The Chobee series is a member of the fine-loamy, siliceous, hyperthermic family of Typic Argiaquolls. It consists of very poorly drained, slowly permeable soils that formed in loamy marine sediment. These soils are in swamps and marshes. Slope is less than 2 percent. These soils are taxadjuncts to the Chobee series because they have a calcic horizon. The calcium carbonate content is only slightly more than the minimum for a calcic horizon. This difference, however, does not significantly affect the use and management of these soils.

Chobee soils are associated on the landscape with Boca, Gator, Gentry, Riviera, Wabasso, and Winder soils. Boca soils do not have a mollic epipedon and have limestone at a depth of 20 to 40 inches. Gator soils are organic. Gentry soils have an argillic horizon at a depth of 20 to 40 inches. Wabasso soils have a Bh horizon that is underlain by a Bt horizon. Winder soils do not have a mollic epipedon.

Typical pedon of Chobee fine sandy loam, depressional; about 11.5 miles east of Felda, about 0.5 mile east and 0.4 mile south of the northwest corner of sec. 29, T. 45 S., R. 31 E.

A—0 to 9 inches; black (10YR 2/1) fine sandy loam; moderate medium granular structure; friable; mildly alkaline; gradual wavy boundary.

Btg—9 to 13 inches; gray (10YR 5/1) fine sandy loam; weak medium granular structure; friable; moderately alkaline; clear wavy boundary.

Btkg1—13 to 28 inches; light gray (10YR 7/1) sandy clay loam; weak medium subangular blocky structure; friable; moderately alkaline; calcareous; gradual wavy boundary.

Btkg2—28 to 39 inches; light gray (10YR 7/1) sandy clay loam; few fine distinct yellow (10YR 7/8) mottles; moderate medium subangular blocky structure; friable; moderately alkaline; calcareous; clear wavy boundary.

Btkg3—39 to 68 inches; light gray (10YR 7/1) sandy clay loam; common medium and coarse prominent brownish yellow (10YR 6/6) mottles; weak coarse subangular blocky structure; friable; moderately alkaline; calcareous; clear wavy boundary.

Cg—68 to 80 inches; light gray (10YR 7/2) fine sandy loam; massive; moderately alkaline.

The solum is more than 40 inches thick. In some pedons a muck layer that is as much as 5 inches thick is on the surface.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2 or is neutral and has value of 2 or 3. Texture is sandy loam, fine sandy loam, or loamy sand. Reaction is slightly acid to mildly alkaline.

The Btg and Btkg horizons have hue of 10YR, value of 2 to 7, and chroma of 1; are neutral in hue and have value of 2 to 7; have hue of 5Y, value of 4 to 6, and chroma of 2; or have hue of 2.5Y, value of 4 or 5, and chroma of 2. Yellowish mottles are in pedons that have hue of 5Y or 2.5Y. Texture is sandy loam, fine sandy loam, or sandy clay loam. Reaction is slightly acid to moderately alkaline in the Btg horizon and neutral to moderately alkaline and calcareous in the Btkg horizon.

The Cg horizon has hue of 10YR, value of 4 to 7, and chroma of 1 or 2; hue of 2.5Y, value of 5 to 7, and chroma of 2; hue of 5Y, value of 5 to 7, and chroma of 1 or 2; or hue of 5G or 5GY, value of 5 to 7, and chroma of 1. Some pedons have mottles. Texture is fine sandy loam, sandy loam, or loamy sand. In some pedons the Cg horizon is a mixture of sand, shell, and loamy carbonatic material.

Dania Series

The Dania series is a member of the euic, hyperthermic, shallow family of Lithic Medisaprists. It consists of very poorly drained, rapidly permeable, organic soils that are underlain by limestone. These soils are mainly in the Everglades. Slope is less than 2 percent.

Dania soils are associated with Lauderhill, Pahokee, and Terra Ceia soils. Lauderhill and Pahokee soils are organic and have limestone below a depth of 20 inches. Terra Ceia soils are muck to a depth of more than 51 inches and are not underlain by limestone.

Typical pedon of Dania muck; in a sugarcane field about 20 miles south of Clewiston on the Palm Beach County line, NE¼NE¼ sec. 36, T. 46 S., R. 34 E.

Oap—0 to 6 inches; black (5YR 2/1) muck; 5 percent fiber; moderate fine and medium granular structure; friable; slightly acid; abrupt wavy boundary.

Oa—6 to 14 inches; dark reddish brown (5YR 3/3) muck; 30 percent fiber when unrubbed, 5 percent when rubbed; moderate medium granular structure; friable; neutral; clear wavy boundary.

C—14 to 18 inches; very dark gray (10YR 3/1) fine sand; weak medium subangular blocky structure; friable; mildly alkaline; abrupt irregular boundary.

R—18 inches; hard limestone bedrock.

These soils are only 8 to 20 inches thick over limestone. Reaction is medium acid to neutral in the organic material and slightly acid to moderately alkaline in the C horizon.

The Oa horizon has hue of 10YR to 5YR, value of 2 or 3, and chroma of 1. Fiber content ranges from 5 to 33 percent when unrubbed and is less than 16 percent when rubbed.

The C horizon has hue of 10YR, value of 2 to 6, and chroma of 1 to 3. Texture is sand, fine sand, loamy sand, or loamy fine sand. This horizon is as much as 6 inches thick. Some pedons do not have a C horizon.

Some pedons have a 2C horizon that has hue of 10YR, value of 7 or 8, and chroma of 1 or 2. Texture is calcareous sand, fine sand, sandy loam, or sandy clay loam. This horizon is as much as 3 inches thick.

Delray Series

The Delray series is a member of the loamy, siliceous, hyperthermic family of Grossarenic Argiaquolls. It consists of very poorly drained, moderately permeable soils that formed in sandy and loamy marine sediment. These soils are in swamps and marshes. Slope is less than 2 percent.

Delray soils are associated on the landscape with Gentry, Gator, Holopaw, Immokalee, Okeelanta, Oldsmar, and Riviera soils. Gentry and Riviera soils have an argillic horizon at a depth of 20 to 40 inches. In addition, Riviera soils do not have a mollic epipedon. Immokalee and Oldsmar soils are on adjacent flatwoods in slightly higher positions on the landscape than the Delray soils. They have a spodic horizon. Okeelanta and Gator soils are organic.

Typical pedon of Delray sand, depressional; about 2.15 miles east of the Lee County line and 50 feet south of Highway 80, NW¼SW¼ sec. 28, T. 43 S., R. 28 E.

A1—0 to 15 inches; black (10YR 2/1) sand; weak medium granular structure; very friable; neutral; gradual wavy boundary.

A2—15 to 22 inches; very dark gray (10YR 3/1) sand; common medium faint gray (10YR 5/1) mottles; weak medium granular structure; very friable; slightly acid; clear wavy boundary.

E—22 to 50 inches; gray (10YR 5/1) sand; single grained; loose; medium acid; abrupt wavy boundary.

Btg—50 to 62 inches; dark grayish brown (2.5Y 4/2) sandy clay loam; weak medium granular structure; friable; slightly acid; abrupt wavy boundary.

Cg—62 to 80 inches; gray (5Y 5/1) fine sandy loam; massive; friable; about 5 percent, by volume, shell fragments; neutral.

The A and E horizons combined are 40 to 60 inches thick. Reaction is medium acid to neutral.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1. Texture is mucky sand, mucky fine sand, mucky loamy fine sand, sand, or fine sand. This horizon is 10 to 24 inches thick.

The E horizon has hue of 2.5Y or 10YR, value of 4 to 7, and chroma of 1 or 2. Very dark gray or black vertical streaks less than 1 inch wide are common in the E horizon. Texture is sand or fine sand.

The Btg horizon has hue of 2.5Y or 10YR, value of 4 to 6, and chroma of 1 or 2. Many pedons have mottles in shades of yellow, brown, and gray. Texture is sandy loam, fine sandy loam, or sandy clay loam.

Many pedons have a BC horizon that has the same range in colors as that of the Btg horizon. Texture is loamy sand or loamy fine sand.

The C horizon is fine sandy loam, loamy fine sand, fine sand, or sand. Layers of shell, shell fragments, or marl are in most pedons. Some pedons do not have a Cg horizon.

Denaud Series

The Denaud series is a member of the coarse-loamy, siliceous, hyperthermic family of Histic Humaquepts. It consists of very poorly drained, slowly permeable, mineral soils that have a histic epipedon. These soils are in depressional areas fringing the Everglades. Slope is less than 2 percent.

Denaud soils are associated on the landscape with Dania, Gator, and Margate soils. Dania and Gator soils are organic. Dania and Margate soils are underlain by limestone within a depth of 40 inches.

Typical pedon of Denaud muck; about 0.53 mile south of Route 833 and 1.7 miles west of Route 833, sec. 29, T. 46 S., R. 33 E.

Oa—0 to 11 inches; black (10YR 2/1) muck; 40 percent fiber when unrubbed, 10 percent when rubbed; weak fine subangular blocky structure; friable; neutral; gradual wavy boundary.

A—11 to 20 inches; black (10YR 2/1) fine sand; single grained; loose; mildly alkaline; gradual wavy boundary.

AC—20 to 23 inches; dark gray (10YR 4/1) fine sand; single grained; loose; mildly alkaline; clear wavy boundary.

Ckg—23 to 42 inches; gray (10YR 5/1) fine sandy loam; weak medium subangular blocky structure; friable; moderately alkaline; strongly effervescent; clear wavy boundary.

2Ckg—42 to 80 inches; gray (10YR 6/1) gravelly fine sand; massive; moderately alkaline; strongly effervescent; 15 percent fine calcareous gravel.

The organic horizon is 9 to 15 inches thick. Mineral content ranges to as much as 70 percent. Reaction is medium acid to mildly alkaline.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2 or is neutral in hue and has value of 2 or 3. Organic matter content ranges to as much as 20 percent. Texture is sand, fine sand, or loamy fine sand. Reaction is medium acid to moderately alkaline. This horizon is 6 to 16 inches thick.

The AC horizon has hue of 10YR, value of 4 to 6, and chroma of 1 to 3. Texture is sand or fine sand. Reaction ranges from slightly acid to moderately alkaline. This horizon is as much as 12 inches thick.

The Ck horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 7, and chroma of 1 to 3 or hue of 5G, 5BG, 5B, or 5GY, value of 4 to 7, and chroma of 1. Texture ranges from loamy fine sand to sandy clay loam. Reaction is slightly acid to moderately alkaline. This horizon is 5 to 30 inches thick.

The 2Ck horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 8, and chroma of 1 to 3 or hue of 5GY, 5G, 5BG, or 5B, value of 4 to 7, and chroma of 1. Texture ranges from fine sand to sandy clay loam or gravelly fine sand to gravelly sandy loam. Some pedons have shell, carbonates, or marl. Reaction is neutral to moderately alkaline. This horizon is 14 to 60 inches thick.

Some pedons have a 3C horizon, which has hue of 5Y, value of 5 to 7, and chroma of 1 or hue of 5GY, 5G, 5BG, or 5B, value of 4 to 7, and chroma of 1. Texture is sand or fine sand. Reaction is neutral to moderately alkaline. This horizon is as much as 30 inches thick.

Gator Series

The Gator series is a member of the loamy, siliceous, euic, hyperthermic family of Terric Medisaprists. It consists of very poorly drained, moderately permeable, organic soils that formed in moderately thick organic material that is underlain by loamy marine sediment. These soils are in marshes and swamps on the lower Coastal Plain. Slope is less than 1 percent.

Gator soils are associated on the landscape with Gentry, Riviera, Wabasso, and Winder soils, which are mineral soils. Riviera and Winder soils have an argillic horizon. Gentry soils have a mollic epipedon and an argillic horizon.

Typical pedon of Gator muck; about 1.6 miles east of the Seaboard Coast Line railroad and 0.5 mile south of Sears Road, NE¼SW¼ sec. 20, T. 44 S., R. 30 E.

Oa1—0 to 10 inches; black (10YR 2/1) muck; about 30 percent fiber when unrubbed, 5 percent when rubbed; massive; very friable; neutral; abrupt wavy boundary.

Oa2—10 to 32 inches; black (5YR 2/1) muck; about 20 percent fiber when unrubbed, 2 percent when rubbed; massive; friable; neutral; abrupt wavy boundary.

2A—32 to 35 inches; black (10YR 2/1) sandy loam; weak medium granular structure; very friable; neutral; clear wavy boundary.

Cg1—35 to 45 inches; gray (5Y 5/1) sandy clay loam; massive; friable; few carbonate nodules; mildly alkaline; gradual wavy boundary.

Cg2—45 to 51 inches; gray (5Y 6/1) sandy clay loam; common calcium carbonate nodules ranging from 0.2 to 2 centimeters; moderately alkaline.

The muck layer is 16 to 40 inches thick. The Oa horizon has hue of 10YR to 5YR, value of 2, and chroma of 1 or 2. Fiber content is less than 33 percent when unrubbed and less than 16 percent when rubbed. Reaction is very strongly acid to medium acid in 0.01 molar calcium chloride and medium acid to mildly alkaline by the Hellige-Truog method.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1. Texture is sandy clay loam, sandy loam, or fine sandy loam.

The C horizon has hue of 10YR, value of 4 to 7, and chroma of 1 or 2 or hue of 2.5Y or 5Y, value of 4 to 6, and chroma of 1 or 2. Texture is sand to sandy clay loam. Reaction is slightly acid to moderately alkaline. Some pedons have a loamy fine sand C horizon that is 3 to 10 inches thick.

Gentry Series

The Gentry series is a member of the loamy, siliceous, hyperthermic family of Arenic Argiaquolls. It consists of very poorly drained, slowly permeable soils that formed in loamy marine sediment. Slope is less than 2 percent.

Gentry soils are associated on the landscape with Chobee, Delray, Gator, Riviera, and Winder soils. Chobee soils have an argillic horizon at a depth of less than 20 inches. Delray soils have an A horizon that is more than 40 inches thick. Gator soils are organic. Riviera and Winder soils do not have a mollic epipedon.

Typical pedon of Gentry fine sand, depressional; about 2.7 miles east of the Lee County line and 7.5 miles south of Highway 80, SW¼SE¼ sec. 33, T. 44 S., R. 28 E.

A1—0 to 10 inches; black (10YR 2/1) fine sand; weak medium granular structure; very friable; neutral; gradual wavy boundary.

A2—10 to 22 inches; very dark gray (10YR 3/1) fine sand; common medium distinct gray (10YR 5/1) mottles and streaks; weak medium granular structure; very friable; neutral; clear irregular boundary.

Btg1—22 to 50 inches; dark gray (10YR 4/1) sandy clay loam; weak medium subangular blocky structure; friable; common vertical streaks of sand; neutral; gradual wavy boundary.

Btg2—50 to 75 inches; gray (10YR 5/1) sandy clay loam; weak medium subangular blocky structure; friable; few sand pockets; mildly alkaline; clear wavy boundary.

Cg—75 to 80 inches; gray (5Y 6/1) sandy loam; few fine faint white (10YR 8/1) carbonate mottles; massive; friable; moderately alkaline.

The solum is 50 to 80 inches or more thick. Reaction is medium acid to neutral in the A horizon and slightly acid to moderately alkaline in the B and C horizons.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2 or hue of 2.5Y or 5Y, value of 3 or 4, and chroma of 1 or 2. Some pedons have mottles in shades of gray and brown and pockets of uncoated sand grains. Texture is sand or fine sand. This horizon is 20 to 28 inches thick.

The Btg horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2 or hue of 2.5Y or 5Y, value of 3 or 4, and chroma of 1 or 2. Some pedons have gray, yellow, brown, or olive mottles and tongues or intrusions of sandy material extending downward from the A1 horizon. Texture is sandy loam, fine sandy loam, or sandy clay loam.

The C horizon has hue of 10YR, value of 4 to 7, and chroma of 1 or 2. Texture is sand, fine sand, fine sandy loam, or sandy loam. Some pedons have shell fragments or marl.

Hallandale Series

The Hallandale series is a member of the siliceous, hyperthermic family of Lithic Psammaquents. It consists of poorly drained and very poorly drained soils that formed in sandy marine sediment underlain by shallow, fractured limestone. Permeability is moderately rapid or rapid. These soils are on broad, low flats and in depressions. Slope is less than 1 percent.

Hallandale soils are associated on the landscape with Basinger, Boca, Malabar, Margate, Pineda, and Riviera soils. Basinger, Malabar, Pineda, and Riviera soils do not have limestone bedrock within a depth of 50 inches. Boca and Margate soils have limestone bedrock at a depth of 20 to 40 inches. Pineda and Riviera soils have an argillic horizon at a depth of 20 to 40 inches. Malabar soils have an argillic horizon at a depth of more than 40 inches. Basinger soils are sandy to a depth of 80 inches or more.

Typical pedon of Hallandale sand; about 200 feet east of the Lee County line and 0.2 mile south of the Glades County line, SW¼NW¼ sec. 6, T. 43 S., R. 28 E.

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

C—4 to 16 inches; brown (10YR 5/3) sand; single grained; loose; slightly acid; abrupt irregular boundary.

2R—16 inches; fractured limestone and solution basins; mottles of grayish brown sandy clay loam and weathered rock fragments in basins.

The thickness of the solum and depth to limestone generally range from 7 to 20 inches. The depth to limestone can range to 50 inches or more in pedons that have fractures and solution basins. Texture generally is sand or fine sand, but loamy or calcareous material is in some cracks and solution basins.

The A or Ap horizon has hue of 10YR, value of 2 to 6, and chroma of 1. Reaction is strongly acid to neutral.

Some pedons have an E horizon that has hue of 10YR and value of 4 to 7 and chroma of 1 or value of 5 or 6 and chroma of 2.

Some pedons have a Bw horizon that has hue of 10YR, value of 5 to 7, and chroma of 3. Reaction is medium acid to moderately alkaline.

The C horizon has hue of 10YR and value of 4 and chroma of 1 or 2, value of 5 or 6 and chroma of 1 to 3, value of 7 and chroma of 1 to 4, or value of 8 and chroma of 3 or 4. Some pedons do not have a C horizon.

The 2R horizon is fractured limestone that has solution basins. Fractures in the limestone range from 4 to 12 inches or more wide. The solution basins range from 4 inches to 3 feet in diameter and occur at intervals of about 1 to 6 feet. They can have a discontinuous Bt horizon consisting of brown or yellowish brown sandy loam, fine sandy loam, or sandy clay loam. In the deeper holes the Bt horizon generally is thicker and has a finer texture. Most holes contain soft, carbonatic material or small fragments of weathered limestone.

Holopaw Series

The Holopaw series is a member of the loamy, siliceous, hyperthermic family of Grossarenic Ochraqualfs. It consists of poorly drained and very poorly drained, moderately slowly permeable soils that formed in sandy and loamy marine sediments. These soils are in sloughs and depressions on the lower Coastal Plain. Slope is less than 2 percent.

Holopaw soils are associated on the landscape with Delray, Gentry, Immokalee, Malabar, Riviera, and Oldsmar soils. Delray and Gentry soils have a mollic epipedon. Immokalee soils do not have an argillic horizon at a depth of 20 to 40 inches. Oldsmar soils have a spodic horizon.

Typical pedon of Holopaw sand; about 0.7 mile east of the Lee County line and 1.15 miles south of the Glades County line, NW¼NE¼ sec. 7, T. 43 S., R. 28 E.

A—0 to 5 inches; dark gray (10YR 4/1) sand; weak medium granular structure; very friable; slightly acid; gradual smooth boundary.

Eg1—5 to 15 inches; light brownish gray (10YR 6/2) sand; single grained; loose; neutral; clear wavy boundary.

Eg2—15 to 34 inches; light gray (10YR 7/2) sand; few fine prominent brownish yellow (10YR 6/8) mottles; single grained; loose; neutral; clear wavy boundary.

Eg3—34 to 48 inches; light brownish gray (10YR 6/2) sand; single grained; loose; mildly alkaline; abrupt wavy boundary.

Btg—48 to 65 inches; grayish brown (2.5Y 5/2) sandy clay loam; common medium distinct olive brown (2.5Y 4/4) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; mildly alkaline; abrupt irregular boundary.

BC—65 to 80 inches; grayish brown (2.5Y 5/2) sandy loam; massive; slightly sticky and slightly plastic; many soft and hard nodules of calcium carbonate; moderately alkaline.

The solum is 50 to 80 inches or more thick.

The A horizon has hue of 10YR or 2.5Y, value of 2 to 4, and chroma of 1 or 2. The E horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. The upper 30 inches of the E horizon can have mottles in shades of yellow and brown. Texture of the A and E horizons is sand or fine sand. Reaction is strongly acid to neutral.

The Btg horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2. Mottles are in shades of brown or yellow. Texture is sandy loam or sandy clay loam. Reaction ranges from slightly acid to moderately alkaline.

The BC horizon is similar in color to the Bt horizon. Texture is sandy loam or fine sandy loam. Some pedons do not have a BC horizon.

Some pedons have a Cg horizon that has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. Texture is sand or loamy sand mixed with shell fragments or calcium carbonate nodules, or both.

Immokalee Series

The Immokalee series is a member of the sandy, siliceous, hyperthermic family of Arenic Haplaquods. It consists of poorly drained, moderately permeable soils that formed in sandy marine sediment. These soils are in broad flatwood areas. Slope is less than 2 percent.

Immokalee soils are associated on the landscape with Basinger, Malabar, Myakka, Oldsmar, Pompano, and Valkaria soils. Basinger and Pompano soils are in sloughs and do not have a spodic horizon. Malabar and Valkaria soils have a Bw horizon. Malabar soils also have an argillic horizon. Myakka soils have a spodic horizon at a depth of less than 30 inches. Oldsmar soils have an argillic horizon beneath the spodic horizon.

Typical pedon of Immokalee sand; about 0.6 mile north of Florida Highway 80 and 0.25 mile west of Florida Highway 78A, SE¼SE¼ sec. 21, T. 43 S., R. 28 E.

A—0 to 5 inches; very dark gray (10YR 3/1) sand; weak fine granular structure; very friable; many fine and medium roots; very strongly acid; clear wavy boundary.

Eg1—5 to 25 inches; gray (10YR 6/1) sand; common medium distinct dark gray (10YR 4/1) mottles and streaks along root channels; single grained; loose; common fine roots; very strongly acid; clear wavy boundary.

Eg2—25 to 40 inches; light gray (10YR 7/1) sand; few medium distinct dark gray streaks along root channels; single grained; loose; few fine and medium roots; strongly acid; abrupt wavy boundary.

Bh—40 to 55 inches; black (5YR 2/1) sand; weak fine granular structure; friable; few medium roots; very strongly acid; gradual smooth boundary.

Bw—55 to 70 inches; dark brown (10YR 4/3) sand; weak fine granular structure; very friable; very strongly acid; clear wavy boundary.

C—70 to 80 inches; light brownish gray (10YR 6/2) sand; single grained; loose; medium acid.

The texture is sand or fine sand to a depth of 80 inches or more. Reaction is very strongly acid to medium acid except where lime has been added or the soil has been irrigated with alkaline water.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1 or 2 or is neutral and has value of 2 to 4. The E horizon has hue of 10YR, value of 5 to 8, and chroma of 2. Some pedons have brownish or yellowish mottles. The combined thickness of the A and E horizons is 30 to 50 inches.

The Bh horizon has hue of 5YR, value of 2, and chroma of 1 or 2; hue of 5YR, value of 3, and chroma of 1 to 3; hue of 7.5YR, value of 3, and chroma of 2; or hue of 10YR, value of 2 or 3, and chroma of 1 or 2. If the sand grains are well coated with organic matter, this horizon can have hue of 10YR and value and chroma of 3.

The Bw horizon has hue of 10YR, value of 3 to 5, and chroma of 3 or 4 or hue of 7.5YR, value of 4, and chroma of 2. Some pedons have mottles in shades of yellow, brown, and gray.

The C horizon has hue of 10YR and value of 4 to 6 and chroma of 1 or 2 or value of 7 and chroma of 3 or 4. Some pedons have yellow, brown, or gray mottles.

In some pedons the Bh or Bw horizon is underlain by a second sequum of E' and B'h horizons. The E' horizon has the same range in colors as that of the E horizon, and the B'h horizon has the same range in colors as that of the Bh horizon.

Jupiter Series

The Jupiter series is a member of the sandy, siliceous, hyperthermic family of Lithic Haplaquolls. It consists of poorly drained, rapidly permeable soils that formed in thin beds of sandy marine sediment underlain by limestone. These soils are on low hammocks and flats adjacent to sloughs and marshes. Slope is 0 to 1 percent.

Jupiter soils are associated on the landscape with Boca, Gator, Hallandale, and Riviera soils. Boca soils have an argillic horizon and have limestone at a depth of 20 to 40 inches. Gator soils are organic. Hallandale soils do not have a mollic epipedon. Riviera soils have an argillic horizon, but they do not have a mollic epipedon or limestone bedrock within a depth of 50 inches.

Typical pedon of Jupiter fine sand; about 2.8 miles east of the Collier County line and 1.3 miles south of Wingate Road, SE¼NE¼ sec. 21, T. 48 S., R. 31 E.

A1—0 to 6 inches; black (10YR 2/1) fine sand; weak fine granular structure; very friable; slightly acid; clear wavy boundary.

A2—6 to 14 inches; very dark grayish brown (10YR 3/2) fine sand; weak fine granular structure; very friable; neutral; abrupt irregular boundary.

2R—14 inches; fractured limestone that has many solution basins.

The depth to fractured limestone is 10 to 20 inches in the major part of each pedon, but limestone is at a depth of more than 20 inches in some part of each pedon. Texture is sand or fine sand throughout the profile. Reaction is slightly acid to moderately alkaline.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2 or hue of 2.5Y, value of 3, and chroma of 2.

Some pedons have a C horizon that has hue of 10YR, value of 4 to 7, and chroma of 1 or 2 or hue of 2.5Y, value of 4 to 6, and chroma of 2.

Lauderhill Series

The Lauderhill series is a member of the euic, hyperthermic family of Lithic Medisaprists. It consists of very poorly drained, rapidly permeable, organic soils that formed in deposits of well decomposed organic matter underlain by limestone. These soils are in depressions and marshes. Slope is less than 2 percent.

Lauderhill soils are associated on the landscape with Basinger, Gator, Margate, Okeelanta, Oldsmar, Pahokee, Plantation, and Terra Ceia soils. Basinger, Margate, Oldsmar, and Plantation are mineral soils. Gator and Okeelanta soils do not have limestone bedrock within a depth of 51 inches. Pahokee soils have limestone at a depth of more than 36 inches.

Typical pedon of Lauderhill muck; about 0.6 mile west of the Palm Beach County line, about 18.7 miles south of Clewiston, SW¼SE¼ sec. 13, T. 46 S., R. 34 E.

Oa1—0 to 24 inches; muck, black (5YR 2/1) when unrubbed, dark reddish brown (5YR 2/2) when rubbed; about 50 percent fiber when unrubbed, 10 percent when rubbed; massive; friable; slightly acid; gradual wavy boundary.
Oa2—24 to 31 inches; dark reddish brown (5YR 2/2) muck; about 40 percent fiber when unrubbed, 10 percent when rubbed; massive; friable; neutral; abrupt wavy boundary.
Oa3—31 to 35 inches; black (10YR 2/1) muck; about 10 percent fiber when rubbed and unrubbed; massive; friable; mildly alkaline; abrupt irregular boundary.
R—35 inches; hard limestone.

The Oa horizon has hue of 10YR to 5YR, value of 2, and chroma of 1 or 2 or hue of 10YR to 5YR, value of 3, and chroma of 2 or 3. Fiber content is less than 16 percent when rubbed. Mineral content ranges from 5 to 40 percent. Reaction is medium acid to mildly alkaline. This horizon is 16 to 36 inches thick. Limestone is at a depth of 20 to 40 inches.

Some pedons have a C horizon, which has hue of 10YR, value of 2 to 8, and chroma of 1 or 2. Texture is sand, loamy sand, or sandy loam. Some pedons have carbonatic material.

Malabar Series

The Malabar series is a member of the loamy, siliceous, hyperthermic family of Grossarenic Ochraqualfs. It consists of poorly drained and very poorly drained, slowly permeable soils that formed in beds of sandy and loamy marine sediments. These nearly level soils are in sloughs in broad flatwood areas.

Malabar soils are associated on the landscape with Holopaw, Oldsmar, Pineda, and Riviera soils. Pineda and Riviera soils have an argillic horizon at a depth of 20 to 40 inches. Riviera and Holopaw soils do not have a Bw horizon. Oldsmar soils have a spodic horizon.

Typical pedon of Malabar sand; about 3.3 miles east of the Seaboard Coast Line railroad and 1.2 miles south of Sears Road, NW¼NW¼ sec. 28, T. 44 S., R. 30 E.

A—0 to 5 inches; dark grayish brown (10YR 4/2) sand; weak fine granular structure; very friable; slightly acid; clear wavy boundary.
E—5 to 15 inches; light brownish gray (10YR 6/2) sand; single grained; loose; slightly acid; gradual wavy boundary.
Bw1—15 to 20 inches; very pale brown (10YR 7/4) sand; single grained; loose; slightly acid; clear wavy boundary.
Bw2—20 to 27 inches; brownish yellow (10YR 6/8) sand; single grained; loose; slightly acid; clear wavy boundary.
Bw3—27 to 35 inches; light yellowish brown (10YR 6/4) sand; single grained; loose; slightly acid; clear wavy boundary.
E'—35 to 45 inches; light brownish gray (10YR 6/2) sand; single grained; loose; neutral; abrupt irregular boundary.
Btg1—45 to 55 inches; gray (10YR 6/1) sandy clay loam; common medium distinct brownish yellow (10YR 6/6) mottles; weak medium subangular blocky structure; friable; neutral; clear wavy boundary.
Btg2—55 to 65 inches; gray (N 6/0) sandy loam; weak medium subangular blocky structure; friable; mildly alkaline; abrupt wavy boundary.
Cg—65 to 80 inches; light gray (2.5Y 7/2) stratified sand and loamy sand; single grained; loose; about 5 percent, by volume, shell fragments; mildly alkaline.

The solum is 46 to 90 inches thick. Reaction is medium acid to moderately alkaline.

The A horizon has hue of 10YR, value of 2, and chroma of 1; hue of 10YR, value of 3 or 4, and chroma of 2; or hue of 2.5Y, value of 3 or 4, and chroma of 2. Texture is sand or fine sand.

The E horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2; hue of 10YR, value of 6 to 8, and chroma of 3; or hue of 10YR, value of 7 or 8, and chroma of 4. Texture is sand or fine sand.

The Bw horizon has hue of 10YR, value of 5 to 7, and chroma of 4 to 8; hue of 10YR, value of 6, and chroma of 3; or hue of 7.5YR, value of 5, and chroma of 6 to 8. Texture is sand or fine sand.

The E' horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2 or hue of 2.5Y, value of 6 or 7, and chroma of 2. Texture is sand or fine sand.

The Btg horizon begins at a depth of 40 to 72 inches. It has hue of 10YR, value of 4 to 7, and chroma of 1; has hue of 5Y, value of 5, and chroma of 1 or 2; has hue of 5Y, value of 6 or 7, and chroma of 1; or is neutral in hue and has value of 5 to 7. Many pedons have mottles in shades of brown or yellow. Texture is fine sandy loam, sandy clay loam, or sandy loam. Pockets or lenses of coarser or finer material are in many pedons.

The C horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2 or hue of 5Y, value of 5, and chroma of 1. Texture is fine sand or sand that has lenses or pockets of loamy material. The content of shell fragments is as much as 50 percent.

Margate Series

The Margate series is a member of the siliceous, hyperthermic family of Mollic Psammaquents. It consists of poorly drained, rapidly permeable soils that formed in sandy marine sediment underlain by limestone. These soils are on low flats and in sloughs. Slope is 0 to 2 percent.

Margate soils are associated on the landscape with Boca, Gator, Hallandale, Okeelanta, Oldsmar, Pahokee, Plantation, and Terra Ceia soils. Boca soils are in slightly higher positions on the landscape than the Margate soils and have an argillic horizon. Gator, Okeelanta, and Terra Ceia soils are organic. Oldsmar soils have a spodic horizon. Plantation soils have a muck surface layer. Hallandale soils have bedrock at a depth of 20 inches or less.

Typical pedon of Margate sand; about 5 miles south of Clewiston and 4.25 miles west of State Road 832, NW¼NE¼ sec. 7, T. 44 S., R. 34 E.

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

E—10 to 18 inches; brown (10YR 5/3) sand; single grained; loose; slightly acid; gradual wavy boundary.

Bw—18 to 24 inches; pale brown (10YR 6/3) sand; single grained; loose; mildly alkaline; gradual wavy boundary.

C—24 to 30 inches; light yellowish brown (10YR 6/4) gravelly sand; single grained; loose; 40 percent shell and 20 percent limestone gravel; moderately alkaline; abrupt irregular boundary.

2R—30 inches; limestone.

The thickness of the solum and depth to limestone range from 20 to 40 inches, but solution basins in each pedon range to a depth of 60 inches or more. Texture is dominantly sand or fine sand throughout the profile.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1. Reaction is very strongly acid to medium acid.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 1 to 4. Reaction is strongly acid to slightly acid.

The Bw horizon has hue of 10YR, value of 4 to 6, and chroma of 2 or 3. Reaction is slightly acid to mildly alkaline.

The C horizon has hue of 10YR, value of 5 or 6, and chroma of 3 to 6. It has as much as 40 percent shell or fine weathered limestone gravel, or both. Solution basins in the underlying limestone are 6 inches to 3 feet in diameter.

Myakka Series

The Myakka series is a member of the sandy, siliceous, hyperthermic family of Aeric Haplaquods. It consists of poorly drained, moderately permeable soils that formed in sandy marine sediment. These soils are in broad flatwood areas and shallow depressions. Slope is less than 2 percent.

Myakka soils are associated on the landscape with Basinger, Immokalee, Oldsmar, Valkaria, and Wabasso soils. Basinger soils are in sloughs and do not have a spodic horizon. Immokalee and Oldsmar soils have a spodic horizon at a depth of more than 30 inches. Oldsmar soils have an argillic horizon beneath the spodic horizon. Valkaria soils are in sloughs, have a Bw horizon, and do not have a spodic horizon.

Typical pedon of Myakka sand; 3 miles east of Florida Highway 29 and 1.8 miles south of Florida Highway 80, SE¼SE¼ sec. 14, T. 43 S., R. 29 E.

A—0 to 6 inches; very dark gray (10YR 3/1) sand; weak fine granular structure; very friable; common fine and medium roots; very strongly acid; clear wavy boundary.

E—6 to 26 inches; gray (10YR 6/1) sand; single grained; loose; very strongly acid; abrupt wavy boundary.

Bh1—26 to 40 inches; black (5YR 2/1) sand; weak medium granular structure; friable; very strongly acid; gradual wavy boundary.

Bh2—40 to 60 inches; dark brown (10YR 3/3) sand; weak fine granular structure; very friable; strongly acid; gradual wavy boundary.

C—60 to 80 inches; grayish brown (10YR 5/2) sand; single grained; slightly acid.

The solum is more than 40 inches thick. Texture is sand or fine sand throughout the profile. Reaction is extremely acid to slightly acid.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1 or is neutral and has value of 2 to 4. Some pedons have a salt-and-pepper appearance.

The E horizon has hue of 10YR, value of 4 to 8, and chroma of 1; is neutral in hue and has value of 6 to 8; or has hue of 10YR or 2.5Y, value of 8, and chroma of 2.

The Bh horizon has hue of 10YR to 5YR, value of 2, and chroma of 1 or 2; has hue of 10YR to 5YR, value of 3, and chroma of 2 to 4; has hue of 7.5YR, value of 3, and chroma of 2; or is neutral in hue and has value of 2.

Some pedons have a second sequum of E' and B'h horizons underlying the Bh horizon. The E' horizon has hue of 10YR, value of 4 to 7, and chroma of 2 to 4. Some pedons have brown and gray mottles. The B'h horizon has the same range in colors as that of the Bh horizon.

The C horizon has hue of 10YR, value of 4, and chroma of 2; hue of 10YR, value of 5, and chroma of 1 to 3; hue of 10YR, value of 6, and chroma of 2; hue of 10YR, value of 7, and chroma of 3 or 4; or hue of 7.5YR, value of 4 or 5, and chroma of 4.

Ochopee Series

The Ochopee series is a member of the coarse-loamy, mixed, calcareous, hyperthermic family of Lithic Haplaquepts. It consists of poorly drained, moderately rapidly permeable soils that formed in calcareous marine sediment underlain by shallow limestone. These soils are on low-lying grassy prairies. Slope is less than 2 percent.

Ochopee soils are associated on the landscape with Boca, Chobee, Gentry, Hallandale, Jupiter, and Riviera soils. These soils do not have a calcareous solum and, except for Hallandale and Jupiter soils, do not have limestone within a depth of 20 inches.

Typical pedon of Ochopee fine sandy loam, in an area of Jupiter-Ochopee-Rock outcrop complex; about 4 miles south of County Road 846 at a point about 7 miles east of the Collier County line, SW¼NW¼ sec. 19, T. 47 S., R. 32 E.

A—0 to 6 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; very friable; common fine and medium roots; moderately effervescent; moderately alkaline, calcareous; clear wavy boundary.

Bk—6 to 10 inches; grayish brown (10YR 5/2) fine sandy loam; few fine prominent strong brown mottles; weak fine granular structure; very friable; common fine and medium roots; sand grains well coated with calcium carbonate; violently effervescent; strongly alkaline, calcareous; clear smooth boundary.

R—10 inches; hard, fractured limestone.

The thickness of the solum and depth to hard limestone is less than 20 inches. Reaction is moderately alkaline and calcareous. Texture generally is sandy loam or fine sandy loam; however, carbonate-free texture is sand or fine sand.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 1 to 3.

The Bk horizon has hue of 10YR, value of 4 to 7, and chroma of 1 to 3.

Okeelanta Series

The Okeelanta series is a member of the sandy or sandy-skeletal, siliceous, euic, hyperthermic family of Terric Medisaprists. It consists of very poorly drained, rapidly permeable, organic soils that formed in moderately thick deposits of well decomposed organic matter underlain by sandy marine sediment. These soils are in depressions and marshes. Slope is less than 2 percent.

Okeelanta soils are associated on the landscape with Basinger, Pompano, and Immokalee soils.

Typical pedon of Okeelanta muck; 4.3 miles west of Florida Highway 833 and 1.6 miles south of Florida Highway 80, NW¼SE¼ sec. 14, T. 43 S., R. 31 E.

Oa—0 to 35 inches; black (10YR 2/1) muck; about 20 percent fiber when unrubbed, 5 percent when rubbed; massive; friable; few pockets or lenses of sandy material below a depth of 16 inches; neutral; clear smooth boundary.

A—35 to 45 inches; very dark grayish brown (10YR 3/2) sand; single grained; loose; neutral; clear wavy boundary.

2C—45 to 60 inches; light brownish gray (10YR 6/2) sand; single grained; loose; neutral.

The Oa horizon has hue of 10YR to 5YR, value of 2, and chroma of 1 or 2; hue of 10YR to 5YR, value of 3, and chroma of 2 or 3; or hue of 7.5YR, value of 3, and chroma of 2. Fiber content generally is 5 to 33 percent when unrubbed and 3 to 16 percent when rubbed. Mineral content ranges from 10 to 40 percent. This horizon is 16 to 50 inches thick.

The A and C horizons have hue of 10YR, value of 2 to 6, and chroma of 1 or 2 or are neutral in hue and have value of 2 to 6. Texture is sand or fine sand to a depth of 60 inches or more. Some pedons have few to many fine and medium shell fragments.

Oldsmar Series

The Oldsmar series is a member of the sandy, siliceous, hyperthermic family of Alfic Arenic Haplaquods. It consists of poorly drained and very poorly drained, slowly permeable soils that formed in sandy and loamy marine sediments. These soils are in broad flatwood areas on the lower Coastal Plain. Slope is less than 2 percent.

Oldsmar soils are associated on the landscape with Immokalee, Holopaw, Malabar, and Wabasso soils. Immokalee soils are sandy to a depth of 80 inches or more. Holopaw and Malabar soils are in sloughs and do not have a spodic horizon. Wabasso soils have a spodic horizon at a depth of less than 30 inches and an argillic horizon at a depth of 30 to 40 inches.

Typical pedon of Oldsmar sand; about 0.4 mile north of Florida Highway 80 and 0.1 mile west of Florida Highway 78A, NE¼NE¼ sec. 28, T. 43 S., R. 28 E.

A—0 to 6 inches; very dark gray (10YR 3/1) sand; weak fine granular structure; very friable; many fine and common medium roots; very strongly acid; clear smooth boundary.

E1—6 to 32 inches; light gray (10YR 7/1) sand; single grained; loose; common medium roots; strongly acid; clear wavy boundary.

E2—32 to 38 inches; grayish brown (10YR 5/2) sand; common medium distinct very dark grayish brown (10YR 3/2) mottles; single grained; loose; very strongly acid; clear wavy boundary.

Bh1—38 to 40 inches; black (10YR 2/1) sand; single grained; loose; very strongly acid; clear wavy boundary.

Bh2—40 to 50 inches; dark reddish brown (5YR 3/2) sand; single grained; loose; strongly acid; clear wavy boundary.

Btg1—50 to 70 inches; dark grayish brown (10YR 4/2) sandy clay loam; weak fine subangular blocky structure; slightly acid; clear wavy boundary.

Btg2—70 to 80 inches; olive gray (5Y 5/2) sandy clay loam; common medium distinct grayish brown (10YR 5/2) mottles; massive; friable; mildly alkaline.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1 or is neutral in hue and has value of 2 to 4. The E horizon has hue of 10YR, value of 5 to 8, and chroma of 1 or 2. Yellow or brown mottles are in some pedons. Texture of the A and E horizons is sand or fine sand. Reaction is extremely acid to neutral. Combined thickness of these horizons is 30 to 50 inches.

Some pedons have a transitional sandy horizon between the E and Bh horizons.

The Bh horizon has hue of 10YR, value of 2, and chroma of 1 or 2; hue of 7.5YR, value of 3, and chroma of 2; hue of 5YR, value of 2, and chroma of 1 or 2; or hue of 5YR, value of 3, and chroma of 2 or 3. Texture is sand or fine sand. Sand grains are well coated with organic matter.

The Bt horizon begins at a depth of 40 to 70 inches. It has hue of 10YR, value of 4 to 7, and chroma of 1 or 2; hue of 2.5Y, value of 4 to 7, and chroma of 2; hue of 5Y, value of 5 or 6, and chroma of 2; or hue of 5GY, value of 5 or 6, and chroma of 1 or 2. Texture is sandy clay loam, sandy loam, or fine sandy loam. Reaction is slightly acid to moderately alkaline.

Some pedons have a sand or fine sand C horizon that contains as much as 50 percent shell fragments.

Pahokee Series

The Pahokee series is a member of the euic, hyperthermic family of Lithic Medisaprists. It consists of very poorly drained, rapidly permeable organic soils that formed in moderately thick deposits of well decomposed organic matter underlain by limestone. This nearly level soil is in swamps and marshes.

Pahokee soils are associated on the landscape with Boca, Gator, Gentry, Hallandale, Margate, Okeelanta, and Winder soils. Boca, Gentry, Hallandale, Margate, and Winder are mineral soils. Gator and Okeelanta are organic soils that are not underlain by limestone. Gator soils are underlain by loamy material, and Okeelanta soils are underlain by sandy material.

Typical pedon of Pahokee muck; about 2.3 miles east of the Collier County line and 0.9 mile south of Wingate Road, NE¼NW¼ sec. 21, T. 48 S., R. 31 E.

Oa1—0 to 10 inches; black (10YR 2/1) muck; about 50 percent fiber when unrubbed, 10 percent when rubbed; massive; very friable; neutral; gradual wavy boundary.

Oa2—10 to 40 inches; black (5YR 2/1) muck; about 35 percent fiber content when unrubbed, 5 percent when rubbed; massive; friable; neutral; abrupt irregular boundary.

2R—40 inches; fractured, hard limestone.

The thickness of the Oa horizon and depth to limestone range from 36 to 51 inches. The organic material has hue of 10YR to 5YR, value of 2 or 3, and chroma of 1 to 3. Fiber content ranges from 2 to 16 percent when rubbed and from 33 to 60 percent when unrubbed. Mineral content ranges from 10 to 25 percent. Reaction is medium acid to mildly alkaline by the Hellige-Truog method and very strongly acid to medium acid in 0.01 molar calcium chloride.

Some pedons have thin layers of sandy or loamy calcareous material between the organic matter and the limestone.

Pineda Series

The Pineda series is a member of the loamy, siliceous, hyperthermic family of Arenic Glossaqualfs. It consists of poorly drained and very poorly drained, very slowly permeable soils that formed in sandy and loamy marine sediments. These soils are in sloughs and on broad, low flats. Slope is less than 2 percent.

The soils in map unit 2, Pineda sand, limestone substratum, do not have tongues of albic material intruding into the argillic horizon. In this respect they are taxadjuncts to the Pineda series. Use and management are not significantly different.

Pineda soils are associated on the landscape with Malabar, Riviera, Wabasso, and Winder soils. Wabasso soils have a spodic horizon. Malabar soils are Grossarenic. Riviera and Winder soils do not have a high-chroma Bw horizon. In addition, Winder soils have an argillic horizon at a depth of less than 20 inches. All the associated soils except the Winder soils do not have glossic properties.

Typical pedon of Pineda fine sand; about 7.5 miles south of Highway 80 and 3.5 miles east of the Lee County line, near the northeast corner of NE¼NW¼ sec. 3, T. 45 S., R. 28 E.

A1—0 to 2 inches; black (10YR 2/1) fine sand; weak fine granular structure; very friable; medium acid; abrupt wavy boundary.

E1—2 to 8 inches; gray (10YR 5/1) fine sand; weak fine granular structure; very friable; medium acid; clear wavy boundary.

E2—8 to 14 inches; light gray (10YR 7/2) fine sand; common medium prominent brownish yellow (10YR 6/6) mottles; single grained; loose; slightly acid; clear wavy boundary.

Bw1—14 to 25 inches; yellowish brown (10YR 5/8) fine sand; single grained; loose; neutral; clear wavy boundary.

E′—25 to 30 inches; light yellowish brown (10YR 6/4) fine sand; single grained; loose; neutral; abrupt irregular boundary.

Btg/E—30 to 50 inches; gray (10YR 6/1) sandy clay loam (Btg) and light yellowish brown (10YR 6/4) vertical intrusions of fine sand (E); few medium prominent brownish yellow (10YR 6/8) mottles; weak medium subangular blocky structure; friable; neutral; gradual wavy boundary.

Cg—50 to 60 inches; gray (10YR 6/1) sandy loam; lenses of loamy sand; massive; friable; neutral; abrupt wavy boundary.

2Cg—60 to 75 inches; gray (5Y 5/1) sandy clay loam; massive; sticky and plastic; moderately alkaline; abrupt wavy boundary.

3Cg—75 to 80 inches; white (10YR 8/1) sand; about 50 percent, by volume, carbonate nodules; calcareous.

The solum is 40 to 80 inches thick. The upper part is sand or fine sand 20 to 40 inches thick, and the lower part is sandy clay loam or sandy loam. Texture of the C horizon is sand, loamy sand, sandy loam, or sandy clay loam. Reaction is strongly acid to mildly alkaline in the A and Bw horizons and neutral to moderately alkaline in the Btg and C horizons.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. Where the value is less than 3.5, this horizon is less than 10 inches thick.

The E horizon has hue of 10YR and value of 5 and chroma of 3 or less, value of 6 and chroma of 1 or 2, or value of 7 or 8 and chroma of 1 to 3 or has hue of 2.5Y, value of 5 to 8, and chroma of 2.

The Bw horizon has hue of 10YR, value of 5 to 7, and chroma of 4 to 8; hue of 10YR, value of 6, and chroma of 3; or hue of 7.5YR, value of 5, and chroma of 6 to 8.

The E′ horizon has hue of 10YR, value of 6 to 8, and chroma of 3 or 4.

The Btg horizon has vertical tongues or intrusions from the overlying horizons. It has hue of 10YR, value of 4 to 7, and chroma of 1 or 2; hue of 2.5Y, value of 4 to 7, and chroma of 2; hue of 5Y, value of 5 or 6, and chroma of 1; or hue of 5GY, value of 5 to 7, and chroma of 1. Most pedons have mottles in shades of yellow and brown.

The Cg horizon has hue of 10YR, value of 5 to 8, and chroma of 1 or 2; hue of 2.5Y, value of 5 to 7, and chroma of 2; or hue of 5Y or 5GY, value of 5 to 7, and chroma of 1. In some pedons this horizon has shell or limestone fragments, carbonate nodules, or marl.

Plantation Series

The Plantation series is a member of the sandy, siliceous, hyperthermic family of Histic Humaquepts. It consists of very poorly drained, rapidly permeable soils that formed in a thin layer of organic material underlain by sandy marine sediment. These soils are on broad flats adjacent to the Everglades. Slope is 1 percent or less.

Plantation soils are associated on the landscape with Boca, Gator, Hallandale, Immokalee, Margate, Okeelanta, Oldsmar, Pahokee, and Terra Ceia soils. Boca, Hallandale, Immokalee, Margate, and Oldsmar soils do not have an organic layer that is 8 inches or more thick. Boca soils have an argillic horizon. Hallandale soils have limestone at a depth of less than 20 inches. Immokalee and Oldsmar soils have a spodic horizon. Gator, Okeelanta, Pahokee, and Terra Ceia soils are organic.

Typical pedon of Plantation muck; about 4.25 miles west of State Road 832 and 5 miles south of Clewiston, NW¼SW¼SE¼ sec. 7, T. 44 S., R. 34 E.

Oa—0 to 12 inches; black (10YR 2/1) muck; weak fine subangular blocky structure; friable; slightly acid; clear smooth boundary.

A—12 to 20 inches; black (10YR 2/1) sand; weak fine subangular blocky structure; very friable; mildly alkaline; gradual wavy boundary.

C—20 to 39 inches; pale brown (10YR 6/3) sand; single grained; loose; moderately alkaline; abrupt irregular boundary.

R—39 inches; hard limestone.

The solum generally is 20 to 40 inches thick; however, solution basins extend to a depth of 60 inches or more in some pedons. Organic material is 8 to 16 inches thick, and mineral material is 12 to 32 inches thick except in solution basins.

The Oa horizon has hue of 10YR, value of 2, and chroma of 1 or 2 or hue of 5YR, value of 2 or 3, and chroma of 2 to 4. Reaction by Truog method ranges from strongly acid to neutral.

The A horizon has hue of 10YR, value of 2 to 6, and chroma of 1. Texture is sand or fine sand. Reaction by Truog method is medium acid to moderately alkaline.

The C horizon has hue of 10YR, value of 5 to 7, and chroma of 3 or 4. Mottles are in some pedons. They have hue of 10YR, value of 2 to 4, and chroma of 1 or 2. Reaction by Truog method is slightly acid to moderately alkaline. Texture is sand or fine sand. Finer textured material, some of which has shell and fragments of limestone or carbonates, is in solution basins.

Pomello Series

The Pomello series is a member of the sandy, siliceous, hyperthermic family of Arenic Haplohumods. It consists of moderately well drained, moderately rapidly permeable soils that formed in sandy marine sediment. These soils are on low sandy ridges. Slope is 0 to 5 percent.

Pomello soils are associated on the landscape with Immokalee, Oldsmar, and Pineda soils. Immokalee and Oldsmar soils are poorly drained. In addition, Oldsmar soils have an argillic horizon beneath the spodic horizon. Pineda soils do not have a spodic horizon and are underlain by an argillic horizon.

Typical pedon of Pomello fine sand, 0 to 5 percent slopes; about 0.6 mile south of Florida Highway 78 and 200 feet east of the Lee County line, NW¼SW¼ sec. 19, T. 43 S., R. 28 E.

A—0 to 4 inches; gray (10YR 5/1) fine sand; single grained; loose; medium acid; clear wavy boundary.

E—4 to 40 inches; white (10YR 8/1) fine sand; single grained; loose; strongly acid; abrupt wavy boundary.

Bh1—40 to 43 inches; dark reddish brown (5YR 2/2) fine sand; weak medium granular structure; friable; very strongly acid; clear irregular boundary.

Bh2—43 to 50 inches; dark reddish brown (5YR 3/3) fine sand; weak medium granular structure; friable; very strongly acid; clear irregular boundary.

BC—50 to 65 inches; dark brown (10YR 4/3) fine sand; single grained; loose; strongly acid; clear wavy boundary.

C—65 to 80 inches; very pale brown (10YR 7/3) fine sand; single grained; loose; medium acid.

The solum is 45 to 75 inches thick. Texture is sand or fine sand. Reaction is very strongly acid to medium acid.

The A horizon has hue of 10YR, value of 4 to 7, and chroma of 1 or 2; has hue of 2.5Y, value of 6 or 7, and chroma of 2; or is neutral in hue and has value of 6 or 7.

The E horizon has hue of 10YR, value of 5 to 8, and chroma of 1 or 2; has hue of 2.5Y, value of 7 or 8, and chroma of 2; or is neutral in hue and has value of 6 to 8. In many pedons, a transitional horizon is between the E and Bh horizons.

The 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 or 3; or hue of 7.5YR, value of 3, and chroma of 2.

The BC horizon has hue of 10YR, 7.5YR, or 5YR, value of 4, and chroma of 2 to 4.

The C horizon has hue of 10YR, value of 6 or 7, and chroma of 1 to 3 or hue of 10YR, value of 5, and chroma of 1 or 2.

Pompano Series

The Pompano series is a member of the siliceous, hyperthermic family of Typic Psammaquents. It consists of poorly drained, very rapidly permeable soils that formed in sandy marine sediment. These soils are in sloughs and depressions. Slope is less than 2 percent.

Pompano soils are associated on the landscape with Basinger, Holopaw, Immokalee, and Valkaria soils. Basinger soils have a nonspodic Bh horizon. Holopaw soils have an argillic horizon at a depth of more than 40 inches. Immokalee soils have a spodic horizon at a depth of more than 30 inches. Valkaria soils have a high-chroma Bw horizon.

Typical pedon of Pompano sand; about 3.5 miles south of Florida Highway 80 and 100 feet west of Florida Highway 29, SE¼NE¼ sec. 29, T. 43 S., R. 29 E.

A—0 to 6 inches; dark gray (10YR 4/1) sand; single grained; loose; strongly acid; abrupt wavy boundary.

C1—6 to 42 inches; light gray (10YR 7/2) sand; few fine prominent brownish yellow (10YR 6/8) mottles; single grained; loose; neutral; clear wavy boundary.

C2—42 to 80 inches; light brownish gray (10YR 6/2) sand; single grained; loose; neutral.

Texture is sand or fine sand throughout the profile. Reaction is very strongly acid to mildly alkaline.

The A horizon has hue of 10YR, value of 2 to 5, and chroma of 1 or hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2. Where the value is 3 or less, this horizon is less than 7 inches thick.

The C horizon has hue of 10YR, value of 5 or 6, and chroma of 1 to 3; hue of 10YR, value of 7, and chroma of 1 to 4; hue of 10YR, value of 8, and chroma of 3 or 4; or hue of 2.5Y, value of 5 to 7, and chroma of 2. The C1 horizon generally is mottled in shades of yellow, brown, and gray. Shell fragments are in the C2 horizon of some pedons.

Riviera Series

The Riviera series is a member of the loamy, siliceous, hyperthermic family of Arenic Glossaqualfs. It consists of deep, poorly drained, slowly permeable soils that formed in sandy and loamy marine sediments. These soils are in sloughs and depressions. Slope is less than 2 percent.

Riviera soils are associated on the landscape with Holopaw, Malabar, Pineda, Wabasso, and Winder soils. Wabasso soils are in adjacent flatwood areas and have spodic horizons. Holopaw and Malabar soils have an argillic horizon at a depth of 40 to 70 inches. Malabar and Pineda soils have a Bw horizon that has high chroma. Winder soils have an argillic horizon at a depth of less than 20 inches.

Typical pedon of Riviera fine sand; about 3.2 miles east of the Lee County line and 8.2 miles south of Highway 80, NW¼SW¼ sec. 3, T. 45 S., R. 28 E.

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

E1—4 to 10 inches; gray (10YR 6/1) fine sand; single grained; loose; slightly acid; gradual wavy boundary.

E2—10 to 26 inches; light gray (10YR 7/2) fine sand; single grained; loose; neutral; abrupt irregular boundary.

Btg/E—26 to 32 inches; gray (10YR 5/1) sandy loam (Btg) with vertical intrusions of light gray fine sand (E); few medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; neutral; clear wavy boundary.

Btg1—32 to 50 inches; gray (10YR 5/1) sandy clay loam; common medium prominent yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable; neutral; gradual wavy boundary.

Btg2—50 to 70 inches; gray (10YR 6/1) sandy loam; weak medium subangular blocky structure; friable; few lenses and pockets of sand; neutral; clear wavy boundary.

Btg3—70 to 80 inches; gray (5Y 5/1) sandy clay loam; few medium distinct olive (5Y 5/3) mottles; weak coarse subangular blocky structure; slightly sticky and slightly plastic; few fine calcium carbonate concretions; moderately alkaline.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1 or 2. The E horizon has hue of 10YR, value of 5 to 8, and chroma of 1 or 2 or hue of 2.5Y, value of 7, and chroma of 2. Mottles in shades of yellow and brown are in most pedons. The A and E horizons combined are 20 to 40 inches thick. Texture is sand or fine sand. Reaction is very strongly acid to neutral.

The Btg part of the Btg/E horizon has hue of 10YR, value of 3 to 7, and chroma of 1 or 2 or hue of 5Y, value of 4 to 6, and chroma of 1 or 2. Most pedons have many mottles in shades of yellow and brown. The

E part consists of tongues or intrusions of sand or fine sand extending downward into the Btg horizon. The Btg/E horizon is 5 to 27 inches thick. Texture of the Btg part is sandy loam or sandy clay loam. Reaction is slightly acid to moderately alkaline.

The Btg1, Btg2, and Btg3 horizons have hue of 10YR, value of 3 to 7, and chroma of 1 or 2; hue of 2.5Y, value of 3 to 5, and chroma of 2; or hue of 5Y, value of 3 to 6, and chroma of 1 or 2. Most pedons have yellowish or brownish mottles in the upper part. Texture is sandy clay loam, fine sandy loam, or sandy loam. Reaction is slightly acid to moderately alkaline.

Many pedons have a Cg horizon that has the same range in colors as that of the Btg3 horizon. Texture ranges from sand to loamy sand. Many pedons are predominantly shell fragments, carbonate nodules, or other calcareous material. Limestone bedrock is below a depth of 50 inches in some pedons.

Terra Ceia Series

The Terra Ceia series is a member of the euic, hyperthermic family of Typic Medisaprists. It consists of deep, very poorly drained, rapidly permeable, organic soils that formed in thick beds of well decomposed organic matter. These soils are in freshwater marshes. Slope is less than 1 percent.

Terra Ceia soils are associated on the landscape with Chobee, Gator, Gentry, Jupiter, Okeelanta, Pahokee, Riviera, and Winder soils. Chobee, Gentry, Jupiter, Riviera, and Winder are mineral soils. Gator, Okeelanta, and Pahokee are organic soils in which the muck is less than 52 inches thick.

Typical pedon of Terra Ceia muck; about 7.5 miles south of Florida Highway 80 and 2.6 miles east of the Lee County line, SW¼SE¼ sec. 33, T. 44 S., R. 38 E.

Oa1—0 to 25 inches; black (10YR 2/1) muck; about 30 percent fiber when unrubbed, about 15 percent when rubbed; weak medium granular structure; very friable; common fine roots; neutral; gradual smooth boundary.

Oa2—25 to 70 inches; black (10YR 2/1) muck; about 15 percent fiber when unrubbed, about 5 percent when rubbed; massive; friable; few fine roots; neutral.

The organic material is more than 51 inches thick. It has hue of 5YR to 10YR, value of 2, and chroma of 1 or 2 or is neutral in hue and has value of 2. Unrubbed fiber content ranges from about 5 to 30 percent except in the upper 6 inches. Rubbed fiber content is less than 15 percent. Reaction is very strongly acid to moderately alkaline in 0.01 molar calcium chloride and medium acid to moderately alkaline by the Hellige-Truog method. The organic material is underlain by various kinds of material ranging from sand to limestone.

Tuscawilla Series

The Tuscawilla series is a member of the fine-loamy, carbonatic, hyperthermic family of Typic Ochraqualfs. It consists of poorly drained, moderately permeable soils that formed in sandy calcareous material. These soils are on low flatwood ridges and hammocks. Slope is less than 2 percent.

These soils are considered to be taxadjuncts to the Tuscawilla series because they have less than 40 percent calcium carbonate. They are, however, similar in use, management, and behavior to other Tuscawilla soils.

Tuscawilla soils are associated on the landscape with Boca, Chobee, Gator, Pineda, Wabasso, and Winder soils. Boca soils have limestone at a depth of 20 to 40 inches. Chobee soils have a mollic epipedon. Gator soils are organic. Pineda soils have an argillic horizon at a depth of 20 to 40 inches that has glossic properties. Wabasso soils have a spodic horizon at a depth of 20 to 30 inches. Winder soils are in sloughs and depressions and have glossic properties.

Typical pedon of Tuscawilla fine sand; about 4 miles east of Felda, NE¼SE¼ sec. 25, T. 45 S., R. 29 E.

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

E—4 to 8 inches; gray (10YR 5/1) fine sand; single grained; loose; medium acid; clear wavy boundary.

Btg—8 to 15 inches; dark grayish brown (10YR 4/2) sandy clay loam; few fine prominent yellowish brown (10YR 5/6) mottles; moderate coarse subangular blocky structure; firm; neutral; abrupt wavy boundary.

Btk1—15 to 39 inches; light gray (10YR 7/2) sandy clay loam; few fine prominent brownish yellow (10YR 6/6) mottles; weak coarse subangular blocky structure; friable; many streaks of calcium carbonate throughout; strongly alkaline; violently effervescent; clear wavy boundary.

Btk2—39 to 56 inches; light gray (10YR 7/2) fine sandy loam; common fine and coarse prominent brownish yellow (10YR 6/6) mottles; weak coarse subangular blocky structure; strongly alkaline; violently effervescent; clear wavy boundary.

2C—56 to 80 inches; white (10YR 8/2) loamy fine sand;

weak coarse subangular blocky structure; friable; few coarse calcium carbonate nodules; strongly alkaline; violently effervescent.

The solum is 30 to 60 inches thick.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1 or is neutral in hue and has value of 2 to 4. Texture is sand or fine sand. Reaction is medium acid to neutral.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. Mottles are in some pedons that have chroma of 1 and in all pedons that have chroma of 2. Texture is sand or fine sand. Reaction is medium acid to moderately alkaline.

The Btg horizon has hue of 10YR and value of 3 to 7 and chroma of 1 or 2 or value of 6 or 7 and chroma of 2 or is neutral in hue and has value of 4 or 5. Mottles are in some pedons that have value of 3 to 7 and chroma of 1 or 2 and in all pedons that have value of 6 or 7 and chroma of 2. Texture is sandy clay loam, sandy loam, or fine sandy loam. Reaction is neutral to moderately alkaline.

The Btk horizon has hue of 10YR, value of 5 to 8, and chroma of 1 or has hue of 10YR, value of 6 or 7, and chroma of 2. Mottles are in some pedons that have chroma of 1 and in all pedons that have chroma of 2. Texture is sandy loam, sandy clay loam, or fine sandy loam. Reaction is neutral to strongly alkaline.

The 2C horizon has hue of 10YR, 5Y, or 5GY, value of 5 to 8, and chroma of 1 or 2 or is neutral in hue and has value of 5 to 8. Texture is fine sand or loamy fine sand.

Valkaria Series

The Valkaria series is a member of the siliceous, hyperthermic family of Spodic Psammaquents. It consists of poorly drained, rapidly permeable soils that formed in sandy marine sediment. These soils are in sloughs and depressions within the flatwoods. Slope is less than 2 percent.

Valkaria soils are associated on the landscape with Basinger, Immokalee, Malabar, Myakka, and Pompano soils. Basinger and Pompano soils do not have a high-chroma Bw horizon. Basinger soils have a Bh horizon. Immokalee and Myakka soils have a spodic horizon. Malabar soils have an argillic horizon.

Typical pedon of Valkaria sand; about 6.7 miles south of Florida Highway 80 and 1.8 miles east of Florida Highway 833, in the southwest corner of NE¼SE¼ sec. 14, T. 44 S., R. 32 E.

A1—0 to 5 inches; very dark gray (10YR 3/1) sand; weak fine granular structure; strongly acid; abrupt wavy boundary.

A2—5 to 10 inches; dark grayish brown (10YR 4/2) sand; single grained; loose; strongly acid; clear wavy boundary.

E—10 to 15 inches; light gray (10YR 7/2) sand; few fine distinct brown (10YR 5/3) mottles; single grained; loose; medium acid; clear wavy boundary.

Bw1—15 to 20 inches; very pale brown (10YR 7/4) sand; few fine faint yellow (10YR 7/8) mottles; single grained; loose; neutral; clear wavy boundary.

Bw2—20 to 30 inches; brownish yellow (10YR 6/6) sand; single grained; loose; neutral; clear wavy boundary.

Bw3—30 to 45 inches; brown (10YR 5/3) sand; single grained; loose; neutral; gradual smooth boundary.

C—45 to 80 inches; light brownish gray (10YR 6/2) sand; single grained; loose; neutral.

Texture is sand or fine sand to a depth of 80 inches or more.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1 or 2 or hue of 2.5Y, value of 4, and chroma of 2. It generally is 4 to 12 inches thick, but where the color is black or very dark gray, it is less than 6 inches thick. The A horizon has many light gray or white sand grains. The E horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. It has mottles and streaks of gray, brown, or yellow in some pedons. Reaction of the A and E horizons is strongly acid to neutral.

The Bw horizon has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 3 to 8. Mottles in shades of gray, yellow, or brown are in some pedons. Reaction is strongly acid to moderately alkaline.

The C horizon has hue of 10YR, value of 4 to 7, and chroma of 1 or 2 or hue of 2.5Y, value of 6 or 7, and chroma of 1 or 2. Some pedons have sand mixed with shell fragments at a depth of 40 to 80 inches.

Wabasso Series

The Wabasso series is a member of the sandy, siliceous, hyperthermic family of Alfic Haplaquods. It consists of poorly drained, slowly permeable soils that formed in sandy and loamy marine sediments. These soils are in broad flatwood areas. Slope is less than 2 percent.

Wabasso soils are associated on the landscape with Oldsmar, Pineda, Riviera, and Winder soils. Oldsmar soils have A and E horizons that have a combined thickness of 30 inches or more. Pineda soils have a high-chroma Bw horizon. Riviera and Winder soils do not have a spodic horizon.

Typical pedon of Wabasso sand; about 200 feet south of the Glades County line and 0.2 mile west of Bee Branch, NE¼NE¼ sec. 2, T. 43 S., R. 28 E.

A—0 to 6 inches; dark gray (10YR 4/1) sand; weak fine granular structure; very friable; slightly acid; clear wavy boundary.

E—6 to 25 inches; light gray (10YR 7/1) sand; single grained; loose; slightly acid; abrupt irregular boundary.

Bh—25 to 30 inches; black (5YR 2/1) sand; massive parting to weak medium granular structure; friable; very strongly acid; abrupt irregular boundary.

Btg1—30 to 40 inches; dark grayish brown (10YR 4/2) sandy clay loam; common medium distinct brown (10YR 4/3) mottles; weak medium subangular blocky structure; friable, slightly sticky and plastic; medium acid; clear wavy boundary.

Btg2—40 to 58 inches; gray (10YR 5/1) sandy clay loam; common coarse prominent yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; neutral; clear wavy boundary.

Cg—58 to 80 inches; grayish brown (10YR 5/2) loamy sand; pockets or lenses of sand and sandy loam; massive; friable; neutral.

The A horizon has hue of 10YR, value of 2, and chroma of 1 or hue of 10YR, value of 3 or 4, and chroma of 1 or 2. The E horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. Some pedons have yellow and brown mottles. Texture is sand and fine sand. Reaction in the A and E horizons is slightly acid to very strongly acid.

The 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 to 4; hue of 7.5YR, value of 3, and chroma of 2; hue of 10YR, value of 2, and chroma of 1; or hue of 10YR, value of 3, and chroma of 2 or 3. This horizon is 4 to 14 inches thick. Texture is sand or loamy sand. Reaction is slightly acid to very strongly acid.

Some pedons have a BC horizon or an E' horizon, or both. The BC horizon has hue of 10YR or 7.5YR, value of 4, and chroma of 2; hue of 10YR to 5YR, value of 4, and chroma of 3; or hue of 7.5YR or 5YR, value of 4, and chroma of 4. Black or dark reddish brown mottles are in most pedons. The E' horizon has hue of 10YR, value of 5 to 7, and chroma of 1 to 3; hue of 10YR, value of 8, and chroma of 3; or hue of 2.5Y, value of 5 to 7, and chroma of 2. Texture is sand or fine sand. Reaction is strongly acid to neutral.

Depth to the Btg horizon is less than 40 inches. This horizon has hue of 10YR, value of 3 or 4, and chroma of 2; hue of 10YR, value of 5 or 6, and chroma of 1 to 8; hue of 10YR, value of 7, and chroma of 1 to 4; hue of 2.5Y, value of 4 to 6, and chroma of 2; or hue of 5Y, value of 4 to 6, and chroma of 1 or 2. The Btg horizon has many mottles in shades of gray, brown, yellow, and red. Texture generally is sandy clay loam, but it is sandy loam in some pedons. Reaction is medium acid to moderately alkaline.

The C or 2C horizon is sand, fine sand, loamy sand, or sandy loam. Shell fragments or carbonate nodules make up, by volume, as much as 90 percent. Some pedons do not have a C or 2C horizon.

Winder Series

The Winder series is a member of the fine-loamy, siliceous, hyperthermic family of Typic Glossaqualfs. It consists of poorly drained and very poorly drained, slowly permeable soils that formed in loamy marine sediment. These soils are in broad, low sloughs and depressions within flatwood areas. Slope is less than 2 percent.

Winder soils are associated on the landscape with Boca, Pineda, Riviera, and Wabasso soils. Boca soils have limestone at a depth of less than 40 inches. Pineda soils have a high-chroma Bw horizon. Riviera and Pineda soils have an argillic horizon at a depth of 20 to 40 inches. Wabasso soils have a spodic horizon.

Typical pedon of Winder fine sand; about 1.6 miles east of the Seaboard Coast Line railroad and 1.05 miles south of Sears Road, NE¼NW¼ sec. 29, T. 44 S., R. 30 E.

A—0 to 4 inches; dark gray (10YR 4/1) fine sand; single grained; loose; slightly acid; abrupt wavy boundary.

E—4 to 14 inches; light gray (10YR 7/1) fine sand; single grained; loose; neutral; abrupt irregular boundary.

B/E—14 to 18 inches; grayish brown (10YR 5/2) sandy loam (B); few coarse distinct vertical intrusions of light gray (10YR 7/2) fine sand and grayish brown (10YR 5/2) loamy sand (E); common medium prominent yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; very friable; neutral; clear wavy boundary.

Btg1—18 to 30 inches; gray (5Y 6/1) sandy clay loam; many medium prominent brownish yellow (10YR 6/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; neutral; clear wavy boundary.

Btg2—30 to 47 inches; gray (10YR 5/1) sandy loam; weak medium subangular blocky structure; friable; mildly alkaline; clear wavy boundary.

2Cg1—47 to 60 inches; gray (10YR 5/1) sandy loam; single grained; loose; few calcium carbonate nodules; moderately alkaline; abrupt wavy boundary.

2Cg2—60 to 80 inches; gray (5Y 6/1) sandy clay loam; massive; firm; common carbonate nodules; moderately alkaline.

The solum is 22 to 54 inches thick. Reaction is medium acid to moderately alkaline.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1. It generally is about 4 inches thick, but it ranges from 3 to 8 inches. The E horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2 or has hue of 10YR, value of 4, and chroma of 1. Many mottles in shades of yellow and brown are in most pedons. Texture is sand or fine sand.

The B part of the B/E horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 7, and chroma of 1 or 2. Most pedons have yellowish and brownish mottles. The E part is tongues or intrusions of sandy material of the overlying E horizon extending downward into the loamy B part. The B/E horizon is 3 to 6 inches thick.

The Btg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 7, and chroma of 1 or 2. Mottles in shades of yellow and brown are common in most pedons. This horizon is 12 to 28 inches thick. Texture is sandy clay loam or sandy loam. The average clay content of the control section ranges from 18 to 35 percent.

The 2Cg horizon is variable. Typically, it has hue of 10YR to 5Y, value of 5 to 8, and chroma of 1 to 8. Most pedons have many coarse mottles in shades of yellow and brown. Texture is sandy loam, fine sandy loam, or sandy clay loam. Most pedons have common to many carbonate concretions up to 2 inches in diameter. In many pedons, layers of sand, loamy sand, or sandy loam with shell fragments and marl are in the lower part of this horizon.

Formation of the Soils

In this section the factors of soil formation are described and related to the soils in Hendry County. The processes of soil formation are also described.

Factors of Soil Formation

Soil is produced by forces of weathering on parent material. The kind of soil that develops depends on five major factors. These factors are the climate under which soil material exists after accumulation, the plant and animal life in and on the soil, the type of parent material, the relief of the land, and the length of time that the forces of soil formation act on the soil material.

The five soil-forming factors are interdependent; each modifies the effects of the others. Any of the five factors can have more influence than the others on the formation of a soil and can account for most of its properties. For example, if the parent material is quartz sand, the soil generally has weakly expressed horizons. The other four factors have had very little effect on these soils. Other kinds of parent material are modified greatly in some places by the effects of climate, relief, time, and plants and animals. A difference in any of the 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 in Hendry County consists of beds of sandy and loamy materials that were transported and deposited by ocean currents. The ocean 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

Hendry County has a humid subtropical climate. In some parts of the county, the temperatures are moderated slightly by the Caloosahatchee River. The average rainfall is about 49 inches per year. The climate is uniform throughout the county.

Few differences among the soils are caused by the climate; however, the climate aids in rapid decomposition of organic matter and hastens chemical reaction 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 content of organic matter, low natural fertility, and low available water capacity.

Relief

Relief has affected the formation of soils in Hendry County mainly through its influence on soil-water relationships. Other factors of soil formation generally associated on the landscape with relief, such as erosion, temperature, and plant cover, are of minor importance.

The county is made up of flatwoods, freshwater marshes and swamps, ponds, and sloughs. 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, plants and animals, and relief are slow. The length of time needed to convert raw, geologic material into soil varies according to the nature of the geologic material and the 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 in the soil to form horizons varies under differing conditions, but the processes always take a relatively long time.

Plants and Animals

Plants have been the principal biological factor in the formation of soils in the county. 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 of the soil to the upper layers. In places plants and animals cause differences in the content of organic matter, nitrogen, and nutrients in the soil and differences in soil structure and porosity. For example, crawfish and the roots of trees have penetrated the loamy subsoil and mixed the sandy surface layer with the subsoil.

Micro-organisms, including bacteria and fungi, weather and break down minerals and 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 county has affected soil formation more than other living organisms.

Man has influenced the formation of the 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.

Processes of Soil Formation

Soil genesis refers to the formation of soil horizons. The differentiation of horizons in soils in Hendry 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 A horizon. The content of organic matter is low in some of the soils and fairly high in others.

Carbonates and salts have been leached in most 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 county are leached to varying degrees.

The reduction and transfer of iron has occurred in most of the soils in the county except the organic soils. In some of the wet soils, iron in the subsoil forms brownish yellow horizons.

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

AC soil. A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alkali (sodic) soil. Soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Aquifer. A layer or a group of layers of geologic materials (consolidated or unconsolidated) that contains sufficient saturated, permeable material to conduct ground water and to yield economically significant quantities of ground water for wells and springs.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

California bearing ratio (CBR). The load-supporting capacity of a soil as compared to that of a standard crushed limestone, expressed as a ratio. First standardized in California. A soil having a CBR of 16 supports 16 percent of the load that would be supported by standard crushed limestone, per unit area, with the same degree of distortion.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

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.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a channer.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Climax vegetation. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.5 to 25 centimeters) in diameter.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Compressible (in tables). Excessive decrease in volume of soft soil under load.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Confined aquifer. An aquifer bounded above and below by impermeable layers or by layers of distinctly lower permeability than that of the aquifer.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Coprogenous earth (sedimentary peat). Fecal material deposited in water by aquatic organisms.

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.

Cypress heads. A small stand of cypress trees in small circular, shallow depressions in otherwise flat terrain.

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.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drumlin. A low, smooth, elongated oval hill, mound, or ridge of compact glacial till. The longer axis is parallel to the path of the glacier and commonly has a blunt nose pointing in the direction from which the ice approached.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Esker (geology). A narrow, winding ridge of stratified gravelly and sandy drift deposited by a stream flowing in a tunnel beneath a glacier.

Excess fines (in tables). Excess silt and clay are in the soil. The soil is not a source of gravel or sand for construction purposes.

Excess humus (in tables). Too much organic matter for the intended use.

Excess lime (in tables). Excess carbonates in the soil that restrict the growth of some plants.

Excess salts (in tables). Excess water-soluble salts in the soil that restrict the growth of most plants.

Excess sodium (in tables). Excess exchangeable sodium in the soil. The resulting poor physical properties restrict the growth of 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.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grains are grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity*.

Fill. Suitable soil material that raises the surface level of the land to a desired level.

Fine textured soil. Sandy clay, silty clay, and clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flatwoods. Broad, nearly level, low ridges of dominantly poorly drained soils characteristically vegetated with an open forest of pines and a ground cover of saw palmetto and pineland threeawn.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant that is not a grass or a sedge.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Graded stripcropping. Growing crops in strips that grade toward a protected waterway.

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 (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric material.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. The major horizons are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed or disturbed surface layer.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) granular, prismatic, or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Hard, consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake in inches per hour is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Karst (topography). The relief of an area underlain by limestone that dissolves in differing degrees, thus forming numerous depressions or small basins.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Large stones (in tables). Rock fragments 3 inches (7.6

centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Mounding. Filling an area for an absorption field with suitable soil material to a level above the water table necessary to meet local and state requirements for proper functioning.

Muck. Dark colored, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Open space. A relatively undeveloped green or wooded area provided mainly within an urban area to minimize feelings of congested living.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil, adversely affecting the specified use.

Permafrost. Layers of soil, or even bedrock, occurring in arctic or subarctic regions, in which a temperature below freezing has existed continuously for a long time.

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.

Pitting (in tables). Pits caused by melting ground ice. They form on the soil after plant cover is removed.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plinthite. The sesquioxide-rich, humus-poor highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor filter (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Potentiometric map. A map showing the elevation of a potentiometric surface of an aquifer by means of contour lines.

Potentiometric surface. An imaginary surface representing the static head of ground water and defined by the level to which water will rise in a well. The water table is a particular potentiometric surface.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Range condition. The present composition of the plant community on a range site in relation to the potential natural plant community for that site. Range condition is expressed as excellent, good, fair, or poor, on the basis of how much the present plant community has departed from the potential.

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 the acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are—

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

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 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-sized 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.

Saprolite (soil science). Unconsolidated residual material underlying the soil and grading to hard bedrock below.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Sheet flow. A thin layer of slowly moving water that accumulates during periods of heavy rainfall and covers the land surface for periods of less than 1 month during most years. It is not as limiting as flooding or ponding.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silica-sesquioxide ratio. The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slippage (in tables). Soil mass susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slough. A broad, poorly defined drainageway 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.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Sodicity. The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium adsorption ratio (SAR) of a saturation extract, or the ratio of Na^+ to $Ca^+ + Mg^{++}$. The degrees of sodicity and their respective ratios are—

Slight	less than 13:1
Moderate	13-30:1
Strong	more than 30:1

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsidence. The sinking of an organic soil to a lower level after lowering the water table.

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in organic matter content than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed 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.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). An otherwise suitable soil material that is too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Too clayey (in tables). Soil slippery and sticky when wet and slow to dry.

Too sandy (in tables). Soil soft and loose; droughty and low in fertility.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, such as zinc, cobalt, manganese, copper, and iron, are in soils in extremely small amounts. They are essential to plant growth.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

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.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Water control. To regulate the water table according to the needs through the use of canals, ditches, tile pumping, or any other appropriate method.

Water table (geologic). That surface of a body of unconfined ground water at which the pressure is equal to that of the atmosphere. Synonym: freshwater surface; top of zone of saturation.

Weathering. All physical and chemical changes produced by atmospheric agents in rocks or other deposits at or near the earth's surface. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Based on data recorded in the period 1974-84 at La Belle, Florida]

Month	Temperature					Precipitation			
	Monthly normal mean	Normal daily maximum	Normal daily minimum	Mean number of days with temperature of--		Mean normal total	Mean maximum total daily	Mean number of days with rainfall of--	
				90 °F or higher	32 °F or lower			0.10 inch or more	0.50 inch or more
	°F	°F	°F			In	In		
January	58.2	84.0	32.5	0	3	1.89	1.10	3	1
February	59.4	86.5	32.4	1	2	2.25	.71	3	2
March	64.5	90.8	38.2	5	0	2.71	1.36	3	2
April	69.2	94.2	44.2	9	0	1.63	.84	3	1
May	75.1	97.4	52.8	18	0	5.30	2.18	7	3
June	79.5	97.5	61.5	23	0	8.40	2.58	10	5
July	81.7	96.8	66.6	27	0	7.54	1.85	12	5
August	81.7	96.1	67.3	26	0	6.49	1.42	11	5
September	80.8	94.9	66.7	21	0	6.45	1.86	9	4
October	72.4	91.8	53.0	6	0	2.03	.95	4	1
November	63.5	87.6	39.4	0	0	2.17	1.04	3	1
December	58.9	85.3	32.8	0	2	2.25	.97	4	1
Year*	70.4	91.9	49.0	11	1	4.09	1.41	6	3

* The yearly figures were derived by adding the monthly figures and then dividing the total by 12.

TABLE 2.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
1	Boca sand	51,052	6.6
2	Pineda sand, limestone substratum	18,119	2.3
4	Oldsmar sand	55,209	7.2
6	Wabasso sand	13,732	1.8
7	Immokalee sand	71,754	9.3
8	Malabar sand	19,184	2.5
9	Riviera fine sand	5,547	0.7
10	Pineda fine sand	6,934	0.9
12	Winder fine sand	558	0.1
13	Gentry fine sand, depressional	7,965	1.0
14	Wabasso sand, limestone substratum	21,909	2.8
15	Myakka sand	28,062	3.6
17	Basinger sand	53,577	6.9
18	Pompano sand	3,483	0.4
19	Gator muck	12,921	1.7
20	Okeelanta muck	3,363	0.4
21	Holopaw sand	26,603	3.4
22	Valkaria sand	3,124	0.4
23	Hallandale sand	39,333	5.1
24	Pomello fine sand, 0 to 5 percent slopes	474	0.1
26	Holopaw sand, limestone substratum	29,045	3.8
27	Riviera sand, limestone substratum	25,633	3.3
28	Boca sand, depressional	16,699	2.2
29	Oldsmar sand, limestone substratum	30,642	4.0
32	Riviera sand, depressional	17,875	2.3
33	Holopaw sand, depressional	13,251	1.7
34	Chobee fine sandy loam, limestone substratum, depressional	9,923	1.3
37	Tuscawilla fine sand	14,810	1.9
39	Udifluvents	2,717	0.4
42	Riviera sand, limestone substratum, depressional	11,788	1.5
44	Jupiter fine sand	8,123	1.0
45	Pahokee muck	5,856	0.8
47	Udorthents	328	*
49	Aquents, organic substratum	418	0.1
50	Delray sand, depressional	7,038	0.9
51	Malabar fine sand, high	8,918	1.2
53	Adamsville fine sand	157	*
56	Terra Ceia muck	3,254	0.4
57	Chobee fine sandy loam, depressional	20,701	2.7
58	Oldsmar sand, depressional	631	0.1
59	Winder fine sand, depressional	17,763	2.3
60	Myakka sand, depressional	602	0.1
61	Malabar sand, depressional	1,896	0.2
62	Pineda sand, depressional	1,739	0.2
63	Jupiter-Ochopee-Rock outcrop complex	4,437	0.6
64	Hallandale sand, depressional	7,097	0.9
65	Plantation muck	17,125	2.2
66	Margate sand	25,096	3.2
67	Lauderhill muck	17,258	2.2
68	Dania muck	7,029	0.9
69	Denaud-Gator mucks	1,020	0.1
70	Denaud muck	553	0.1
73	Adamsville variant sand	578	0.1
	Water	1,110	0.1
	Total	774,013	100.0

* Less than 0.1 percent.

TABLE 3.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Map symbol and soil name	Land capability	Oranges	Grapefruit	Tomatoes	Cucumbers	Bahiagrass	Watermelons	Sugarcane
		Boxes	Boxes	Tons	Tons	AUM*	Tons	Tons
1--------------- Boca	IIIw	375	575	16	11	8.0	20	40
2--------------- Pineda	Vw	425	575	---	10	8.0	16	45
4--------------- Oldsmar	IVw	325	525	8	10	8.0	20	35
6--------------- Wabasso	IIIw	400	575	13	11	8.0	20	45
7--------------- Immokalee	IVw	350	550	15	10	8.0	20	35
8--------------- Malabar	IVw	325	575	13	9	8.0	16	35
9--------------- Riviera	IIIw	425	575	---	10	8.0	16	45
10-------------- Pineda	IIIw	425	575	13	10	8.0	16	45
12-------------- Winder	IIIw	425	575	8	5	9.0	---	45
13-------------- Gentry	VIIw	---	---	---	---	10.0	---	50
14-------------- Wabasso	IIIw	400	575	13	11	8.0	20	45
15-------------- Myakka	IVw	350	550	15	10	9.0	20	30
17-------------- Basinger	IVw	350	450	13	---	---	---	40
18-------------- Pompano	IVw	300	400	13	---	8.0	---	40
19-------------- Gator	VIIw	---	---	---	---	---	---	45
20-------------- Okeelanta	IIIw	---	---	---	---	---	---	45
21-------------- Holopaw	IVw	375	575	7	---	8.0	---	35
22-------------- Valkaria	IVw	350	450	12	---	---	---	40
23-------------- Hallandale	IVw	375	500	16	---	---	---	25

See footnote at end of table.

TABLE 3.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Land capability	Oranges	Grapefruit	Tomatoes	Cucumbers	Bahiagrass	Watermelons	Sugarcane
		Boxes	Boxes	Tons	Tons	AUM*	Tons	Tons
24-------------- Pomello	VIs	250	400	---	---	3.5	---	30
26-------------- Holopaw	IVw	375	575	7	---	8.0	---	35
27-------------- Riviera	IIIw	425	575	8	10	7.5	16	45
28-------------- Boca	VIIw	---	---	---	---	---	---	40
29-------------- Oldsmar	IVw	350	525	---	10	8.0	20	35
32-------------- Riviera	VIIw	---	---	---	---	---	---	45
33-------------- Holopaw	VIIw	---	---	---	---	---	---	---
34-------------- Chobee	VIIw	---	---	---	---	10.0	---	50
37-------------- Tuscawilla	IIIw	425	550	---	11	9.0	20	40
39. Udifluvents								
42-------------- Riviera	VIIw	---	---	---	---	---	---	45
44-------------- Jupiter	IVw	375	500	16	---	5.5	---	35
45-------------- Pahokee	IIIw	---	---	---	---	15.0	---	50
47. Udorthents								
49. Aquents								
50-------------- Delray	VIIw	---	---	---	---	10.0	---	45
51-------------- Malabar	IVw	300	500	---	6	9.0	---	35
53-------------- Adamsville	IIIw	375	500	7	6	7.0	---	---
56-------------- Terra Ceia	IIIw	---	---	---	---	15.0	---	50
57-------------- Chobee	VIIw	425	500	---	---	12.0	---	50

See footnote at end of table.

TABLE 3.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Land capability	Oranges	Grapefruit	Tomatoes	Cucumbers	Bahiagrass	Watermelons	Sugarcane
		Boxes	Boxes	Tons	Tons	AUM*	Tons	Tons
58-------------- Oldsmar	VIIw	---	---	---	---	---	---	35
59-------------- Winder	VIIw	---	---	---	---	---	---	45
60-------------- Myakka	VIIw	---	---	---	---	---	---	30
61-------------- Malabar	VIIw	---	---	---	---	---	---	35
62-------------- Pineda	VIIw	---	---	---	---	---	---	45
63-------------- Jupiter-Ochopee-Rock outcrop	IVw	---	---	---	---	---	---	---
64-------------- Hallandale	VIIw	---	---	---	---	---	---	35
65-------------- Plantation	IVw	---	---	---	---	15.0	---	45
66-------------- Margate	IVw	300	400	12	---	7.5	---	40
67-------------- Lauderhill	IIIw	---	---	---	---	15.0	---	50
68-------------- Dania	Vw	---	---	---	---	15.0	---	40
69-------------- Denaud-Gator	VIIw	---	---	---	---	14.0	---	45
70-------------- Denaud	IIIw	---	---	6	---	14.0	---	---
73-------------- Adamsville variant	IIIw	---	---	---	---	---	---	---

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

TABLE 4.--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	171,194	---	171,194	---	---
IV	423,715	---	423,715	---	---
V	25,148	---	25,148	---	---
VI	474	---	---	474	---
VII	148,909	---	148,909	---	---
VIII	---	---	---	---	---

TABLE 5.--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
1 Boca	South Florida Flatwoods	6,000	4,500	3,000
2 Pineda	Slough	8,000	6,000	4,000
4 Oldsmar	South Florida Flatwoods	6,000	4,500	3,000
6 Wabasso	South Florida Flatwoods	6,000	4,500	3,000
7 Immokalee	South Florida Flatwoods	6,000	4,500	3,000
8 Malabar	Slough	8,000	6,000	4,000
9 Riviera	Slough	8,000	6,000	4,000
10 Pineda	Slough	8,000	6,000	4,000
12 Winder	Slough	8,000	6,000	4,000
13 Gentry	Freshwater Marshes and Ponds	10,000	7,500	5,000
14 Wabasso	South Florida Flatwoods	6,000	4,500	3,000
15 Myakka	South Florida Flatwoods	6,000	4,500	3,000
17 Basinger	Slough	8,000	6,000	4,000
18 Pompano	Slough	8,000	6,000	4,000
19 Gator	Freshwater Marshes and Ponds	10,000	7,500	5,000
20 Okeelanta	Freshwater Marshes and Ponds	10,000	7,500	5,000
21 Holopaw	Slough	8,000	6,000	4,000
22 Valkaria	Slough	8,000	6,000	4,000
23 Hallandale	South Florida Flatwoods and Everglades Flatwoods.	4,500	3,000	1,500

TABLE 5.--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
24: Pomello	Sand Pine Scrub	3,500	2,000	1,500
26: Holopaw	Slough	8,000	6,000	4,000
27: Riviera	Slough	8,000	6,000	4,000
28: Boca	Freshwater Marshes and Ponds	10,000	7,500	5,000
29: Oldsmar	South Florida Flatwoods	6,000	4,500	3,000
32: Riviera	Freshwater Marshes and Ponds	10,000	7,500	5,000
33: Holopaw	Freshwater Marshes and Ponds	10,000	7,500	5,000
34: Chobee	Freshwater Marshes and Ponds	10,000	7,500	5,000
42: Riviera	Freshwater Marshes and Ponds	10,000	7,500	5,000
44: Jupiter	Cabbage Palm Hammock	4,000	3,000	2,000
45: Pahokee	Freshwater Marshes and Ponds	10,000	7,500	5,000
50: Delray	Freshwater Marshes and Ponds	10,000	7,500	5,000
51: Malabar	South Florida Flatwoods	6,000	4,500	3,000
56: Terra Ceia	Freshwater Marshes and Ponds	10,000	7,500	5,000
57: Chobee	Freshwater Marshes and Ponds	10,000	7,500	5,000
58: Oldsmar	Freshwater Marshes and Ponds	10,000	7,500	5,000
59: Winder	Freshwater Marshes and Ponds	10,000	7,500	5,000
60: Myakka	Freshwater Marshes and Ponds	10,000	7,500	5,000
61: Malabar	Freshwater Marshes and Ponds	10,000	7,500	5,000
62: Pineda	Freshwater Marshes and Ponds	10,000	7,500	5,000

TABLE 5.--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
63:				
Jupiter	Everglades Flatwoods	3,000	2,250	1,500
Ochopee.				
Rock outcrop.				
64 Hallandale	Freshwater Marshes and Ponds	10,000	7,500	5,000
66 Margate	Slough	8,000	6,000	4,000
67 Lauderhill	Freshwater Marshes and Ponds	10,000	7,500	5,000
68 Dania	Freshwater Marshes and Ponds	10,000	7,500	5,000
69:				
Denaud	Freshwater Marshes and Ponds	10,000	7,500	5,000
Gator.				
70 Denaud	Freshwater Marshes and Ponds	10,000	7,500	5,000

TABLE 6.--RANGE SITE PRODUCTIVITY POTENTIALS

Range site	Annual production of range in excellent condition		Important range plants	Cover in excellent condition
	Kind of year	Dry weight		
		Lb/acre		Pct
Cabbage Palm Flatwoods	Good	9,000	Creeping bluestem	30
	Fair	6,000	South Florida bluestem	10
	Poor	4,500	Chalky bluestem	10
			Blue maidencane	10
Cabbage Palm Hammock	Good	4,000	Creeping bluestem	10
	Fair	3,000	Low panicums	5
	Poor	2,000	Hairy bluestem	5
			American beautyberry	5
Everglades Flatwoods	Good	3,000	Cabanis bluestem	20
	Fair	2,000	Creeping bluestem	20
	Poor	1,500	Chalky bluestem	10
			South Florida bluestem	10
Freshwater Marshes and Ponds	Good	9,000	Maidencane	50
	Fair	7,000	Chalky bluestem	10
	Poor	5,000	Blue maidencane	5
			Bluejoint panicum	5
Oak Hammock	Good	3,500	Eastern gamagrass	5
	Fair	2,500	Maidencane	5
	Poor	2,000	Switchgrass	5
			Creeping bluestem	5
Sand Pine Scrub	Good	3,500	Indiangrass	10
	Fair	2,500	Beaked panicums	5
	Poor	1,500	Creeping bluestem	5
			Purple bluestem	5
Slough	Good	8,000	Blue maidencane	50
	Fair	6,000	Chalky bluestem	10
	Poor	3,000	Bluejoint panicum	10
			Other sedges and rushes	10
South Florida Flatwoods	Good	6,000	Creeping bluestem	50
	Fair	4,500	Chalky bluestem	10
	Poor	3,000	Indiangrass	10
			Blue maidencane	10
			Other sedges and rushes	10

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
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Productivity class*	
1 Boca	6W	Slight	Moderate	Moderate	Slight	Moderate	South Florida slash pine	55	6	South Florida slash pine.
2 Pineda	3W	Slight	Severe	Severe	Moderate	Severe	South Florida slash pine	35	3	South Florida slash pine, slash pine.
4 Oldsmar	4W	Slight	Moderate	Moderate	Slight	Moderate	South Florida slash pine	45	4	Slash pine, South Florida slash pine.
6 Wabasso	4W	Slight	Moderate	Moderate	Slight	Moderate	South Florida slash pine	45	4	South Florida slash pine.
7 Immokalee	3W	Slight	Moderate	Moderate	Moderate	Moderate	South Florida slash pine	35	3	South Florida slash pine.
8 Malabar	4W	Slight	Moderate	Severe	Slight	Moderate	South Florida slash pine	45	4	South Florida slash pine.
9 Riviera	4W	Slight	Moderate	Moderate	Moderate	Moderate	South Florida slash pine	45	4	South Florida slash pine.
10 Pineda	4W	Slight	Moderate	Severe	Slight	Moderate	South Florida slash pine	45	4	South Florida slash pine.
							Cabbage palm	---	---	
12 Winder	4W	Slight	Moderate	Moderate	Moderate	Moderate	South Florida slash pine	45	4	South Florida slash pine.
13 Gentry	2W	Slight	Severe	Severe	Moderate	Severe	Pondcypress	75	2	**
							Red maple	---	---	
							Cabbage palm	---	---	
							Sweetbay	---	---	
14 Wabasso	5W	Slight	Moderate	Moderate	Moderate	Moderate	South Florida slash pine	50	5	South Florida slash pine.
15 Myakka	3W	Slight	Moderate	Moderate	Moderate	Moderate	South Florida slash pine	35	3	South Florida slash pine.
17 Basinger	3W	Slight	Severe	Severe	Slight	Severe	South Florida slash pine	35	3	South Florida slash pine.

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns					Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Productivity class*	
18----------------- Pompano	3W	Slight	Severe	Severe	Slight	Moderate	South Florida slash pine---------------	35	3	South Florida slash pine.
21----------------- Holopaw	4W	Slight	Moderate	Severe	Slight	Moderate	South Florida slash pine---------------	45	4	South Florida slash pine.
							Cabbage palm--------	---	---	
22----------------- Valkaria	3W	Slight	Severe	Moderate	Slight	Moderate	South Florida slash pine---------------	35	3	South Florida slash pine.
23----------------- Hallandale	3W	Slight	Moderate	Moderate	Moderate	Moderate	South Florida slash pine---------------	35	---	South Florida slash pine.
24----------------- Pomello	3S	Slight	Moderate	Severe	Moderate	Moderate	Sand pine-----------	60	3	Sand pine, slash pine, South Florida slash pine.
							Longleaf pine-------	60	4	
							South Florida slash pine---------------	35	---	
26----------------- Holopaw	4W	Slight	Moderate	Severe	Slight	Moderate	South Florida slash pine---------------	45	4	South Florida slash pine.
							Cabbage palm--------	---	---	
27----------------- Riviera	10W	Slight	Moderate	Severe	Slight	Moderate	Slash pine----------	80	10	Slash pine, South Florida slash pine.
							South Florida slash pine---------------	45	---	
28----------------- Boca	2W	Slight	Severe	Severe	Moderate	Severe	Pondcypress---------	75	2	**
							Baldcypress---------	---	---	
							Cabbage palm--------	---	---	
29----------------- Oldsmar	5W	Slight	Moderate	Moderate	Slight	Moderate	South Florida slash pine---------------	45	5	South Florida slash pine, slash pine.
32----------------- Riviera	2W	Slight	Severe	Severe	Moderate	Severe	Pondcypress---------	75	2	**
							Baldcypress---------	---	---	
							Cabbage palm--------	---	---	
33----------------- Holopaw	2W	Slight	Severe	Severe	Moderate	--------	Pondcypress---------	75	2	**
							Baldcypress---------	---	---	
							Cabbage palm--------	---	---	
							Loblollybay gordonia	---	---	
							Pond pine-----------	---	---	
							Red maple-----------	---	---	
							Sweetbay------------	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
34 Chobee	2W	Slight	Severe	Severe	Moderate	Moderate	Pondcypress	75	2	**
							Baldcypress	---	---	
							Cabbage palm	---	---	
37 Tuscawilla	6W	Slight	Moderate	Moderate	Slight	Severe	South Florida slash pine	55	6	South Florida slash pine.
							Cabbage palm	---	---	
42 Riviera	2W	Slight	Severe	Severe	Moderate	Severe	Pondcypress	75	2	**
							Baldcypress	---	---	
							Cabbage palm	---	---	
							Red maple	---	---	
							Blackgum	---	---	
							Loblollybay gordonia	---	---	
							Sweetbay	---	---	
44 Jupiter	3W	Slight	Severe	Moderate	Moderate	Moderate	South Florida slash pine	35	3	South Florida slash pine.
50 Delray	2W	Slight	Severe	Severe	Moderate	Severe	Pondcypress	75	2	**
							Baldcypress	---	---	
							Cabbage palm	---	---	
51 Malabar	5W	Slight	Moderate	Moderate	Slight	Moderate	South Florida slash pine	45	5	South Florida slash pine, slash pine.
							Cabbage palm	---	---	
53 Adamsville	3W	Slight	Moderate	Moderate	Slight	Moderate	South Florida slash pine	50	3	South Florida slash pine.
							Laurel oak	---	---	
							Water oak	---	---	
							Hickory	---	---	
58 Oldsmar	2W	Slight	Severe	Severe	Moderate	Severe	Pondcypress	75	2	**
							Baldcypress	---	---	
							Blackgum	---	---	
							Cabbage palm	---	---	
							Pond pine	---	---	
							Loblollybay gordonia	---	---	
							Red maple	---	---	
							Sweetbay	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
59 Winder	2W	Slight	Severe	Severe	Moderate	Severe	Pondcypress	75	2	**
							Baldcypress	---	---	
							Blackgum	---	---	
							Cabbage palm	---	---	
							Pond pine	---	---	
							Loblollybay gordonia	---	---	
							Red maple	---	---	
							Sweetbay	---	---	
60 Myakka	2W	Slight	Severe	Severe	Moderate	Severe	Pondcypress	75	2	**
							Baldcypress	---	---	
							Blackgum	---	---	
							Sweetbay	---	---	
							Loblollybay gordonia	---	---	
							Red maple	---	---	
61 Malabar	2W	Slight	Severe	Severe	Moderate	Severe	Pondcypress	75	2	**
							Baldcypress	---	---	
							Blackgum	---	---	
							Cabbage palm	---	---	
							Carolina ash	---	---	
							Loblollybay gordonia	---	---	
							Red maple	---	---	
							Sweetbay	---	---	
							Pond pine	---	---	
62 Pineda	2W	Slight	Severe	Severe	Moderate	Severe	Pondcypress	75	2	**
							Baldcypress	---	---	
							Blackgum	---	---	
							Cabbage palm	---	---	
							Pond pine	---	---	
							Loblollybay gordonia	---	---	
							Red maple	---	---	
							Sweetbay	---	---	
63: Jupiter	3W	Slight	Severe	Moderate	Moderate	Moderate	South Florida slash pine	35	3	South Florida slash pine.
Ochopee.										
Rock outcrop.										

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns					Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Productivity class*	
64----------------- Hallandale	2W	Slight	Severe	Severe	Severe	Severe	Pondcypress--------- Baldcypress--------- Cabbage palm-------- Pond pine-----------	75 --- --- ---	2 --- --- ---	**

* Productivity class is the yield in cubic meters per hectare per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

** This soil generally is not suited to the production of pine trees because of ponding or prolonged wetness. It may be suited to cypress and hardwood production through natural regeneration.

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
1 Boca	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
2 Pineda	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, droughty.
4 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.
6 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.
7 Immokalee	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
8 Malabar	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
9 Riviera	Severe: wetness, percs slowly, too sandy.	Severe: wetness, too sandy, percs slowly.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
10 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.
12 Winder	Severe: wetness, percs slowly, too sandy.	Severe: wetness, too sandy, percs slowly.	Severe: too sandy, wetness, percs slowly.	Severe: wetness, too sandy.	Severe: wetness.
13 Gentry	Severe: ponding, percs slowly.	Severe: ponding, too sandy, percs slowly.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding.
14 Wabasso	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
15 Myakka	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
17 Basinger	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
18 Pompano	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
19 Gator	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.
20 Okeelanta	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
21 Holopaw	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
22 Valkaria	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, droughty.
23 Hallandale	Severe: wetness, too sandy.	Severe: wetness, too sandy, depth to rock.	Severe: too sandy, wetness, depth to rock.	Severe: wetness, too sandy.	Severe: wetness, droughty, thin layer.
24 Pomello	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
26 Holopaw	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness.
27 Riviera	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
28 Boca	Severe: ponding, too sandy.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding, droughty.
29 Oldsmar	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness.
32 Riviera	Severe: ponding, percs slowly, too sandy.	Severe: ponding, too sandy, percs slowly.	Severe: too sandy, ponding, percs slowly.	Severe: ponding, too sandy.	Severe: ponding.
33 Holopaw	Severe: ponding, too sandy.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding, droughty.
34 Chobee	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
37 Tuscawilla	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
39. Udifluvents					

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
42-------------------- Riviera	Severe: ponding, too sandy.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding, droughty.
44-------------------- Jupiter	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.
45-------------------- Pahokee	Severe: small stones, ponding, excess humus.	Severe: ponding, excess humus, small stones.	Severe: small stones, excess humus, ponding.	Severe: ponding, excess humus, small stones.	Severe: small stones, ponding, excess humus.
47. Udorthents					
49-------------------- Aquents	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: wetness.
50-------------------- Delray	Severe: ponding, too sandy.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding.
51-------------------- Malabar	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
53-------------------- Adamsville	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty, too sandy.
56-------------------- Terra Ceia	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
57-------------------- Chobee	Severe: ponding, percs slowly.	Severe: ponding, percs slowly.	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.
58-------------------- Oldsmar	Severe: ponding, too sandy.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding, droughty.
59-------------------- Winder	Severe: ponding, percs slowly, too sandy.	Severe: ponding, too sandy, percs slowly.	Severe: too sandy, ponding, percs slowly.	Severe: ponding, too sandy.	Severe: ponding.
60-------------------- Myakka	Severe: ponding, too sandy.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding.
61-------------------- Malabar	Severe: ponding, too sandy.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding, droughty.
62-------------------- 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, droughty.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
63:					
Jupiter	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.
Ochopee	Severe: wetness, depth to rock.	Severe: wetness, depth to rock.	Severe: wetness, depth to rock.	Severe: wetness.	Severe: wetness, thin layer.
Rock outcrop.					
64 Hallandale	Severe: ponding, too sandy, depth to rock.	Severe: ponding, too sandy, depth to rock.	Severe: too sandy, ponding, depth to rock.	Severe: ponding, too sandy.	Severe: ponding, droughty, depth to rock.
65 Plantation	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
66 Margate	Severe: ponding, too sandy.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding, droughty.
67 Lauderhill	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
68 Dania	Severe: ponding, excess humus, depth to rock.	Severe: ponding, excess humus, depth to rock.	Severe: excess humus, ponding, depth to rock.	Severe: ponding, excess humus.	Severe: ponding, thin layer, excess humus.
69:					
Denaud	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
Gator	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.
70 Denaud	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
73 Adamsville variant	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty.

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	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
1------------------ Boca	Poor	Fair	Fair	Poor	Poor	Good	Fair	Fair	Poor	Fair	Good.
2------------------ Pineda	Poor	Fair	Fair	Poor	Poor	Good	Fair	Fair	Poor	Fair	---
4------------------ Oldsmar	Poor	Fair	Fair	Poor	Fair	Poor	Poor	Fair	Fair	Poor	---
6------------------ Wabasso	Poor	Poor	Poor	Poor	Good	Fair	Poor	Poor	Fair	Poor	---
7------------------ Immokalee	Poor	Poor	Fair	Poor	Poor	Fair	Poor	Poor	Poor	Poor	---
8------------------ Malabar	Poor	Poor	Poor	Poor	Poor	Fair	Fair	Poor	Poor	Fair	---
9------------------ Riviera	Poor	Fair	Fair	Fair	Fair	Poor	Fair	Fair	Fair	Fair	---
10----------------- Pineda	Poor	Fair	Fair	Poor	Poor	Good	Fair	Fair	Poor	Fair	---
12----------------- Winder	Poor	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	---
13----------------- Gentry	Very poor.	Poor	Poor	Fair	Poor	Good	Good	Poor	Poor	Good	---
14----------------- Wabasso	Poor	Poor	Poor	Poor	Good	Fair	Poor	Poor	Fair	Poor	---
15----------------- Myakka	Poor	Fair	Fair	Poor	Poor	Fair	Poor	Fair	Poor	Poor	---
17----------------- Basinger	Poor	Poor	Fair	Poor	Poor	Good	Fair	Poor	Poor	Fair	---
18----------------- Pompano	Poor	Fair	Poor	Poor	Poor	Fair	Fair	Poor	Poor	Fair	---
19----------------- Gator	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Good	Good	Very poor.	Very poor.	Good	---
20----------------- Okeelanta	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	---	Good	Very poor.
21----------------- Holopaw	Poor	Poor	Fair	Poor	Fair	Fair	Fair	Fair	Fair	Fair	---
22----------------- Valkaria	Poor	Fair	Fair	Fair	Fair	Good	Fair	Poor	Poor	Good	---
23----------------- Hallandale	Poor	Poor	Poor	Poor	Poor	Fair	Good	Poor	Poor	Fair	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	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
24: Pomello	Poor	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.	---
26: Holopaw	Poor	Fair	Fair	Poor	Fair	Fair	Fair	Fair	Fair	Fair	---
27: Riviera	Poor	Fair	Fair	Poor	Poor	Fair	Fair	Fair	Poor	Fair	---
28: Boca	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good	---
29: Oldsmar	Poor	Fair	Fair	Poor	Fair	Poor	Poor	Fair	Fair	Poor	---
32: Riviera	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good	---
33: Holopaw	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good	---
34: Chobee	Poor	Poor	Poor	Fair	Poor	Good	Good	Poor	Poor	Good	---
37: Tuscawilla	Poor	Fair	Fair	Good	Fair	Fair	Fair	Fair	Good	Fair	---
39. Udifluvents											
42: Riviera	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good	---
44: Jupiter	Poor	Poor	Poor	Poor	Poor	Good	Poor	Poor	Poor	Fair	---
45: Pahokee	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	---	Good	Very poor.
47. Udorthents											
49. Aquents											
50: Delray	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good	---
51: Malabar	Poor	Fair	Fair	Poor	Fair	Fair	Fair	Fair	Poor	Fair	Fair.
53: Adamsville	Poor	Poor	Fair	Fair	Fair	Poor	Poor	Poor	Fair	Poor	---
56: Terra Ceia	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good	---
57: Chobee	Poor	Poor	Poor	Fair	Poor	Good	Good	Poor	Poor	Good	---

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	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
58: Oldsmar	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Fair	Good	Very poor.	Very poor.	Good	---
59: Winder	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good	---
60: Myakka	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Fair	Good	Very poor.	Very poor.	Good	---
61: Malabar	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Fair	Good	Very poor.	Very poor.	Good	---
62: Pineda	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good	---
63:											
Jupiter	Poor	Poor	Poor	Poor	Poor	Good	Poor	Poor	Poor	Fair	---
Ochopee	Poor	Fair	Fair	Poor	Poor	Fair	Good	Poor	Poor	Fair	Poor.
Rock outcrop.											
64: Hallandale	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good	---
65: Plantation	Very poor.	Poor	Poor	Very poor.	Very poor.	Good	Good	Poor	Very poor.	Good	---
66: Margate	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good	---
67: Lauderhill	Very poor.	Poor	Poor	Very poor.	Very poor.	Good	Good	Poor	Very poor.	Good	---
68: Dania	Very poor.	Poor	Poor	Very poor.	Very poor.	Good	Good	Poor	Very poor.	Good	Fair.
69:											
Denaud	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good	---
Gator	Very poor.	Very poor.	Very poor.	Fair	Very poor.	Good	Good	Very poor.	Poor	Good	---
70: Denaud	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good	---
73: Adamsville variant	Poor	Poor	Poor	Fair	Fair	Poor	Very poor.	Poor	Fair	Very poor.	---

TABLE 10.--BUILDING SITE 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. 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
1----------------- Boca	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
2----------------- Pineda	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
4----------------- Oldsmar	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
6----------------- Wabasso	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
7----------------- Immokalee	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
8----------------- Malabar	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
9----------------- Riviera	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
10---------------- Pineda	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
12---------------- Winder	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
13---------------- Gentry	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
14---------------- Wabasso	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
15---------------- Myakka	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
17---------------- Basinger	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
18---------------- Pompano	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
19 Gator	Severe: cutbanks cave, excess humus, ponding.	Severe: ponding, low strength.	Severe: ponding.	Severe: ponding, low strength.	Severe: ponding.	Severe: ponding, excess humus.
20 Okeelanta	Severe: cutbanks cave, excess humus, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding.	Severe: ponding, excess humus.
21 Holopaw	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
22 Valkaria	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
23 Hallandale	Severe: wetness, depth to rock.	Severe: wetness.	Severe: wetness, depth to rock.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty, thin layer.
24 Pomello	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Severe: droughty.
26 Holopaw	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
27 Riviera	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
28 Boca	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, droughty.
29 Oldsmar	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
32 Riviera	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
33 Holopaw	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, droughty.
34 Chobee	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
37 Tuscawilla	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
39. Udifluvents						

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
42---------------- Riviera	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, droughty.
44---------------- Jupiter	Severe: depth to rock, wetness.	Severe: wetness.	Severe: wetness, depth to rock.	Severe: wetness.	Severe: wetness.	Severe: wetness, thin layer.
45---------------- Pahokee	Severe: depth to rock, excess humus, ponding.	Severe: ponding, low strength.	Severe: ponding, depth to rock.	Severe: ponding, low strength.	Severe: ponding.	Severe: small stones, ponding, excess humus.
47. Udorthents						
49---------------- Aquents	Severe: cutbanks cave, excess humus.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Moderate: wetness.
50---------------- Delray	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
51---------------- Malabar	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
53---------------- Adamsville	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: droughty, too sandy.
56---------------- Terra Ceia	Severe: excess humus, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding.	Severe: ponding, excess humus.
57---------------- Chobee	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
58---------------- Oldsmar	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, droughty.
59---------------- Winder	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
60---------------- Myakka	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
61---------------- Malabar	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, droughty.
62---------------- Pineda	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, 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
63:						
Jupiter	Severe: depth to rock, wetness.	Severe: wetness.	Severe: wetness, depth to rock.	Severe: wetness.	Severe: wetness.	Severe: wetness, thin layer.
Ochopee	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.
Rock outcrop.						
64 Hallandale	Severe: depth to rock, ponding.	Severe: ponding.	Severe: depth to rock, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, droughty, depth to rock.
65 Plantation	Severe: cutbanks cave, ponding.	Severe: ponding, low strength.	Severe: ponding.	Severe: ponding, low strength.	Severe: ponding.	Severe: ponding, excess humus.
66 Margate	Severe: depth to rock, cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, droughty.
67 Lauderhill	Severe: excess humus, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding.	Severe: ponding, excess humus.
68 Dania	Severe: depth to rock, ponding.	Severe: ponding, low strength, depth to rock.	Severe: ponding, depth to rock.	Severe: ponding, low strength, depth to rock.	Severe: depth to rock, ponding.	Severe: ponding, thin layer, excess humus.
69:						
Denaud	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, excess humus.
Gator	Severe: cutbanks cave, excess humus, ponding.	Severe: ponding, low strength.	Severe: ponding.	Severe: ponding, low strength.	Severe: ponding.	Severe: ponding, excess humus.
70 Denaud	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, excess humus.
73 Adamsville variant	Severe: cutbanks cave, excess humus, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: droughty.

TABLE 11.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "severe," "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
1------------------- 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.
2------------------- Pineda	Severe: wetness, percs slowly, poor filter.	Severe: seepage.	Severe: depth to rock, wetness.	Severe: seepage, wetness.	Poor: wetness, thin layer.
4------------------- Oldsmar	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
6------------------- Wabasso	Severe: wetness, percs slowly, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
7------------------- Immokalee	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
8------------------- Malabar	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
9------------------- Riviera	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
10------------------ Pineda	Severe: wetness, percs slowly, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
12------------------ Winder	Severe: percs slowly, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Poor: wetness, thin layer.
13------------------ Gentry	Severe: flooding, wetness, percs slowly.	Severe: seepage, flooding.	Severe: flooding, wetness.	Severe: flooding, seepage, wetness.	Poor: wetness.
14------------------ Wabasso	Severe: wetness, percs slowly, poor filter.	Severe: seepage, wetness.	Severe: depth to rock, wetness, seepage.	Severe: seepage, wetness.	Poor: wetness, thin layer.

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
15: Myakka	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
17: Basinger	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
18: Pompano	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
19: Gator	Severe: ponding, percs slowly, poor filter.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding.	Severe: seepage, ponding.	Poor: ponding, thin layer.
20: Okeelanta	Severe: ponding, poor filter.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
21: Holopaw	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
22: Valkaria	Severe: wetness, poor filter.	Severe: wetness, seepage.	Severe: wetness, seepage, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
23: 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.
24: Pomello	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
26: Holopaw	Severe: wetness, percs slowly, poor filter.	Severe: wetness, seepage.	Severe: depth to rock, too sandy, wetness.	Severe: wetness, seepage.	Poor: wetness, seepage, too sandy.
27: Riviera	Severe: wetness.	Severe: seepage, wetness.	Severe: depth to rock, seepage, wetness.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
28: Boca	Severe: depth to rock, ponding, poor filter.	Severe: seepage, depth to rock, ponding.	Severe: depth to rock, ponding, too sandy.	Severe: depth to rock, seepage, ponding.	Poor: depth to rock, seepage, too sandy.
29: Oldsmar	Severe: wetness, percs slowly, poor filter.	Severe: wetness, seepage.	Severe: depth to rock, wetness, too sandy.	Severe: seepage, wetness.	Poor: too sandy, seepage, 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
32----------------- Riviera	Severe: ponding, percs slowly, poor filter.	Severe: seepage, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
33----------------- Holopaw	Severe: ponding, poor filter.	Severe: seepage, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
34----------------- Chobee	Severe: ponding, percs slowly.	Severe: ponding.	Severe: depth to rock, ponding.	Severe: ponding.	Poor: ponding.
37----------------- Tuscawilla	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Poor: wetness, thin layer.
39. Udifluvents					
42----------------- Riviera	Severe: ponding, percs slowly, poor filter.	Severe: seepage, ponding.	Severe: depth to rock, seepage, ponding.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
44----------------- Jupiter	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.
45----------------- Pahokee	Severe: depth to rock, ponding, poor filter.	Severe: seepage, depth to rock, excess humus.	Severe: depth to rock, seepage, ponding.	Severe: depth to rock, seepage, ponding.	Poor: area reclaim, small stones, ponding.
47. Udorthents					
49----------------- Aquents	Severe: wetness, poor filter.	Severe: excess humus, wetness.	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Poor: hard to pack.
50----------------- Delray	Severe: ponding, poor filter.	Severe: seepage, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
51----------------- Malabar	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
53----------------- Adamsville	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
56----------------- Terra Ceia	Severe: subsides, ponding, poor filter.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, excess humus.	Severe: seepage, ponding.	Poor: ponding, excess humus.

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
57: Chobee	Severe: ponding, percs slowly.	Severe: seepage, ponding.	Severe: seepage, ponding.	Severe: seepage, ponding.	Poor: seepage, ponding.
58: Oldsmar	Severe: ponding, percs slowly, poor filter.	Severe: seepage, ponding.	Severe: ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
59: Winder	Severe: ponding, percs slowly.	Severe: seepage, ponding.	Severe: seepage, ponding.	Severe: ponding.	Poor: ponding, thin layer.
60: Myakka	Severe: ponding, poor filter.	Severe: seepage, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
61: Malabar	Severe: ponding, poor filter.	Severe: seepage, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
62: Pineda	Severe: ponding, percs slowly.	Severe: seepage, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
63:					
Jupiter	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.
Ochopee	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Poor: depth to rock, wetness.
Rock outcrop.					
64: Hallandale	Severe: depth to rock, ponding, poor filter.	Severe: seepage, depth to rock, ponding.	Severe: depth to rock, seepage, ponding.	Severe: depth to rock, seepage, ponding.	Poor: depth to rock, seepage, too sandy.
65: Plantation	Severe: depth to rock, ponding, poor filter.	Severe: seepage, depth to rock, excess humus.	Severe: depth to rock, seepage, ponding.	Severe: depth to rock, seepage, ponding.	Poor: area reclaim, seepage, too sandy.
66: Margate	Severe: depth to rock, ponding, poor filter.	Severe: seepage, depth to rock, ponding.	Severe: depth to rock, seepage, ponding.	Severe: depth to rock, seepage, ponding.	Poor: area reclaim, seepage, too sandy.
67: Lauderhill	Severe: depth to rock, ponding, poor filter.	Severe: seepage, depth to rock, excess humus.	Severe: depth to rock, seepage, ponding.	Severe: depth to rock, seepage, ponding.	Poor: depth to rock, ponding, excess humus.
68: Dania	Severe: depth to rock, ponding.	Severe: seepage, depth to rock, excess humus.	Severe: depth to rock, seepage, ponding.	Severe: depth to rock, seepage, ponding.	Poor: area reclaim, ponding, excess humus.

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
69:					
Denaud	Severe: ponding.	Severe: ponding, excess humus, seepage.	Severe: ponding, seepage.	Severe: ponding, seepage.	Poor: ponding, thin layer.
Gator	Severe: ponding, percs slowly, poor filter.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding.	Severe: seepage, ponding.	Poor: ponding, thin layer.
70 Denaud	Severe: ponding.	Severe: ponding, excess humus, seepage.	Severe: ponding, seepage.	Severe: ponding, seepage.	Poor: ponding, thin layer.
73 Adamsville variant	Severe: wetness, poor filter.	Severe: seepage, excess humus, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.

TABLE 12.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "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	Roadfill	Sand	Gravel	Topsoil
1: Boca	Poor: thin layer, wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, wetness.
2: Pineda	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, wetness.
4: Oldsmar	Poor: wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, wetness.
6: Wabasso	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
7: Immokalee	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
8: Malabar	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
9: Riviera	Poor: wetness.	Probable	Improbable: excess fines.	Poor: too sandy, wetness.
10: Pineda	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
12: Winder	Poor: wetness.	Probable	Probable	Poor: too sandy, wetness.
13: Gentry	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
14: Wabasso	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, wetness.
15: Myakka	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
17: Basinger	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
18: Pompano	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
19-------------------- Gator	Poor: wetness.	Probable------------	Improbable: too sandy.	Poor: excess humus, wetness.
20-------------------- Okeelanta	Poor: wetness.	Probable------------	Improbable: too sandy.	Poor: excess humus, wetness.
21-------------------- Holopaw	Poor: wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, wetness.
22-------------------- Valkaria	Poor: wetness.	Probable------------	Improbable: too sandy.	Poor: wetness, too sandy.
23-------------------- Hallandale	Poor: area reclaim, thin layer, wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, wetness, area reclaim.
24-------------------- Pomello	Fair: wetness.	Probable------------	Improbable: too sandy.	Poor: too sandy.
26-------------------- Holopaw	Poor: wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, wetness.
27-------------------- Riviera	Poor: wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, wetness.
28-------------------- Boca	Poor: depth to rock, wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, wetness.
29-------------------- Oldsmar	Poor: wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, wetness.
32-------------------- Riviera	Poor: wetness.	Probable------------	Improbable: excess fines.	Poor: too sandy, wetness.
33-------------------- Holopaw	Poor: wetness.	Probable------------	Improbable: too sandy.	Poor: too sandy, wetness.
34-------------------- Chobee	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
37-------------------- Tuscawilla	Poor: wetness.	Probable------------	Improbable: too sandy.	Poor: small stones, wetness.
39. Udifluvents				
42-------------------- Riviera	Poor: wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, wetness.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
44: Jupiter	Poor: area reclaim, wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: area reclaim, too sandy, wetness.
45: Pahokee	Poor: area reclaim, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, small stones, area reclaim.
47. Udorthents				
49: Aquents	Fair: thin layer.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy.
50: Delray	Poor: wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, wetness.
51: Malabar	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
53: Adamsville	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
56: Terra Ceia	Poor: wetness.	Probable	Improbable: too sandy.	Poor: excess humus, wetness.
57: Chobee	Poor: wetness.	Improbable: excess fines.	Improbable: too sandy.	Poor: wetness.
58: Oldsmar	Poor: wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, wetness.
59: Winder	Poor: wetness.	Probable	Improbable: excess fines.	Poor: wetness.
60: Myakka	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
61: Malabar	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
62: Pineda	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
63:				
Jupiter	Poor: area reclaim, wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: area reclaim, too sandy, wetness.
Ochopee	Poor: depth to rock, wetness.	Improbable: thin layer, excess fines.	Improbable: thin layer, excess fines.	Poor: depth to rock, wetness.
Rock outcrop.				

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
64 Hallandale	Poor: depth to rock, wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: depth to rock, too sandy, wetness.
65 Plantation	Poor: area reclaim, wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: excess humus, wetness.
66 Margate	Poor: area reclaim, wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, wetness.
67 Lauderhill	Poor: depth to rock, wetness.	Improbable: excess humus.	Improbable: excess humus.	Poor: excess humus, wetness.
68 Dania	Poor: area reclaim, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, excess humus, wetness.
69:				
Denaud	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness.
Gator	Poor: wetness.	Probable	Improbable: too sandy.	Poor: excess humus, wetness.
70 Denaud	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness.
73 Adamsville variant	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.

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--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
1----------------- Boca	Severe: seepage.	Severe: seepage, piping, wetness.	Moderate: depth to rock, cutbanks cave.	Depth to rock, cutbanks cave.	Wetness, droughty, fast intake.	Depth to rock, wetness, too sandy.	Wetness, droughty, depth to rock.
2----------------- Pineda	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave, slow refill.	Percs slowly---	Wetness, fast intake, droughty.	Wetness, soil blowing, percs slowly.	Wetness, droughty, rooting depth.
4----------------- Oldsmar	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: slow refill.	Percs slowly, cutbanks cave.	Wetness, droughty, fast intake.	Wetness, too sandy.	Wetness, droughty.
6----------------- Wabasso	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Percs slowly, cutbanks cave.	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty, rooting depth.
7----------------- Immokalee	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty.
8----------------- Malabar	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty.
9----------------- Riviera	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Wetness, percs slowly.	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty, percs slowly.
10---------------- Pineda	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: slow refill, cutbanks cave.	Percs slowly, cutbanks cave.	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty, percs slowly.
12---------------- Winder	Moderate: seepage.	Severe: wetness.	Severe: slow refill, cutbanks cave.	Percs slowly---	Wetness, droughty, fast intake.	Wetness, soil blowing, percs slowly.	Wetness, droughty, percs slowly.

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-- Terraces and diversions	Features affecting-- Grassed waterways
13----------------- Gentry	Severe: seepage.	Severe: piping, wetness.	Severe: slow refill, cutbanks cave.	Percs slowly, flooding.	Wetness, fast intake, soil blowing.	Wetness, soil blowing, percs slowly.	Wetness, percs slowly.
14----------------- Wabasso	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Percs slowly, cutbanks cave.	Wetness, droughty, fast intake.	Wetness, soil blowing, too sandy.	Wetness, droughty.
15----------------- Myakka	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty.
17----------------- Basinger	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty.
18----------------- Pompano	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty.
19----------------- Gator	Severe: seepage.	Severe: piping, ponding.	Severe: slow refill, cutbanks cave.	Ponding, percs slowly, subsides.	Ponding, soil blowing, percs slowly.	Ponding, soil blowing, percs slowly.	Wetness, percs slowly.
20----------------- Okeelanta	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, subsides, cutbanks cave.	Ponding, soil blowing.	Ponding, too sandy, soil blowing.	Wetness.
21----------------- Holopaw	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty.
22----------------- Valkaria	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty.
23----------------- Hallandale	Severe: depth to rock.	Severe: seepage, piping, wetness.	Severe: depth to rock, cutbanks cave.	Depth to rock, cutbanks cave.	Wetness, droughty, fast intake.	Depth to rock, wetness, too sandy.	Wetness, droughty, depth to rock.

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-- Terraces and diversions	Features affecting-- Grassed waterways
24---------------- Pomello	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Droughty.
26---------------- Holopaw	Severe: seepage.	Severe: piping, seepage, wetness.	Severe: slow refill, cutbanks cave.	Cutbanks cave	Wetness, fast intake, droughty.	Soil blowing, too sandy, wetness.	Wetness, droughty.
27---------------- Riviera	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, fast intake, soil blowing.	Wetness, too sandy, soil blowing.	Wetness.
28---------------- Boca	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: depth to rock, cutbanks cave.	Ponding, depth to rock, cutbanks cave.	Ponding, droughty, fast intake.	Depth to rock, ponding, too sandy.	Wetness, droughty, depth to rock.
29---------------- Oldsmar	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave, slow refill.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty.
32---------------- Riviera	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, percs slowly, cutbanks cave.	Ponding, droughty, fast intake.	Ponding, too sandy, soil blowing.	Wetness, droughty, percs slowly.
33---------------- Holopaw	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, cutbanks cave.	Ponding, droughty, fast intake.	Ponding, too sandy, soil blowing.	Wetness, droughty.
34---------------- Chobee	Moderate: depth to rock.	Severe: ponding.	Severe: slow refill, cutbanks cave.	Ponding, percs slowly.	Ponding, percs slowly.	Ponding, percs slowly.	Wetness, percs slowly.
37---------------- Tuscawilla	Severe: seepage.	Severe: wetness.	Severe: cutbanks cave.	Favorable------	Wetness, droughty, fast intake.	Wetness, soil blowing.	Wetness, droughty.
39. Udifluvents							
42---------------- Riviera	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: slow refill, cutbanks cave.	Ponding, cutbanks cave.	Droughty, ponding, fast intake.	Ponding, too sandy, soil blowing.	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	Terraces and diversions	Grassed waterways
44----------------- Jupiter	Severe: depth to rock.	Severe: seepage, piping, wetness.	Severe: depth to rock, cutbanks cave.	Depth to rock, cutbanks cave.	Wetness, droughty, fast intake.	Depth to rock, wetness, too sandy.	Wetness, droughty, depth to rock.
45----------------- Pahokee	Severe: seepage.	Severe: excess humus, ponding.	Severe: depth to rock.	Ponding, depth to rock, subsides.	Ponding, soil blowing, depth to rock.	Depth to rock, ponding, soil blowing.	Wetness, depth to rock.
47. Udorthents							
49----------------- Aquents	Severe: seepage.	Severe: seepage, hard to pack.	Moderate: deep to water.	Cutbanks cave	Droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty.
50----------------- Delray	Severe: seepage.	Severe: seepage, ponding.	Severe: cutbanks cave.	Ponding, cutbanks cave.	Ponding, droughty, fast intake.	Ponding, too sandy, soil blowing.	Wetness, droughty.
51----------------- Malabar	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, soil blowing, too sandy.	Wetness, droughty.
53----------------- Adamsville	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Droughty.
56----------------- Terra Ceia	Severe: seepage.	Severe: excess humus, ponding.	Severe: cutbanks cave.	Ponding, subsides.	Ponding, soil blowing.	Ponding, soil blowing.	Wetness.
57----------------- Chobee	Moderate: seepage.	Severe: ponding, piping, seepage.	Severe: slow refill, cutbanks cave.	Ponding, percs slowly.	Ponding, soil blowing, percs slowly.	Ponding, soil blowing, percs slowly.	Wetness, percs slowly.
58----------------- Oldsmar	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: slow refill, cutbanks cave.	Ponding, cutbanks cave.	Ponding, droughty, fast intake.	Ponding, too sandy, soil blowing.	Wetness, droughty.
59----------------- Winder	Severe: seepage.	Severe: seepage, ponding.	Severe: seepage.	Ponding, percs slowly.	Ponding, droughty, fast intake.	Ponding, soil blowing, percs slowly.	Wetness, droughty, percs slowly.
60----------------- Myakka	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, cutbanks cave.	Ponding, droughty, fast intake.	Ponding, too sandy, soil blowing.	Wetness, 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	Terraces and diversions	Grassed waterways
61----------------- Malabar	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, cutbanks cave.	Ponding, droughty, fast intake.	Ponding, too sandy, soil blowing.	Wetness, droughty.
62----------------- Pineda	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: slow refill, cutbanks cave.	Ponding, percs slowly, cutbanks cave.	Ponding, droughty, fast intake.	Ponding, too sandy, soil blowing.	Wetness, droughty, percs slowly.
63:							
Jupiter----------	Severe: depth to rock.	Severe: seepage, piping, wetness.	Severe: depth to rock, cutbanks cave.	Depth to rock, cutbanks cave.	Wetness, droughty, fast intake.	Depth to rock, wetness, too sandy.	Wetness, droughty, depth to rock.
Ochopee----------	Severe: depth to rock.	Severe: wetness.	Severe: depth to rock.	Depth to rock	Wetness, soil blowing, depth to rock.	Depth to rock, wetness.	Wetness, depth to rock.
Rock outcrop.							
64----------------- Hallandale	Severe: seepage, depth to rock.	Severe: seepage, piping, ponding.	Severe: depth to rock, cutbanks cave.	Ponding, depth to rock, cutbanks cave.	Ponding, droughty, fast intake.	Depth to rock, ponding, too sandy.	Wetness, droughty, depth to rock.
65----------------- Plantation	Severe: seepage.	Severe: seepage, piping, excess humus.	Severe: depth to rock, cutbanks cave.	Ponding, depth to rock, subsides.	Ponding, soil blowing, depth to rock.	Depth to rock, ponding, too sandy.	Wetness, depth to rock.
66----------------- Margate	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: depth to rock, cutbanks cave.	Ponding, depth to rock.	Ponding, droughty, fast intake.	Depth to rock, ponding, too sandy.	Wetness, droughty, depth to rock.
67----------------- Lauderhill	Severe: seepage.	Severe: excess humus, ponding.	Severe: depth to rock.	Ponding, depth to rock, subsides.	Ponding, soil blowing, depth to rock.	Depth to rock, ponding, soil blowing.	Wetness, depth to rock.
68----------------- Dania	Severe: depth to rock.	Severe: excess humus, ponding.	Severe: depth to rock, cutbanks cave.	Ponding, depth to rock, subsides.	Ponding, soil blowing, depth to rock.	Depth to rock, ponding, soil blowing.	Wetness, depth to rock.

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	Terraces and diversions	Grassed waterways
69:							
Denaud	Severe: seepage.	Severe: thin layer, ponding.	Severe: cutbanks cave.	Ponding, subsides, cutbanks cave.	Ponding, soil blowing, rooting depth.	Ponding, soil blowing.	Wetness, rooting depth.
Gator	Severe: seepage.	Severe: piping, ponding.	Severe: slow refill, cutbanks cave.	Ponding, percs slowly, subsides.	Ponding, soil blowing, percs slowly.	Ponding, soil blowing, percs slowly.	Wetness, percs slowly.
70: Denaud	Severe: seepage.	Severe: thin layer, ponding.	Severe: cutbanks cave.	Ponding, subsides, cutbanks cave.	Ponding, soil blowing, rooting depth.	Ponding, soil blowing.	Wetness, rooting depth.
73: Adamsville variant	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Subsides, cutbanks cave.	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Droughty.

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 may have Unified classifications and USDA textures in addition to those shown. In general, the dominant classifications and textures are shown]

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
1 Boca	0-7	Sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-99	2-12	---	NP
	7-28	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-99	2-12	---	NP
	28-33	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
	33	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
2 Pineda	0-32	Sand	SP, SP-SM	A-3	0	100	100	80-100	2-10	---	NP
	32-50	Fine sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4, A-2-6	0	100	100	65-97	13-35	<30	NP-15
	50	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
4 Oldsmar	0-38	Sand	SP, SP-SM	A-3	0	100	100	80-100	2-10	---	NP
	38-50	Fine sand, sand, loamy fine sand.	SM, SP-SM	A-2-4, A-3	0	100	100	80-100	5-20	---	NP
	50-80	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
6 Wabasso	0-25	Sand	SP, SP-SM	A-3	0	100	100	95-100	2-10	---	NP
	25-30	Sand, fine sand	SP, SP-SM	A-3	0	100	100	95-100	2-10	---	NP
	30-58	Sand, fine sand	SP, SP-SM	A-3	0	100	100	95-100	2-10	---	NP
	58-80	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
	48-75	Sand, fine sand, loamy sand.	SP-SM, SM	A-3, A-2-4	0	100	100	95-100	5-20	---	NP
7 Immokalee	0-5	Sand	SP, SP-SM	A-3	0	100	100	70-100	2-10	---	NP
	5-40	Fine sand, sand	SP, SP-SM	A-3	0	100	100	70-100	2-10	---	NP
	40-55	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
8 Malabar	0-15	Sand	SP, SP-SM	A-3	0	100	100	80-100	2-10	---	NP
	15-35	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	3-12	---	NP
	35-45	Sand, fine sand	SP, SP-SM	A-3	0	100	100	80-100	2-10	---	NP
	45-65	Sandy clay loam, fine sandy loam, sandy loam.	SC, SM-SC	A-2, A-4, A-6	0	100	100	80-100	20-40	20-40	NP-12
	65-80	Sand, fine sand, loamy fine sand.	SP-SM, SM	A-3, A-2-4	0	100	100	80-100	5-20	---	NP
9 Riviera	0-26	Fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	4-12	---	NP
	26-32	Sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4	0	100	100	80-100	15-35	<35	NP-15
	32-50	Sandy loam, sandy clay loam.	SM-SC, SC	A-2-4, A-2-6	0	100	100	80-100	20-35	20-40	4-20
	50-80	Sand, fine sand, loamy sand.	SP, SP-SM	A-3, A-1, A-2-4	0	60-80	50-75	40-70	3-10	---	NP

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
10--------------- Pineda	0-30	Fine sand--------	SP, SP-SM	A-3	0	100	100	80-95	2-8	---	NP
	30-75	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-95	2-10	---	NP
	75-80	Sandy loam, fine sandy loam, sandy clay loam.	SC, SM-SC, SM	A-2-4, A-2-6	0	100	100	65-95	15-35	20-30	NP-15
	54-80	Sand, loamy sand, fine sand.	SP-SM, SM, SP	A-3, A-2-4	0	90-100	95-100	80-95	4-15	---	NP
12--------------- Winder	0-14	Fine sand--------	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	2-12	---	NP
	14-18	Loamy sand, sandy loam, fine sandy loam.	SM	A-2-4	0	100	100	80-100	15-25	<35	NP-10
	18-30	Sandy clay loam	SC	A-2-4, A-2-6	0	100	100	80-100	18-35	20-40	9-26
	30-80	Sandy loam, fine sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4	0	60-80	50-75	40-70	15-35	<35	NP-20
13--------------- Gentry	0-22	Fine sand--------	SP, SP-SM, SM	A-3, A-2-4	0	100	100	70-100	2-20	---	NP
	22-75	Sandy loam, fine sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4, A-2-6	0	100	100	60-100	20-35	<30	NP-16
	75-80	Sand, loamy fine sand, fine sandy loam.	SP-SM, SM	A-3, A-2-4	0	100	100	70-100	5-25	---	NP
14--------------- Wabasso	0-25	Sand-------------	SP-SM, SM	A-3, A-2-4	0	100	100	70-100	5-25	---	NP
	25-35	Sand, fine sand	SP-SM, SM	A-3, A-2-4	0	100	100	70-100	5-25	---	NP
	35-45	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
15--------------- Myakka	0-26	Sand-------------	SP, SP-SM	A-3	0	100	100	85-100	2-10	---	NP
	26-60	Sand, fine sand, loamy fine sand.	SM, SP-SM	A-3, A-2-4	0	100	100	85-100	5-20	---	NP
	60-80	Sand, fine sand	SP, SP-SM	A-3	0	100	100	85-100	2-8	---	NP
17--------------- Basinger	0-25	Sand-------------	SP	A-3	0	100	100	85-100	1-4	---	NP
	25-50	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	85-100	2-12	---	NP
	50-80	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	85-100	2-12	---	NP
18--------------- Pompano	0-80	Sand-------------	SP, SP-SM	A-3, A-2-4	0	100	100	75-100	1-12	---	NP
19--------------- Gator	0-32	Muck-------------	PT	A-8	0	---	---	---	---	---	---
	32-51	Fine sandy loam, sandy clay loam.	SM-SC, SC, SM	A-2-4, A-2-6	0	100	100	80-99	25-35	<40	NP-15
20--------------- Okeelanta	0-35	Muck-------------	PT	A-8	0	---	---	---	---	---	---
	35-60	Fine sand, sand, loamy sand.	SP, SP-SM, SM	A-3, A-2-4	0	100	85-100	80-95	2-15	---	NP
21--------------- Holopaw	0-48	Sand-------------	SP, SP-SM	A-3	0	100	95-100	70-95	2-10	---	NP
	48-80	Sandy loam, sandy clay loam, fine sandy loam.	SM, SM-SC	A-2-4	0	100	95-100	70-99	15-30	<25	NP-7

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	
22--------------- Valkaria	0-10	Sand-------------	SP, SP-SM	A-3	0	100	75-100	75-100	2-10	---	NP
	10-15	Sand, fine sand	SP, SP-SM	A-3	0	100	75-100	75-100	2-10	---	NP
	15-45	Sand, fine sand	SP, SP-SM	A-3	0	100	75-100	75-100	3-10	---	NP
	45-80	Sand, fine sand	SP, SP-SM	A-3	0	100	75-100	75-100	2-10	---	NP
23--------------- Hallandale	0-4	Sand-------------	SP, SP-SM	A-3	0	100	100	90-100	2-6	---	NP
	4-16	Fine sand, sand	SP, SP-SM	A-3	0	100	100	90-100	2-6	---	NP
	16	Weathered bedrock	---	---	---	---	---	---	---	---	---
24--------------- Pomello	0-40	Fine sand--------	SP, SP-SM	A-3	0	100	100	60-100	1-8	---	NP
	40-50	Coarse sand, sand, fine sand.	SP-SM, SM	A-3, A-2-4	0	100	100	60-100	6-15	---	NP
	50-80	Coarse sand, sand, fine sand.	SP, SP-SM	A-3	0	100	100	60-100	4-10	---	NP
26--------------- Holopaw	0-45	Sand-------------	SP, SP-SM	A-3	0	100	95-100	70-95	2-10	---	NP
	45-60	Sandy loam, sandy clay loam, fine sandy loam.	SM, SM-SC	A-2-4	0	99-100	95-100	70-99	15-30	<25	NP-7
	60	Weathered bedrock	---	---	---	---	---	---	---	---	---
27--------------- Riviera	0-35	Sand-------------	SP, SP-SM	A-3	0	100	100	90-99	2-5	---	NP
	35-50	Sand, loamy sand, sandy loam.	SP, SP-SM	A-3, A-2-4	0	100	100	80-99	2-12	---	NP
	50	Weathered bedrock	---	---	---	---	---	---	---	---	---
28--------------- Boca	0-5	Sand-------------	SP, SP-SM	A-3, A-2-4	0	100	100	80-99	2-12	---	NP
	5-25	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-99	2-12	---	NP
	25-32	Sandy loam, fine sandy loam, sandy clay loam.	SM-SC, SC	A-2-4, A-6, A-2-6, A-4	0	100	100	80-99	25-40	16-37	6-20
	32	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
29--------------- Oldsmar	0-38	Sand-------------	SP, SP-SM	A-3	0	100	100	85-100	2-10	---	NP
	38-63	Fine sand--------	SP, SP-SM	A-3	0	100	100	85-95	2-10	---	NP
	63-73	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
	73	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
32--------------- Riviera	0-26	Sand-------------	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	4-12	---	NP
	26-70	Sandy loam, sandy clay loam.	SM-SC, SC	A-2-4, A-2-6	0	100	100	80-100	20-35	20-40	4-20
	70-80	Sand, fine sand, loamy sand.	SP, SP-SM	A-3, A-1, A-2-4	0	60-100	50-95	40-90	3-10	---	NP
33--------------- Holopaw	0-65	Sand-------------	SP, SP-SM	A-3	0	100	95-100	70-95	2-10	---	NP
	65-80	Sandy loam, fine sandy loam, sandy clay loam.	SM, SM-SC	A-2-4	0	100	95-100	70-95	15-30	<25	NP-7
34--------------- Chobee	0-22	Fine sandy loam	SP-SM, SM	A-2-4	0	100	95-100	85-99	12-25	<40	NP-10
	22-50	Sandy clay loam	SC	A-2-6, A-2-7, A-6	0	100	90-100	80-95	12-45	<40	NP-20
	50	Weathered bedrock	---	---	---	---	---	---	---	---	---

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
37--------------- Tuscawilla	0-8	Fine sand--------	SP-SM	A-3, A-2-4	0	85-100	85-100	75-90	5-12	---	NP
	8-56	Sandy clay loam, fine sandy loam.	SC	A-2, A-4, A-6	0-15	85-100	85-100	80-95	25-40	28-40	8-20
	56-80	Fine sand, sand, loamy fine sand.	SP-SM, SM	A-3, A-2-4	0	100	100	80-100	5-15	---	NP
39. Udifluvents											
42--------------- Riviera	0-35	Sand-------------	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	4-12	---	NP
	35-58	Sandy loam, fine sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4, A-2-6	0	100	100	80-100	15-35	<35	NP-15
	58-60	Sand, fine sand, loamy fine sand.	SP, SP-SM	A-3, A-1, A-2-4	0	60-80	50-75	40-70	3-10	---	NP
	60	Weathered bedrock	---	---	---	---	---	---	---	---	---
44--------------- Jupiter	0-14	Fine sand--------	SP-SM	A-3, A-2-4	0	100	100	85-95	5-12	<40	NP
	14	Weathered bedrock	---	---	---	---	---	---	---	---	---
45--------------- Pahokee	0-40	Muck-------------	PT	---	---	---	---	---	---	---	---
	40	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
47. Udorthents											
49--------------- Aquents	0-8	Fine sand--------	SP, SP-SM	A-3, A-2-4, A-1-B	0-15	60-90	50-80	40-70	2-12	---	NP
	8-35	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-95	2-12	---	NP
	35-42	Muck-------------	PT	A-8	0	---	---	---	---	---	---
	42-80	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-95	2-12	---	NP
50--------------- Delray	0-22	Sand-------------	SP-SM, SM, SM-SC	A-3, A-2-4	0	100	100	95-100	5-20	<20	NP-5
	22-50	Fine sand, sand	SP-SM	A-3, A-2-4	0	100	100	95-100	5-12	---	NP
	50-80	Sandy loam, fine sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4, A-2-6	0	100	100	95-100	20-35	<40	NP-15
51--------------- Malabar	0-28	Fine sand--------	SP, SP-SM	A-3	0	100	100	80-100	2-10	---	NP
	28-35	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	3-12	---	NP
	35-42	Sand, fine sand	SP, SP-SM	A-3	0	100	100	80-100	2-10	---	NP
	42-65	Fine sandy loam, sandy clay loam.	SC, SM-SC, SM	A-2, A-4, A-6	0	100	100	80-100	20-40	20-40	NP-12
	65-80	Sand, fine sand, loamy fine sand.	SP-SM, SP	A-3, A-2-4	0	100	100	80-100	5-20	---	NP
53--------------- Adamsville	0-5	Fine sand--------	SP-SM	A-3, A-2-4	0	100	100	90-100	5-12	---	NP
	5-80	Fine sand, sand	SP-SM, SP	A-3, A-2-4	0	100	100	90-100	2-12	---	NP
56--------------- Terra Ceia	0-70	Muck-------------	PT	A-8	---	---	---	---	---	---	---

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
57------------- Chobee	0-13	Fine sandy loam	SP-SM, SM	A-2-4	0	100	100	85-100	12-25	<40	NP-10
	13-68	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	85-100	12-45	<45	NP-25
	68-80	Fine sand, loamy sand, fine sandy loam.	SP-SM, SM, SP	A-2-4	0	100	100	85-100	12-25	<40	NP-10
58------------- Oldsmar	0-32	Sand------------	SP, SP-SM	A-3	0	100	100	80-100	2-10	---	NP
	32-55	Sand, fine sand, loamy fine sand.	SP-SM, SM	A-3, A-2-4	0	100	100	80-100	5-20	---	NP
	55-65	Sandy loam, fine 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
59------------- Winder	0-19	Fine sand--------	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	2-12	---	NP
	19-60	Sandy loam, fine sandy loam, sandy clay loam.	SM, SM-SC, SC, GM-GC	A-2-4, A-2-6, A-1-B	0	60-100	50-95	40-90	15-35	<35	NP-20
	60-80	Sand, fine sand, loamy sand.	SP, SP-SM, SM	A-3, A-2-4, A-1-B	0	60-100	50-95	40-90	3-20	<35	NP-10
60------------- Myakka	0-25	Sand------------	SP, SP-SM	A-3	0	100	100	85-100	2-10	---	NP
	25-60	Sand, fine sand, loamy fine sand.	SM, SP-SM	A-3, A-2-4	0	100	100	85-100	5-20	---	NP
	60-80	Sand, fine sand	SP, SP-SM	A-3	0	100	100	85-100	2-8	---	NP
61------------- Malabar	0-11	Sand------------	SP, SP-SM	A-3	0	100	100	80-100	2-10	---	NP
	11-35	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	3-12	---	NP
	35-50	Sand, fine sand	SP, SP-SM	A-3	0	100	100	80-100	2-10	---	NP
	50-70	Sandy clay loam, fine sandy loam, sandy loam.	SC, SM-SC	A-2, A-4, A-6	0	100	100	80-100	20-40	20-40	NP-12
	70-80	Sand, fine sand, loamy fine sand.	SP-SM, SM	A-3, A-2-4	0	100	100	80-100	5-20	---	NP
62------------- Pineda	0-24	Sand------------	SP, SP-SM	A-3	0	100	100	80-95	2-5	---	NP
	24-42	Sandy loam, fine sandy loam, sandy clay loam.	SC, SM-SC	A-2-4, A-2-6	0	100	100	80-95	15-35	20-30	4-12
	42-80	Sand, loamy sand.	SP-SM, SM	A-3, A-2-4	0	100	100	80-95	5-15	---	NP
63:											
Jupiter---------	0-6	Fine sand--------	SP-SM	A-3, A-2-4	0	100	100	85-95	5-12	<40	NP
	6-14	Sand, fine sand	SP, SP-SM	A-3	0	100	100	85-95	2-5	<40	NP
	14	Weathered bedrock	---	---	---	---	---	---	---	---	---
Ochopee---------	0-6	Fine sandy loam	SM, SM-SC	A-2-4, A-4	0	100	100	40-60	20-40	<28	NP-7
	6-10	Fine sandy loam	SM, SM-SC	A-2-4, A-4	0	100	100	40-60	20-40	<28	NP-7
	10	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
64-------------- Hallandale	0-3	Sand------------	SP, SP-SM	A-3	0	100	100	90-100	2-6	---	NP
	3-15	Sand, fine sand	SP, SP-SM	A-3	0	100	100	90-100	2-6	---	NP
	15	Weathered bedrock	---	---	---	---	---	---	---	---	---
65-------------- Plantation	0-12	Muck------------	PT	---	---	---	---	---	---	---	---
	12-39	Sand, fine sand	SP	A-3	0	100	100	90-100	1-4	---	NP
	39	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
66-------------- Margate	0-7	Sand------------	SP, SP-SM	A-3	0	100	100	95-100	2-8	---	NP
	7-14	Fine sand, sand	SP, SP-SM	A-3	0	100	100	95-100	2-8	---	NP
	14-30	Fine sand, sand	SP, SP-SM	A-3	0	100	100	95-100	2-8	---	NP
	30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
67-------------- Lauderhill	0-35	Muck------------	PT	---	0	---	---	---	---	---	---
	35	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
68-------------- Dania	0-14	Muck------------	PT	---	0	---	---	---	---	---	---
	14-18	Sand, fine sand, loamy sand.	SP, SP-SM, SM	A-3, A-2-4	0	100	95-100	80-95	2-15	<25	NP-3
	18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
69:											
Denaud----------	0-11	Muck------------	PT	---	0	---	---	---	---	---	---
	11-20	Sand, fine sand, loamy fine sand.	SP-SM, SM	A-3, A-2-4	0	100	100	95-100	5-20	---	NP
	20-23	Sand, fine sand	SP, SP-SM	A-3	0	100	100	95-100	2-10	---	NP
	23-42	Loamy fine sand, fine sandy loam, sandy clay loam.	SC, SM-SC	A-2-4, A-2-6	0	80-100	80-100	75-100	20-35	20-30	5-13
	42-80	Variable---------	---	---	---	---	---	---	---	---	---
Gator-----------	0-32	Muck------------	PT	A-8	0	---	---	---	---	---	---
	32-80	Fine sand, loamy sand, loamy fine sand.	SP-SM	A-3, A-2-4	0	100	100	85-100	5-12	---	NP
70-------------- Denaud	0-11	Muck------------	PT	---	0	---	---	---	---	---	---
	11-20	Sand, fine sand, loamy fine sand.	SP-SM, SM	A-3, A-2-4	0	100	100	95-100	5-20	---	NP
	20-23	Sand, fine sand	SP, SP-SM	A-3	0	100	100	95-100	2-10	---	NP
	23-42	Loamy fine sand, fine sandy loam, sandy clay loam.	SC, SM-SC	A-2-4, A-2-6	0	80-100	80-100	75-100	20-35	20-30	5-13
	42-80	Variable---------	---	---	---	---	---	---	---	---	---
73-------------- Adamsville variant	0-49	Sand------------	SP, SP-SM	A-3	0	100	100	80-95	2-10	---	NP
	49-59	Muck------------	PT	---	---	---	---	---	---	---	---
	59-80	Fine sand, sand	SP, SP-SM	A-3	0	100	100	80-95	2-10	---	NP

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 K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm					Pct
1----------------	0-7	<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	7-28	<2	1.50-1.60	6.0-20	0.02-0.05	5.1-8.4	<2	Low--------	0.17			
	28-33	14-30	1.55-1.65	0.6-2.0	0.10-0.15	5.1-8.4	<2	Low--------	0.20			
	33	---	---	---	---	---	---	-----------	----			
2----------------	0-32	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
Pineda	32-50	17-35	1.65-1.75	0.06-0.2	0.10-0.15	6.6-7.8	<2	Low--------	0.24			
	50	---	---	---	---	---	---	-----------	----			
4----------------	0-38	<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
Oldsmar	38-50	2-8	1.42-1.59	0.2-6.0	0.10-0.15	3.6-7.3	<2	Low--------	0.15			
	50-80	15-30	1.60-1.69	<0.2	0.10-0.15	6.1-8.4	<2	Low--------	0.24			
6----------------	0-25	1-5	1.25-1.45	6.0-20	0.03-0.08	3.6-6.5	<2	Low--------	0.10	5	2	1-4
Wabasso	25-30	0-5	1.35-1.55	6.0-20	0.02-0.05	3.6-6.5	<2	Low--------	0.10			
	30-58	2-5	1.40-1.55	6.0-20	0.02-0.05	5.1-8.4	<2	Low--------	0.10			
	58-80	12-30	1.60-1.75	<0.2	0.10-0.15	5.1-8.4	<2	Low--------	0.24			
7----------------	0-5	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
Immokalee	5-40	1-5	1.45-1.70	6.0-20	0.02-0.05	3.6-6.0	<2	Low--------	0.10			
	40-55	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			
8----------------	0-15	0-4	1.35-1.55	6.0-20	0.03-0.08	5.1-8.4	<2	Low--------	0.10	5	2	1-2
Malabar	15-35	1-5	1.35-1.70	6.0-20	0.05-0.10	5.1-8.4	<2	Low--------	0.10			
	35-45	1-5	1.40-1.70	6.0-20	0.02-0.05	5.1-8.4	<2	Low--------	0.10			
	45-65	12-25	1.55-1.75	<0.2	0.10-0.15	5.1-8.4	<2	Low--------	0.24			
	65-80	1-8	1.40-1.70	6.0-20	0.03-0.08	5.1-8.4	<2	Low--------	0.15			
9----------------	0-26	1-6	1.40-1.65	6.0-20	0.05-0.08	4.5-7.3	<2	Low--------	0.10	4	2	.1-2
Riviera	26-32	12-25	1.50-1.70	<0.2	0.10-0.14	6.1-8.4	<2	Low--------	0.24			
	32-50	15-25	1.50-1.70	<0.2	0.12-0.15	6.1-8.4	<2	Low--------	0.24			
	50-80	1-8	1.40-1.65	0.6-6.0	0.05-0.08	7.9-8.4	<2	Low--------	0.15			
10---------------	0-30	1-6	1.25-1.60	6.0-20	0.05-0.10	4.5-7.3	<2	Low--------	0.10	5	2	.5-6
Pineda	30-75	1-8	1.40-1.70	6.0-20	0.02-0.05	4.5-7.3	<2	Low--------	0.10			
	75-80	10-25	1.50-1.70	<0.2	0.10-0.15	5.1-8.4	<2	Low--------	0.24			
12---------------	0-14	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
Winder	14-18	10-18	1.45-1.65	0.2-0.6	0.06-0.10	6.1-7.8	<2	Low--------	0.20			
	18-30	20-30	1.60-1.70	<0.2	0.10-0.15	6.6-8.4	<2	Low--------	0.24			
	30-47	15-30	1.50-1.70	<0.2	0.06-0.12	7.4-8.4	<2	Low--------	0.24			
	47-80	6-13	1.40-1.65	6.0-20	0.03-0.10	7.4-8.4	<2	Low--------	0.15			
13---------------	0-22	1-6	1.35-1.45	6.0-20	0.10-0.15	5.1-7.3	<2	Low--------	0.10	5	2	2-6
Gentry	22-75	10-30	1.60-1.70	<0.2	0.10-0.20	5.6-8.4	<2	Low--------	0.24			
	75-80	3-10	1.35-1.65	0.6-2.0	0.05-0.10	6.1-8.4	<2	Low--------	0.17			
14---------------	0-25	1-6	1.25-1.45	6.0-20	0.03-0.08	3.6-6.5	<2	Low--------	0.10	4	2	1-4
Wabasso	25-35	1-6	1.50-1.75	0.6-20	0.02-0.05	3.6-6.5	<2	Low--------	0.15			
	35-45	12-32	1.60-1.75	<0.2	0.10-0.15	7.4-8.4	<2	Low--------	0.24			
15---------------	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	26-60	1-8	1.45-1.60	0.6-6.0	0.10-0.20	3.6-6.5	<2	Low--------	0.15			
	60-80	<2	1.48-1.70	6.0-20	0.02-0.10	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		Wind erodi- bility group	Organic matter
									K	T		
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm					Pct
17--------------- Basinger	0-25	0-4	1.40-1.55	6.0-20	0.03-0.07	3.6-8.4	<2	Low--------	0.10	5	2	.5-2
	25-50	0-4	1.40-1.55	6.0-20	0.05-0.10	3.6-7.3	<2	Low--------	0.10			
	50-80	1-6	1.40-1.65	6.0-20	0.10-0.15	3.6-7.3	<2	Low--------	0.10			
18--------------- Pompano	0-80	0-5	1.30-1.65	6.0-20	0.02-0.05	4.5-7.8	<2	Low--------	0.10	5	2	1-5
19--------------- Gator	0-32	0-1	0.10-0.30	6.0-20	0.30-0.40	3.6-6.0	<2	Low--------	----	---	2	55-85
	32-51	13-20	1.60-1.70	0.6-2.0	0.10-0.15	6.1-8.4	<2	Low--------	0.32			
20--------------- Okeelanta	0-35	---	0.22-0.38	6.0-20	0.30-0.50	4.5-6.5	<2	Low--------	----	---	2	60-90
	35-60	1-5	1.30-1.55	6.0-20	0.05-0.10	5.1-7.8	<2	Low--------	0.15			
21--------------- Holopaw	0-48	1-7	1.35-1.60	6.0-20	0.07-0.10	5.1-7.3	<2	Low--------	0.10	5	2	1-4
	48-80	13-28	1.60-1.70	0.2-2.0	0.15-0.20	5.1-8.4	<2	Low--------	0.20			
22--------------- Valkaria	0-10	1-3	1.35-1.50	6.0-20	0.05-0.10	4.5-7.3	<2	Low--------	0.10	5	2	1-4
	10-15	0-2	1.45-1.60	6.0-20	0.03-0.08	4.5-7.3	<2	Low--------	0.10			
	15-45	2-5	1.45-1.60	6.0-20	0.05-0.10	4.5-7.3	<2	Low--------	0.10			
	45-80	1-5	1.45-1.60	6.0-20	0.03-0.08	5.1-8.4	<2	Low--------	0.10			
23--------------- Hallandale	0-4	<3	1.35-1.45	6.0-20	0.05-0.11	5.1-6.5	<2	Low--------	0.10	2	2	2-5
	4-16	<3	1.50-1.60	2.0-6.0	0.03-0.08	5.6-8.4	<2	Low--------	0.10			
	16	---	---	---	---	---	---	-----------	----			
24--------------- Pomello	0-40	<2	1.35-1.65	>20	0.02-0.05	4.5-6.0	<2	Very low	0.10	5	1	<1
	40-50	<2	1.45-1.60	2.0-6.0	0.10-0.30	4.5-6.0	<2	Very low	0.15			
	50-80	<2	1.35-1.65	6.0-20	0.02-0.05	4.5-6.0	<2	Very low	0.10			
26--------------- Holopaw	0-45	1-7	1.35-1.60	6.0-20	0.07-0.10	5.1-8.4	<2	Low--------	0.10	5	2	1-4
	45-60	13-28	1.60-1.70	0.2-2.0	0.15-0.20	5.1-8.4	<2	Low--------	0.20			
	60	---	---	---	---	---	---	-----------	----			
27--------------- Riviera	0-35	1-5	1.30-1.60	6.0-20	0.02-0.05	5.1-7.8	<2	Low--------	0.10	5	2	.5-4
	35-50	1-10	1.45-1.60	2.0-20	0.02-0.10	6.6-8.4	<2	Low--------	0.15			
	50	---	---	---	---	---	---	-----------	----			
28--------------- Boca	0-5	0-2	1.30-1.55	6.0-20	0.05-0.10	5.1-7.8	<2	Low--------	0.10	5	2	1-3
	5-25	0-2	1.50-1.60	6.0-20	0.02-0.05	5.1-8.4	<2	Low--------	0.10			
	25-32	15-30	1.55-1.65	0.6-2.0	0.10-0.15	5.1-8.4	<2	Low--------	0.20			
	32	---	---	---	---	---	---	-----------	----			
29--------------- Oldsmar	0-38	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
	38-63	1-3	1.40-1.65	0.2-0.6	0.05-0.10	4.5-5.5	<2	Low--------	0.15			
	63-73	15-35	1.50-1.70	0.06-0.2	0.10-0.15	5.1-7.8	<2	Low--------	0.24			
	73	---	---	---	---	---	---	-----------	----			
32--------------- Riviera	0-26	1-6	1.40-1.65	6.0-20	0.05-0.08	4.5-7.3	<2	Low--------	0.10	4	2	.1-2
	26-70	15-25	1.50-1.70	<0.2	0.12-0.15	6.1-8.4	<2	Low--------	0.24			
	70-80	1-8	1.40-1.65	0.6-6.0	0.05-0.08	7.9-8.4	<2	Low--------	0.15			
33--------------- Holopaw	0-65	1-7	1.35-1.60	6.0-20	0.03-0.10	5.1-7.3	<2	Low--------	0.10	5	2	1-4
	65-80	13-28	1.60-1.70	0.2-2.0	0.10-0.20	5.1-8.4	<2	Low--------	0.20			
34--------------- Chobee	0-22	7-20	1.45-1.50	0.6-2.0	0.10-0.15	5.6-7.3	<2	Low--------	0.15	5	3	2-15
	22-50	20-35	1.50-1.70	0.06-0.2	0.12-0.17	6.1-8.4	<2	Moderate	0.32			
	50	---	---	---	---	---	---	-----------	----			
37--------------- Tuscawilla	0-8	1-5	1.10-1.40	6.0-20	0.05-0.10	5.6-8.4	<2	Low--------	0.10	5	2	1-3
	8-56	14-30	1.25-1.55	0.6-2.0	0.08-0.12	6.6-9.0	<2	Low--------	0.24			
	56-80	1-30	1.55-1.70	0.6-20	0.03-0.12	7.4-9.0	<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 K	Erosion factors T	Wind erodi- bility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm					Pct
39. Udifluvents												
42----------------- Riviera	0-35	1-6	1.40-1.65	6.0-20	0.02-0.05	5.1-7.8	<2	Low--------	0.10	5	2	.1-2
	35-58	12-25	1.50-1.70	0.2-6.0	0.10-0.15	6.6-7.8	<2	Low--------	0.24			
	58-60	1-8	1.40-1.65	0.6-6.0	0.05-0.08	7.9-8.4	<2	Low--------	0.15			
	60	---	---	---	---	---	---	-----------	----			
44----------------- Jupiter	0-14	2-8	1.35-1.50	6.0-20	0.12-0.18	6.1-8.4	<2	Low--------	0.10	2	2	1-3
	14	---	---	---	---	---	---	-----------	----			
45----------------- Pahokee	0-40	---	0.20-1.00	6.0-20	0.20-0.25	5.6-7.3	<2	Low--------	----	---	2	75-90
	40	---	---	---	---	---	---	-----------	----			
47. Udorthents												
49----------------- Aquents	0-8	1-10	1.35-1.55	6.0-20	0.02-0.10	6.6-8.4	<2	Low--------	0.10	5	2	---
	8-35	1-10	1.35-1.55	6.0-20	0.02-0.10	5.6-7.3	<2	Low--------	0.10			
	35-42	---	0.20-0.40	6.0-20	0.30-0.50	5.1-7.3	<2	Low--------	----			
	42-80	1-5	1.35-1.55	6.0-20	0.02-0.10	5.1-7.3	<2	Low--------	0.10			
50----------------- Delray	0-22	3-13	1.35-1.45	6.0-20	0.10-0.15	5.6-7.3	<2	Low--------	0.10	5	2	2-5
	22-50	1-7	1.50-1.65	6.0-20	0.05-0.08	6.1-7.3	<2	Low--------	0.10			
	50-80	13-30	1.45-1.60	0.6-6.0	0.10-0.15	6.6-7.8	<2	Low--------	0.24			
51----------------- Malabar	0-28	0-4	1.35-1.55	6.0-20	0.03-0.08	5.1-6.5	<2	Low--------	0.10	5	2	1-2
	28-35	1-5	1.35-1.70	6.0-20	0.05-0.10	5.1-7.3	<2	Low--------	0.10			
	35-42	1-3	1.40-1.70	6.0-20	0.03-0.05	5.1-7.3	<2	Low--------	0.10			
	42-65	12-25	1.55-1.75	<0.2	0.10-0.15	5.1-7.3	<2	Low--------	0.24			
	65-80	1-8	1.40-1.70	6.0-20	0.03-0.08	5.1-7.3	<2	Low--------	0.10			
53----------------- Adamsville	0-5	1-8	1.35-1.65	6.0-20	0.05-0.10	4.5-7.8	<2	Low--------	0.10	5	2	<2
	5-80	1-7	1.35-1.65	6.0-20	0.03-0.08	4.5-7.8	<2	Low--------	0.10			
56----------------- Terra Ceia	0-70	---	0.15-0.35	6.0-20	0.30-0.50	4.5-8.4	<2	Low--------	----	---	2	60-90
57----------------- Chobee	0-13	10-20	1.15-1.30	2.0-6.0	0.15-0.20	5.1-7.3	<2	Low--------	0.15	5	3	2-10
	13-68	10-30	1.40-1.45	<0.2	0.12-0.17	5.6-8.4	<2	Low--------	0.15			
	68-80	0-15	1.45-1.50	2.0-6.0	0.10-0.15	5.6-7.8	<2	Low--------	0.15			
58----------------- Oldsmar	0-32	0-2	1.45-1.60	6.0-20	0.02-0.05	3.6-7.3	<2	Low--------	0.10	5	2	1-2
	32-55	2-8	1.40-1.60	0.2-6.0	0.10-0.15	3.6-7.3	<2	Low--------	0.15			
	55-65	15-30	1.60-1.70	<0.2	0.10-0.15	6.1-8.4	<2	Low--------	0.24			
59----------------- Winder	0-19	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
	19-60	15-30	1.50-1.70	<0.2	0.06-0.12	7.4-8.4	<2	Low--------	0.24			
	60-80	6-13	1.40-1.65	6.0-20	0.03-0.10	7.4-8.4	<2	Low--------	0.15			
60----------------- Myakka	0-25	0-2	1.35-1.45	6.0-20	0.02-0.05	3.6-6.5	<2	Low--------	0.10	5	2	1-2
	25-60	2-8	1.45-1.60	0.6-6.0	0.10-0.20	3.6-6.5	<2	Low--------	0.15			
	60-80	0-2	1.45-1.60	6.0-20	0.02-0.10	3.6-6.5	<2	Low--------	0.10			
61----------------- Malabar	0-11	0-4	1.20-1.55	6.0-20	0.03-0.08	5.1-8.4	<2	Low--------	0.10	5	2	1-2
	11-35	1-5	1.35-1.70	6.0-20	0.05-0.10	5.1-8.4	<2	Low--------	0.10			
	35-50	1-5	1.40-1.70	6.0-20	0.02-0.05	5.1-8.4	<2	Low--------	0.10			
	50-70	12-25	1.55-1.75	<0.2	0.10-0.15	5.1-8.4	<2	Low--------	0.24			
	70-80	1-8	1.40-1.70	6.0-20	0.03-0.08	5.1-8.4	<2	Low--------	0.15			
62----------------- Pineda	0-24	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
	24-42	10-25	1.50-1.70	<0.2	0.10-0.15	5.1-8.4	<2	Low--------	0.24			
	42-80	3-12	1.45-1.60	2.0-6.0	0.02-0.05	5.6-8.4	<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/cc	In/hr	In/in	pH	mmhos/cm					Pct
63:												
Jupiter---------	0-6	2-8	1.35-1.50	6.0-20	0.12-0.18	6.1-8.4	<2	Low--------	0.10	2	2	1-3
	6-14	1-3	1.50-1.65	6.0-20	0.02-0.08	6.1-8.4	<2	Low--------	0.17			
	14	---	---	---	---	---	---	----------	----			
Ochopee---------	0-10	5-15	1.30-1.50	2.0-6.0	0.09-0.22	7.9-9.0	<2	Low--------	0.17	1	3	2-5
	10	---	---	---	---	---	---	----------	----			
Rock outcrop.												
64--------------- Hallandale	0-3	0-3	1.35-1.45	6.0-20	0.05-0.10	5.1-6.5	<2	Low--------	0.10	2	2	2-5
	3-15	0-3	1.50-1.60	6.0-20	0.03-0.05	6.1-6.5	<2	Low--------	0.10			
	15	---	---	---	---	---	<2	----------	----			
65--------------- Plantation	0-12	---	0.15-0.35	6.0-20	0.20-0.30	4.5-6.0	<2	Low--------	0.10	1	2	20-50
	12-39	1-3	1.50-1.60	6.0-20	0.02-0.05	5.1-8.4	<2	Low--------	0.10			
	39	---	---	---	---	---	---	----------	----			
66--------------- Margate	0-7	1-4	1.25-1.45	6.0-20	0.05-0.10	4.5-6.0	<2	Low--------	0.10	3	2	1-4
	7-14	0-4	1.55-1.65	6.0-20	0.03-0.06	5.1-6.5	<2	Low--------	0.10			
	14-30	1-4	1.55-1.65	6.0-20	0.03-0.06	6.1-7.8	<2	Low--------	0.10			
	30	---	---	---	---	---	---	----------	----			
67--------------- Lauderhill	0-35	---	0.15-0.35	6.0-20	0.30-0.50	5.6-7.8	<2	Low--------	----	---	2	60-90
	35	---	---	---	---	---	---	----------	----			
68--------------- Dania	0-14	---	0.15-0.35	6.0-20	0.20-0.30	5.6-7.3	<2	Low--------	----	5	2	>60
	14-18	2-10	1.45-1.55	6.0-20	0.02-0.10	6.6-8.4	<2	Low--------	0.10			
	18	---	---	---	---	---	---	----------	----			
69:												
Denaud----------	0-11	---	0.20-0.40	6.0-20	0.20-0.30	5.6-7.8	<2	Low--------	0.10	2	2	30-80
	11-20	1-15	1.30-1.60	6.0-20	0.02-0.10	5.6-7.8	<2	Low--------	0.10			
	20-23	2-8	1.40-1.60	6.0-20	0.02-0.05	5.6-8.4	<2	Low--------	0.10			
	23-42	12-30	1.60-1.80	0.6-6.0	0.10-0.15	6.6-8.4	<2	Low--------	0.28			
	42-80	---	---	---	---	---	---	----------	----			
Gator-----------	0-32	0-1	0.10-0.30	6.0-20	0.30-0.40	3.6-6.0	<2	Low--------	----	---	2	55-85
	32-80	1-2	1.20-1.55	2.0-6.0	0.03-0.05	4.5-6.5	<2	Low--------	0.17			
70--------------- Denaud	0-11	---	0.20-0.40	6.0-20	0.20-0.30	5.6-7.8	<2	Low--------	0.10	2	2	30-80
	11-20	1-15	1.30-1.60	6.0-20	0.02-0.10	5.6-7.8	<2	Low--------	0.10			
	20-23	2-8	1.40-1.60	6.0-20	0.02-0.05	5.6-8.4	<2	Low--------	0.10			
	23-42	12-30	1.60-1.80	0.6-6.0	0.10-0.15	6.6-8.4	<2	Low--------	0.28			
	42-80	---	---	---	---	---	---	----------	----			
73--------------- Adamsville variant	0-49	2-8	1.35-1.45	6.0-20	0.02-0.05	4.5-6.5	<2	Low--------	0.10	5	2	<1
	49-59	---	0.20-0.40	6.0-20	0.20-0.25	4.5-6.5	<2	Low--------	0.10			
	59-80	2-8	1.45-1.60	6.0-20	0.02-0.05	4.5-6.5	<2	Low--------	0.10			

TABLE 16.--SOIL AND WATER FEATURES

["Water table" and "apparent" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated]

Map symbol and soil name	Hydro- logic group	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hard- ness	Subsidence: Ini- tial	Subsidence: Total	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
		Ft			In		In	In		
1----------------- Boca	B/D	0-1.0	Apparent	Jun-Feb	24-40	Soft	---	---	High-----	Moderate.
2----------------- Pineda	B/D	0-1.0	Apparent	Jun-Nov	40-80	Soft	---	---	High-----	Low.
4----------------- Oldsmar	B/D	0-1.0	Apparent	Jun-Feb	>60	---	---	---	Moderate	High.
6----------------- Wabasso	B/D	0-1.0	Apparent	Jun-Oct	>60	---	---	---	Moderate	High.
7----------------- Immokalee	B/D	0-1.0	Apparent	Jun-Nov	>60	---	---	---	High-----	High.
8----------------- Malabar	B/D	0-1.0	Apparent	Jun-Nov	>60	---	---	---	High-----	Low.
9----------------- Riviera	C/D	0-1.0	Apparent	Jun-Dec	>60	---	---	---	High-----	High.
10---------------- Pineda	B/D	0-1.0	Apparent	Jun-Nov	>60	---	---	---	High-----	Low.
12---------------- Winder	B/D	0-1.0	Apparent	Jun-Dec	>60	---	---	---	High-----	Low.
13---------------- Gentry	D	+2-1.0	Apparent	Jun-Jan	>60	---	---	---	High-----	Moderate.
14---------------- Wabasso	B/D	0-1.0	Apparent	Jun-Oct	40-80	Hard	---	---	Moderate	Moderate.
15---------------- Myakka	B/D	0-1.0	Apparent	Jun-Nov	>60	---	---	---	High-----	High.
17---------------- Basinger	B/D	0-1.0	Apparent	Jun-Feb	>60	---	---	---	High-----	Moderate.
18---------------- Pompano	B/D	0-1.0	Apparent	Jun-Nov	>60	---	---	---	High-----	Moderate.
19---------------- Gator	D	+2-1.0	Apparent	Jun-Dec	>60	---	2-6	20-23	High-----	High.
20---------------- Okeelanta	B/D	+1-0	Apparent	Jun-Jan	>60	---	16-20	16-30	High-----	Moderate.
21---------------- Holopaw	B/D	0-1.0	Apparent	Jun-Nov	>60	---	---	---	High-----	Moderate.
22---------------- Valkaria	B/D	0-1.0	Apparent	Jun-Sep	>60	---	---	---	High-----	Moderate.
23---------------- Hallandale	B/D	0-1.0	Apparent	Jun-Nov	7-20	Soft	---	---	High-----	Low.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Map symbol and soil name	Hydro-logic group	High water table			Bedrock		Subsidence		Risk of corrosion	
		Depth	Kind	Months	Depth	Hard-ness	Ini-tial	Total	Uncoated steel	Concrete
		Ft			In		In	In		
24----------------- Pomello	C	2.0-3.5	Apparent	Jul-Nov	>60	---	---	---	Low------	High.
26----------------- Holopaw	B/D	0-1.0	Apparent	Jun-Nov	50-80	Soft	---	---	High-----	Moderate.
27----------------- Riviera	B/D	0-1.0	Apparent	Jun-Nov	>50	Soft	---	---	High-----	Moderate.
28----------------- Boca	D	+2-1.0	Apparent	Jun-Feb	24-40	Soft	---	---	High-----	Moderate.
29----------------- Oldsmar	B/D	0-1.0	Apparent	Jun-Oct	60-72	Hard	---	---	High-----	Low.
32----------------- Riviera	D	+2-1.0	Apparent	Jun-Dec	>60	---	---	---	High-----	High.
33----------------- Holopaw	D	+2-1.0	Apparent	Jun-Apr	>60	---	---	---	High-----	Moderate.
34----------------- Chobee	D	+2-0	Apparent	Jun-Mar	40-79	Soft	---	---	Moderate	Low.
37----------------- Tuscawilla	D	0-1.0	Apparent	Jul-Sep	>60	---	---	---	High-----	Low.
39. Udifluvents										
42----------------- Riviera	D	+2-1.0	Apparent	Jun-Feb	40-80	Soft	---	---	High-----	High.
44----------------- Jupiter	B/D	0-1.0	Apparent	Jun-Nov	8-20	Soft	---	---	High-----	Low.
45----------------- Pahokee	B/D	+1-0	Apparent	Jun-Feb	36-51	Hard	4-8	36-50	High-----	Moderate.
47. Udorthents										
49----------------- Aquents	B	2.0-3.0	Apparent	Jun-Nov	>60	---	---	---	High-----	High.
50----------------- Delray	D	+2-1.0	Apparent	Jun-Dec	>60	---	---	---	Moderate	Low.
51----------------- Malabar	B/D	0-1.0	Apparent	Jun-Oct	>60	---	---	---	High-----	Low.
53----------------- Adamsville	C	2.0-3.5	Apparent	Jun-Nov	>60	---	---	---	Low------	Moderate.
56----------------- Terra Ceia	B/D	+1-1.0	Apparent	Jan-Dec	>60	---	16-20	50-60	Moderate	Moderate.
57----------------- Chobee	D	+2-1.0	Apparent	Jun-Dec	>60	---	---	---	High-----	High.
58----------------- Oldsmar	D	+2-1.0	Apparent	Jun-Feb	>60	---	---	---	Moderate	High.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Map symbol and soil name	Hydro-logic group	High water table			Bedrock		Subsidence		Risk of corrosion	
		Depth	Kind	Months	Depth	Hard-ness	Ini-tial	Total	Uncoated steel	Concrete
		Ft			In		In	In		
59----------------- Winder	D	+2-1.0	Apparent	Jun-Dec	>60	---	---	---	High-----	Low.
60----------------- Myakka	D	+2-1.0	Apparent	Jun-Feb	>60	---	---	---	High-----	High.
61----------------- Malabar	D	+2-1.0	Apparent	Jun-Nov	>60	---	---	---	High-----	Low.
62----------------- Pineda	D	+2-1.0	Apparent	Jun-Dec	>60	---	---	---	High-----	Low.
63:										
Jupiter----------	B/D	0-1.0	Apparent	Jun-Nov	8-20	Soft	---	---	High-----	Low.
Ochopee----------	B/D	0-1.0	Apparent	Jun-Nov	<20	Soft	---	---	High-----	Low.
Rock outcrop.										
64----------------- Hallandale	B/D	+2-1.0	Apparent	Jun-Nov	7-20	Soft	---	---	High-----	Low.
65----------------- Plantation	B/D	+1-1.0	Apparent	Jun-Nov	20-40	Soft	4-8	4-16	High-----	Moderate.
66----------------- Margate	B/D	+1-1.0	Apparent	Jun-Feb	20-40	Soft	---	---	High-----	Moderate.
67----------------- Lauderhill	B/D	+1-1.0	Apparent	Jun-Feb	20-40	Soft	8-12	16-36	High-----	Moderate.
68----------------- Dania	B/D	+1-1.0	Apparent	Jun-Feb	8-20	Soft	4-8	8-14	High-----	Moderate.
69:										
Denaud-----------	B/D	+3-0	Apparent	Jan-Dec	>60	---	3-6	8-15	High-----	Low.
Gator------------	D	+2-1.0	Apparent	Jun-Dec	>60	---	2-6	20-23	High-----	High.
70----------------- Denaud	B/D	+3-0	Apparent	Jan-Dec	>60	---	3-6	8-15	High-----	Low.
73----------------- Adamsville variant	C	2.0-3.5	Apparent	Jun-Nov	>60	---	1-2	5-10	High-----	Moderate.

TABLE 17.--PHYSICAL ANALYSES OF SELECTED SOILS

[The symbol < means less than]

Soil name and sample number	Depth	Horizon	Particle-size distribution: Sand: Very coarse (2-1 mm)	Coarse (1-0.5 mm)	Medium (0.5-0.25 mm)	Fine (0.25-0.1 mm)	Very fine (0.1-0.05 mm)	Total (2-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm)	Hydraulic conductivity	Bulk density (field moist)	Water content: 1/10 bar	1/3 bar	15 bar
	Cm		Pct								Cm/hr	G/cm	Pct (wt)		
Chobee fine sandy loam:															
S82FL-051-012-1	0-23	A	0.1	3.8	20.5	39.2	8.7	72.3	11.5	16.1	30.2	1.19	30.0	25.1	11.5
-2	23-33	ABg	0.0	4.2	22.6	38.2	9.0	74.0	9.0	17.0	2.5	1.54	18.6	15.2	8.1
-3	33-71	Btkg1	2.6	5.8	18.6	31.0	7.2	65.2	11.4	23.4	9.4	1.52	19.9	17.4	10.0
-4	71-99	Btkg2	1.4	4.6	19.4	35.2	8.2	68.8	9.4	21.8	0.1	1.64	16.9	15.4	10.8
-5	99-173	Btkg3	0.6	4.6	23.0	35.4	7.0	70.6	7.6	21.8	0.3	1.59	21.4	19.6	11.1
-6	173-203	C	0.2	7.2	30.0	36.4	5.4	79.2	3.8	17.0	0.3	1.66	17.9	15.7	8.2
Margate fine sand:															
S83FL-051-018-1	0-18	Ap	0.0	2.6	22.0	67.2	3.9	95.7	0.0	4.3	25.3	1.09	32.6	25.8	8.2
-2	18-36	E1	0.1	3.1	23.7	67.2	3.4	97.5	0.1	2.4	30.9	1.53	5.7	3.8	0.8
-3	36-68	E2	0.1	2.9	23.2	69.1	3.4	98.7	0.0	1.3	30.2	1.57	3.8	2.3	0.2
-4	68-76	Bw	0.1	2.8	21.3	68.8	3.8	96.8	0.2	3.0	9.0	1.68	5.5	3.6	0.5
-5	76-84	Cr	0.1	2.0	17.8	61.0	3.4	84.3	1.1	14.6	0.1	1.63	20.2	15.7	5.6
Oldsmar sand:															
S80FL-051-002-1	0-18	Ap	0.0	4.2	61.4	29.4	2.2	97.2	2.0	1.8	71.6	1.37	8.0	6.2	3.0
-2	18-41	E1	0.0	4.1	62.2	29.5	2.8	98.6	1.2	0.2	69.0	1.48	6.3	5.6	0.9
-3	41-96	E2	0.0	4.4	56.7	34.1	3.7	98.9	0.7	0.4	55.9	1.54	2.9	2.2	0.8
-4	96-109	Bh1	0.0	4.2	54.3	29.4	3.8	91.7	3.4	4.9	16.4	1.58	11.5	8.7	3.9
-5	109-130	Bh2	0.0	4.9	55.4	30.1	2.1	92.5	3.2	4.3	25.0	1.56	9.1	6.8	3.3
-6	130-150	BE	0.0	4.9	65.3	24.8	2.0	97.0	1.4	1.6	49.9	1.58	4.0	2.5	1.2
-7	150-178	E'	0.0	5.0	60.6	30.0	2.8	98.4	0.4	1.2	32.2	1.63	4.3	2.7	1.3
-8	178-203	Btg	0.2	7.6	31.6	29.4	8.8	77.6	4.6	17.8	0.1	1.55	22.5	20.0	13.8
Oldsmar sand, limestone substratum:															
S83FL-051-017-1	0-13	A	0.1	9.3	38.7	47.0	3.4	98.5	0.5	1.0	71.0	1.24	11.3	8.3	2.9
-2	13-30	E1	0.2	8.7	37.3	48.1	3.8	98.1	0.7	1.2	63.1	1.45	5.6	4.0	1.1
-3	30-96	E2	0.3	8.3	33.9	51.3	5.0	98.8	0.3	0.9	53.9	1.57	3.3	2.4	0.3
-4	96-107	BE	0.3	8.7	32.9	50.9	5.1	97.9	0.9	1.2	37.4	1.61	4.4	2.8	0.2
-5	107-127	Bh1	0.5	9.3	30.7	48.9	4.2	93.6	5.8	0.6	7.4	1.65	13.4	9.9	1.9
-6	127-160	Bh2	0.4	9.7	31.5	50.2	4.2	96.0	3.0	1.0	37.1	1.61	6.9	5.1	0.8
-7	160-185	Bt	0.3	5.8	23.9	40.6	4.0	74.6	0.8	24.6	1.7	1.69	18.9	17.6	7.9
Pineda fine sand, limestone substratum:															
S80FL-051-004-1	0-13	Ap	0.0	2.7	26.6	63.0	5.9	98.2	0.7	1.1	33.5	1.51	6.2	4.1	2.0
-2	13-28	E	0.0	3.6	28.0	61.6	5.4	98.6	1.0	0.4	24.9	1.60	3.7	2.5	1.1
-3	28-53	Bw	0.1	3.2	27.1	60.9	5.2	96.5	1.1	2.4	21.0	1.64	4.2	2.3	0.6
-4	53-64	E'	0.0	4.5	28.2	61.0	4.8	98.5	0.9	0.6	27.6	1.68	2.8	1.6	0.5
-5	64-94	Bt	0.2	3.2	23.3	53.5	3.0	83.2	2.1	14.7	0.3	1.64	18.9	15.7	8.2
-6	94-130	Btg1	0.0	2.4	19.0	54.4	2.9	78.7	2.1	19.2	0.1	1.69	17.9	15.8	10.2
-7	130-150	Btg2	0.2	1.8	13.4	46.4	6.0	67.8	17.8	14.4	0.1	1.69	19.8	16.7	10.5

TABLE 17.--PHYSICAL ANALYSES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Particle-size distribution: Sand: Very coarse (2-1 mm)	Coarse (1-0.5 mm)	Medium (0.5-0.25 mm)	Fine (0.25-0.1 mm)	Very fine (0.1-0.05 mm)	Total (2-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm)	Hydraulic conductivity	Bulk density (field moist)	Water content: 1/10 bar	1/3 bar	15 bar
	Cm		Pct								Cm/hr	G/cm	Pct (wt)		
Pineda sand, limestone substratum:															
S82FL-051-010-1	0-8	Ap	0.2	10.3	38.4	47.1	2.0	98.0	1.4	0.6	49.3	1.56	4.5	3.6	0.9
-2	8-20	E	0.0	10.9	39.9	46.9	1.3	99.0	0.6	0.4	66.4	1.58	3.2	2.4	0.4
-3	20-38	Bw1	0.3	11.2	35.8	48.0	3.0	98.3	1.1	0.6	56.5	1.52	3.3	1.6	0.2
-4	38-84	Bw2	0.3	11.7	34.8	48.2	3.1	98.1	1.5	0.4	45.3	1.61	2.6	1.9	0.3
-5	84-132	Bt	0.4	4.0	27.4	42.8	1.8	76.4	2.5	21.1	0.2	1.69	17.9	16.9	8.5
-6	132-160	Btg	0.2	2.0	20.2	54.8	2.6	79.8	2.4	17.8	0.4	1.61	21.4	20.2	10.0
-7	160-203	R	---	---	---	---	---	---	---	---	---	---	---	---	---
Plantation muck:															
S83FL-051-019-1	0-23	Oap	---	---	---	---	---	---	---	---	57.2	0.37	148.8	128.6	44.4
-2	23-48	A/E	0.0	2.1	19.1	72.9	4.3	98.4	0.0	1.6	30.2	1.35	14.2	10.5	2.2
-3	48-84	Bw	0.1	2.8	21.1	71.0	3.5	98.5	0.0	1.5	41.4	1.60	5.5	3.0	0.2
Riviera fine sand:															
S80FL-051-005-1	0-5	A	0.0	2.9	21.9	60.0	8.3	93.1	2.3	4.6	36.8	1.36	9.4	6.8	2.3
-2	5-18	Eg1	0.0	4.0	25.2	61.9	6.3	97.4	0.7	1.9	21.3	1.53	5.5	3.7	1.1
-3	18-51	Eg2	0.0	4.1	25.8	62.4	5.9	98.2	1.2	0.6	23.3	1.61	3.9	2.4	0.6
-4	51-58	B/E	0.1	5.2	25.2	57.1	5.6	93.2	3.6	3.2	2.1	1.71	8.7	4.8	1.1
-5	58-89	Btg1	0.1	3.5	20.3	54.2	4.5	82.6	2.0	15.4	0.0	1.74	17.8	15.7	7.0
-6	89-122	Btg2	0.0	2.2	17.6	50.2	4.3	74.3	8.7	17.0	0.1	1.62	22.2	19.4	10.5

TABLE 18.--CHEMICAL ANAYLSES OF SELECTED SOILS

[See the section "Soil Series and Their Morphology" for location of pedons sampled. Not all of the samples are from the type location of the series. Dashes indicate that data are not available]

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						H_2O (1:1)	$CaCl_2$ 0.1m (1:2)	KCl in (1:1)	C	Fe	Al	Al	Fe
	Cm		---Milliequivalents/100 grams of soil---							Pct	Pct	Mmhos /cm				Pct	Pct	Pct	Pct	Pct
Chobee fine sandy loam:																				
S82FL-051-012-1	0-23	A	20.75	6.17	0.24	0.06	27.22	8.02	35.24	77	2.60	0.14	7.7	7.0	6.8	---	---	---	---	---
-2	23-33	ABg	15.75	6.17	0.21	0.04	22.17	7.03	29.20	76	0.32	0.13	7.9	7.0	6.5	---	---	---	---	---
-3	33-71	Btkg1	27.75	9.05	0.26	0.07	37.13	6.14	43.27	86	0.18	0.26	8.2	7.5	7.3	---	---	---	0.05	0.02
-4	71-99	Btkg2	25.75	10.70	0.27	0.10	36.82	6.70	43.52	85	0.07	0.27	8.3	7.4	7.4	---	---	---	0.13	0.03
-5	99-173	Btkg3	20.25	11.11	0.25	0.12	31.73	6.41	38.14	83	0.04	0.25	8.3	7.5	7.4	---	---	---	0.38	0.04
-6	173-203	C	15.00	7.41	0.18	0.10	22.69	5.76	28.45	80	0.03	0.19	8.4	7.4	7.3	---	---	---	---	---
Margate fine sand:																				
S83FL-051-018-1	0-18	Ap	12.69	1.11	0.11	0.27	14.18	27.08	41.26	34	7.10	0.07	5.1	4.6	4.6	---	---	---	---	---
-2	18-36	E1	1.92	0.07	0.03	0.02	2.04	6.12	8.16	25	0.77	0.04	5.6	4.9	5.2	---	---	---	---	---
-3	36-68	E2	0.47	0.02	0.02	0.02	0.53	4.84	5.37	10	0.16	0.02	5.9	5.3	5.5	---	---	---	---	---
-4	68-76	Bw	0.95	0.03	0.04	0.03	1.05	4.84	5.89	18	0.11	0.04	6.2	6.3	6.1	---	---	---	---	---
-5	76-84	Cr	13.31	0.25	0.10	0.22	13.88	6.21	20.09	69	0.37	0.06	7.1	6.9	6.7	---	---	---	---	---
Oldsmar sand:																				
S80FL-051-002-1	0-18	Ap	1.42	0.40	0.03	0.03	1.88	2.98	4.86	39	0.83	0.02	5.3	4.2	4.3	---	---	---	---	---
-2	18-41	E1	0.45	0.04	0.01	0.00	0.50	0.66	1.16	43	0.22	0.02	5.3	4.1	4.2	---	---	---	---	---
-3	41-96	E2	0.10	0.02	0.01	0.01	0.14	0.26	0.40	35	0.06	0.01	5.3	4.5	4.4	0.94	0.01	0.15	0.03	0.12
-4	96-109	Bh1	0.40	0.05	0.03	0.01	0.49	13.09	13.58	4	1.28	0.03	4.9	4.0	3.9	0.85	0.01	0.16	0.03	0.17
-5	109-130	Bh2	0.22	0.07	0.03	0.01	0.33	12.96	13.29	2	1.04	0.02	5.0	4.0	4.0	---	---	---	---	---
-6	130-150	BE	0.10	0.03	0.03	0.01	0.17	3.04	3.21	5	0.24	0.02	5.1	4.3	4.3	---	---	---	---	---
-7	150-178	E'	0.06	0.03	0.01	0.00	0.10	0.79	0.89	11	0.09	0.02	6.3	4.4	4.4	---	---	---	---	---
-8	178-203	Btg	19.00	0.62	0.06	0.19	19.87	5.26	25.13	79	0.34	0.27	6.6	6.3	6.4	---	---	---	0.16	0.03
Oldsmar sand, limestone substratum:																				
S83FL-051-017-1	0-13	A	1.29	0.60	0.06	0.02	1.97	23.70	25.67	8	3.51	0.06	4.1	3.1	2.8	---	---	---	---	---
-2	13-30	E1	0.14	0.08	0.04	0.01	0.27	2.02	2.29	12	0.57	0.03	4.2	3.5	3.3	---	---	---	---	---
-3	30-96	E2	0.04	0.02	0.01	0.01	0.08	0.70	0.78	10	0.16	0.01	4.8	4.0	3.8	---	---	---	---	---
-4	96-107	BE	0.34	0.04	0.02	0.00	0.40	1.63	2.03	20	0.26	0.01	4.7	3.8	3.7	---	---	---	---	---
-5	107-127	Bh1	5.52	0.29	0.06	0.00	5.87	9.23	15.10	39	1.77	0.05	4.9	4.5	4.5	1.11	0.05	0.08	0.11	0.03
-6	127-160	Bh2	3.15	0.16	0.06	0.00	3.37	4.03	7.40	46	0.73	0.06	5.3	5.0	5.1	0.54	0.04	0.08	0.11	0.02
-7	160-185	Bt	9.81	0.88	0.19	0.03	10.91	6.17	17.08	64	0.78	0.06	5.3	4.9	4.7	---	---	---	0.20	0.04

TABLE 18.--CHEMICAL ANAYLSES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Extractable bases: Ca	Extractable bases: Mg	Extractable bases: Na	Extractable bases: K	Extractable bases: Sum	Extractable acidity	Sum of cations	Base saturation	Organic carbon	Electrical conductivity	pH: H_2O (1:1)	pH: $CaCl_2$ 0.1m (1:2)	pH: KCl in (1:1)	Pyrophosphate extractable: C	Pyrophosphate extractable: Fe	Pyrophosphate extractable: Al	Citrate-dithionite extractable: Al	Citrate-dithionite extractable: Fe
	Cm		---Milliequivalents/100 grams of soil---							Pct	Pct	Mmhos /cm				Pct	Pct	Pct	Pct	Pct
Pineda fine sand, limestone substratum:																				
S80FL-051-004-1	0-13	Ap	1.15	0.19	0.03	0.02	1.39	2.06	3.45	40	0.70	0.03	7.0	5.3	5.5	---	---	---	---	---
-2	13-28	E	0.22	0.08	0.02	0.01	0.33	0.59	0.92	36	0.07	0.02	7.1	5.3	4.7	---	---	---	---	---
-3	28-53	Bw	0.19	0.03	0.02	0.00	0.24	0.66	0.90	27	0.07	0.01	6.9	5.0	4.5	0.00	0.03	0.00	---	---
-4	53-64	E'	0.12	0.02	0.01	0.00	0.15	0.73	0.88	17	0.02	0.01	6.8	5.0	4.4	---	---	---	---	---
-5	64-94	Bt	10.00	0.97	0.02	0.14	11.13	3.09	14.22	78	0.17	0.04	6.7	6.1	5.8	---	---	---	0.43	0.05
-6	94-130	Btg1	11.25	1.03	0.04	0.15	12.47	3.45	15.92	78	0.20	0.08	7.0	6.6	6.1	---	---	---	0.13	0.03
-7	130-150	Btg2	23.00	1.73	0.06	0.22	25.01	4.80	29.81	84	0.21	0.19	7.1	6.7	6.4	---	---	---	0.13	0.03
Pineda sand, limestone substratum:																				
S82FL-051-010-1	0-8	Ap	2.10	0.23	0.05	0.04	2.42	1.74	4.16	58	0.81	0.14	5.8	5.3	5.3	---	---	---	---	---
-2	8-20	E	0.70	0.05	0.02	0.01	0.78	0.90	1.68	46	0.25	0.06	6.0	5.3	5.3	---	---	---	---	---
-3	20-38	Bw1	0.15	0.02	0.01	0.00	0.18	0.21	0.39	46	0.02	0.04	6.4	6.1	6.0	0.32	0.01	0.00	0.36	0.01
-4	38-84	Bw2	0.17	0.02	0.01	0.00	0.20	0.27	0.47	43	0.03	0.03	6.6	6.3	6.3	0.21	0.00	0.00	0.05	0.01
-5	84-132	Bt	8.00	1.15	0.13	0.11	9.39	3.25	12.64	74	0.17	0.16	7.0	6.4	6.1	---	---	---	1.10	0.10
-6	132-160	Btg	13.00	2.39	0.16	0.15	15.70	3.12	18.82	83	0.08	0.26	7.8	7.1	6.7	---	---	---	0.19	0.03
-7	160-203	R	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Plantation muck:																				
S83FL-051-019-1	0-23	Oap	8.87	9.67	1.08	0.96	20.58	38.57	59.15	35	33.54	0.09	5.8	5.6	5.5	---	---	---	---	---
-2	23-48	A/E	7.69	0.64	0.17	0.02	8.52	6.26	14.78	58	1.76	0.07	6.6	6.5	6.6	---	---	---	---	---
-3	48-84	Bw	1.25	0.10	0.08	0.01	1.44	4.53	5.97	24	0.16	0.06	7.4	7.1	7.4	---	---	---	---	---
Riviera fine sand:																				
S80FL-051-005-1	0-5	A	5.50	0.58	0.04	0.11	6.23	3.41	9.64	65	1.43	0.07	7.2	5.9	6.1	---	---	---	---	---
-2	5-18	Eg1	0.72	0.07	0.02	0.02	0.83	0.83	1.66	50	0.25	0.02	6.9	5.6	5.5	---	---	---	---	---
-3	18-51	Eg2	0.25	0.03	0.02	0.00	0.30	0.20	0.50	60	0.05	0.03	6.9	5.6	5.3	---	---	---	---	---
-4	51-58	B/E	1.10	0.12	0.01	0.01	1.24	0.71	1.95	64	0.08	0.01	6.9	5.6	5.3	0.00	0.00	0.00	0.30	0.04
-5	58-89	Btg1	5.75	0.62	0.04	0.04	6.45	2.89	9.34	69	0.14	0.02	6.8	5.8	5.3	---	---	---	1.89	0.17
-6	89-122	Btg2	10.00	0.68	0.05	0.08	10.81	3.72	14.53	74	0.15	0.15	6.6	6.0	5.5	---	---	---	0.58	0.06

TABLE 19.--CLAY MINERALOGY OF SELECTED SOILS

Soil name and sample number	Depth	Horizon	Clay minerals: Montmo-rillonite	Clay minerals: 14-angstrom intergrade	Clay minerals: Kaolinite	Clay minerals: Quartz
	Cm		Pct	Pct	Pct	Pct
Chobee fine sandy loam:						
S82FL-051-012-1	0-23	A	97	0	1	2
-3	33-71	Btkgl	97	0	1	2
-6	173-203	C	96	0	1	3
Margate fine sand:						
S83FL-051-018-1	0-18	Ap	24	27	17	32
-4	68-76	Bw	26	31	28	15
-5	76-84	Cr	25	30	35	10
Oldsmar sand:						
S80FL-051-002-1	0-18	Ap	40	0	7	53
-4	96-109	Bhl	9	8	8	75
-7	150-178	E'	11	35	34	20
-8	178-203	Btg	96	0	2	2
Oldsmar sand, limestone substratum:						
S83FL-051-017-1	0-13	A	30	0	8	62
-5	107-127	Bhl	12	27	19	42
-7	160-185	Bt	18	19	54	9
Pineda fine sand:						
S80FL-051-004-1	0-13	Ap	70	10	9	11
-3	28-53	Bw	72	14	0	14
-5	64-94	Bt	59	24	11	6
-7	130-150	Btg2	64	16	14	6
Pineda sand, limestone substratum:						
S82FL-051-010-1	0-8	Ap*	62	0	8	27
-3	20-38	Bw1**	14	0	0	14
-4	38-84	Bw2	12	9	3	76
-5	84-132	Bt	28	23	41	8
Plantation muck:						
S83FL-051-019-2	23-48	A/E	50	26	12	12
-3	48-84	Bw	55	22	14	9
Riviera fine sand						
S80FL-051-005-1	0-5	A	61	14	16	9
-5	58-89	Btgl	46	22	32	0

* 3 percent feldspar
** 72 percent goethite

TABLE 20.--ENGINEERING INDEX TEST DATA

[Tests performed by the Florida Department of Transportation (FDOT) in cooperation with the U.S. Bureau of Public Roads, in accordance with standard procedures of the American Association of State Highway and Transportation Officials (AASHTO). See the section "Soil Series and Their Morphology" for location of pedon sampled. Not all of the samples are from the type location of the series. NP means nonplastic]

Soil name, report number, horizon, and depth in inches	FDOT report number	Classification		Mechanical analysis								Liquid limit	Plasticity index	Moisture density	
				Percentage passing sieve--				Percentage smaller than--						Maximum dry density	Optimum moisture
		AASHTO	Unified	No. 4	No. 10	No. 40	No. 200	.05 mm	.02 mm	.005 mm	.002 mm				
												Pct		Lb/ft^3	Pct
Chobee fine sandy loam, depressional:															
(S82FL-051-012)															
Btkg3 --------- 39-68	24	A-2-6(0)	SC	100	91	83	25	23	20	19	18	32	13	---	---
Oldsmar sand:															
(S80FL-051-002)															
E2 ----------- 16-38	3	A-3 (1)	SP	100	100	91	2	1	0	0	0	---	NP	115.5	14.5
Bh1 ----------- 38-43	4	A-3 (1)	SP-SM	100	100	90	8	3	0	0	0	---	NP	119.1	14.0
Btg ----------- 70-80	5	A-2-6(1)	SC	100	100	96	25	20	17	14	13	28	15	111.0	14.9
Oldsmar sand, limestone substratum:															
(S83FL-051-017)															
Bt ----------- 63-73	32	A-2-6(0)	SC	100	100	89	25	14	12	12	12	26	13	113.0	13.9
Pineda sand, limestone substratum:															
(S82FL-051-010)															
Bw2 ----------- 15-33	20	A-3(1)	SP	100	100	80	3	2	2	1	1	---	NP	103.5	14.2
Bt ----------- 33-52	21	A-2-4(2)	SC	100	100	91	23	22	21	20	19	30	10	---	---
Pineda fine sand, limestone substratum:															
(S80FL-051-004)															
Bw ----------- 11-21	8	A-3(1)	SP-SM	100	100	94	5	4	2	2	2	---	NP	105.9	13.3
Bt ----------- 25-37	9	A-2-4(2)	SC	100	100	97	21	19	18	16	16	25	9	111.7	14.7
Plantation muck:															
(S83FL-051-019)															
A/E ----------- 9-19	33	A-3(1)	SP	100	100	95	4	4	4	3	2	---	NP	113.0	14.5
Riviera fine sand:															
(S80FL-051-005)															
E2 ----------- 7-20	10	A-3(1)	SP	100	100	94	4	2	0	0	0	---	NP	103.1	14.1
Btg1 ---------- 23-35	11	A-2-4(2)	SM, SM-SC	100	100	95	17	15	12	12	12	20	4	116.5	13.3

TABLE 21.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Adamsville	Hyperthermic, uncoated Aquic Quartzipsamments
Adamsville variant	Hyperthermic, uncoated Aquic Quartzipsamments
Basinger	Siliceous, hyperthermic Spodic Psammaquents
Boca	Loamy, siliceous, hyperthermic Arenic Ochraqualfs
*Chobee	Fine-loamy, siliceous, hyperthermic Typic Argiaquolls
Dania	Euic, hyperthermic, shallow Lithic Medisaprists
Delray	Loamy, siliceous, hyperthermic Grossarenic Argiaquolls
Denaud	Coarse-loamy, siliceous, hyperthermic Histic Humaquepts
Gator	Loamy, siliceous, euic, hyperthermic Terric Medisaprists
Gentry	Loamy, siliceous, hyperthermic Arenic Argiaquolls
Hallandale	Siliceous, hyperthermic Lithic Psammaquents
Holopaw	Loamy, siliceous, hyperthermic Grossarenic Ochraqualfs
Immokalee	Sandy, siliceous, hyperthermic Arenic Haplaquods
Jupiter	Sandy, siliceous, hyperthermic Lithic Haplaquolls
Lauderhill	Euic, hyperthermic Lithic Medisaprists
Malabar	Loamy, siliceous, hyperthermic Grossarenic Ochraqualfs
Margate	Siliceous, hyperthermic Mollic Psammaquents
Myakka	Sandy, siliceous, hyperthermic Aeric Haplaquods
Ochopee	Coarse-loamy, mixed (calcareous), hyperthermic Lithic Haplaquepts
Okeelanta	Sandy or sandy-skeletal, siliceous, euic, hyperthermic Terric Medisaprists
Oldsmar	Sandy, siliceous, hyperthermic Alfic Arenic Haplaquods
Pahokee	Euic, hyperthermic Lithic Medisaprists
**Pineda	Loamy, siliceous, hyperthermic Arenic Glossaqualfs
Plantation	Sandy, siliceous, hyperthermic Histic Humaquepts
Pomello	Sandy, siliceous, hyperthermic Arenic Haplohumods
Pompano	Siliceous, hyperthermic Typic Psammaquents
Riviera	Loamy, siliceous, hyperthermic Arenic Glossaqualfs
Terra Ceia	Euic, hyperthermic Typic Medisaprists
*Tuscawilla	Fine-loamy, carbonatic, hyperthermic Typic Ochraqualfs
Valkaria	Siliceous, hyperthermic Spodic Psammaquents
Wabasso	Sandy, siliceous, hyperthermic Alfic Haplaquods
Winder	Fine-loamy, siliceous, hyperthermic Typic Glossaqualfs

* 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 characteristics.

** The Pineda soil in map unit 2 is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of characteristics.

U.S. GOVERNMENT PRINTING OFFICE: 1991-281-140/20004

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